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System 85 R2

Version 3
Maintenance Service Manual

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INTRODUCTION

PURPOSE

This service manual describes maintenance of the System 85 R2, Version 3 switch and switch related components. It is intended for use primarily by personnel trained in the maintenance of digital switching equipment. It may be used by others having a working knowledge of digital switching equipment while under the control and direction of a remote maintenance facility such as Remote Maintenance, Administration, and Traffic System (RMATS II).

The service manual is intended for use by maintenance personnel using the Maintenance and Administration Panel (MAAP). The manual as well as the switch maintenance process is keyed to the use of the MAAP connected to the switch.

Issue 2 replaces all previous issues of this document. Reasons for reissue include an update of the MAAP flipcharts from Issue 3 to Issue 6 and addition of the following items:

- Improvement of the repair guide sections for **PROC 601, PROC 611, PROC 620, PROC 646**, and **PROC 652**.
- Modification of flipchart and text for **PROC 618**.
- Additional testing techniques for DS-1 in **PROC 620**.
- Modification of flipchart and text for **PROC 625**.
- Modification of **PROC 652**.
- Inclusion of Test 5 for **PROC 961**.
- Inclusion of Test 3 for **PROC 962**.

HOW TO USE THIS MANUAL

It is recommended that you become familiar with the contents and organization of this manual. Read the sections entitled SWITCH MAINTENANCE OVERVIEW and HUMAN INTERFACES to become familiar with the maintenance processes, aids, and types of troubles you may encounter.

Read the section entitled TROUBLE CLEARING to become familiar with the trouble locating process and the methods for isolating a failure.

The detailed information on the maintenance procedure (PROC) flipcharts is arranged in numerical sequence with the procedure identified at the top of the page.

Observe the switch alarm panel to identify the lighted indicator. Some indicators on the alarm panel are marked to associate the fault indicator with a particular PROC. **Always** start with PROC 600 (alarm causes/error log) to determine the maintenance procedure used to isolate that failure, then go to the referenced procedure for detailed information.

The failure identification and clearing process is progressive. Unless you are certain of the failure cause, always start with Test 1 (when applicable) and progress through all tests of the referenced procedure given for that failure.

If you are providing on site support for a remote maintenance facility, use the Index to locate the instruction for performing the action or replacing the component identified by the remote facility.

ORGANIZATION

This service manual is divided into the following sections:

1. **Switch Maintenance Overview** - provides an overview of the error logging software and stored maintenance programs. Faults, errors, and failures are defined in their relationship to the maintenance process.
2. **Human Interfaces** - describes the functions of the switch alarm panel and the MAAP. Use of switch microdiagnostic testing capabilities, LEDs on circuit packs, tools and test equipment, and preventive maintenance are also covered.
3. **Trouble Clearing** - describes the recommended method of handling alarmed, user reported, and no response from the switch trouble conditions.
4. **Maintenance Procedures** - contains the detailed instructions for using the maintenance procedures for failure analysis and trouble clearing.
5. **Switch Component Replacement** - provides description of the switch cabinets and carriers and contains instructions for checking option settings and replacing circuit packs and components.
6. **SMDR Component Replacement** - provides instructions for replacing circuit packs and components. Adjustments required as a result of circuit pack replacement are also provided.
7. **Auxiliary Cabinet Component Replacement** - provides a description of the auxiliary cabinet and contains instructions on replacing auxiliary cabinet components.
8. **Maintenance and Administration Panel (MAAP)** - provides a description of the MAAP and how to use it. Port contention between facilities utilizing the maintenance mode is also covered.

Common procedures (opening cabinet doors, removing rear covers, etc.) are assumed and not illustrated or covered in the component replacement procedures.

This issue of the maintenance service manual is compatible with MAAP flipcharts comcode 845303114, Issues 1 through 6. The flipchart illustrations in this manual are not drawn to scale and should not be reproduced for use as replacements on your MAAP.

SWITCH MAINTENANCE OVERVIEW

GENERAL

Switch maintenance uses built-in maintenance capabilities, error logging software programs, and stored diagnostic maintenance procedures.

The self-diagnostic ability and the various fault handling capabilities programmed into switch software are used as the basis for the analysis and trouble clearing processes presented.

Maintenance objectives are the fault detection, isolation, and repair of defective equipment.

Major alarms are faults affecting more than (or equal to) 64 time slots and minor alarms are faults affecting less than 64 time slots.

Faults, errors, and failures are detected and identified when they occur.

a. A fault is a physical defect of the switch hardware that causes improper circuit operation. Some faults are intermittent because they have no predictable or regular frequency of occurrence. Others are considered solid. Possible causes of intermittent faults are noise, deterioration, and critical timing.

b. An error is a single occurrence of an incorrect event or response and can be either hardware or software in nature. An error is the result of a fault, noise, a software bug, or an irregularity.

c. A failure is when the number of detected errors exceeds a predetermined threshold. The signal that this threshold is exceeded is an alarm(s). The level of alarm shows the effect of the failure on the quality of service.

Tests are used for both detection and diagnosis. A test is a sequence of stimuli applied to a circuit, a group of circuits, or a software function, with the expected output or results.

A detection test determines the existence of a fault or an abnormal software condition; i.e., it indicates whether or not the circuit(s) or function(s) appears to operate correctly.

A diagnostic test analyzes the nature of detected errors and isolates the source of each. There are two subsets of diagnostic tests: identification and analytical.

a. Identification tests provide information for the error log when an error is detected: e.g., circuit identity and error code.

b. Analytical tests perform higher level analysis of recorded errors: e.g., patterning, manually initiated testing, and repair analysis.

ERROR DETECTION

Error detection routines determine whether or not specific circuits or system functions are operating correctly. Detection of errors can occur during an integrity check, an operational check and/or a demand test.

a. **Integrity Check:** A test which is scheduled to be executed on either a periodic or time-available basis in order to verify the integrity of the system.

b. **Operational Check:** A check which is performed when the switch carries out one of its assigned operations. The check can be done by hardware (e.g., a parity check) or by software (e.g., verification of data consistency by the call processing routines).

c. **Demand Test:** A test which is executed upon demand via a maintenance procedure. Demand tests include the set of tests that are used for integrity checks.

Once an error is detected, a diagnostic routine may be used to analyze the nature of the error and to determine its source. The error is then recorded in the error log, and if necessary appropriate recovery action is initiated.

Detection tests check the integrity of the switch's hardware components and some of the software functions on an on-going basis. These tests are scheduled either as periodic or time-available tasks and are designed to detect both hardware and software errors.

The integrity of selected portions of the switch can be verified by running corresponding demand tests. Integrity checks, as well as operational checks, record errors in the Periodic Maintenance Information Data Structure (PMIDS) while demand tests record errors in the Demand Maintenance Information Data Structure (DMIDS).

Operational checks are made to detect abnormal conditions and/or correct results that might arise during switch operation. Detection of these errors is provided by special hardware and software.

a. For hardware detectable errors, circuitry on the circuit packs is used to find faults such as parity or data errors. Most of the errors cause a bit to be set in a special error register that is polled every second by the network (TMS and/or module) processor.

b. A 1-second periodic task in the common control processor requests the error information from the network (TMS and/or module) processor and takes appropriate action. Other faults cause an interrupt to be sent to the module processor for immediate processing.

ERROR LOGGING

Overview

To allow for automatic detection of defective circuits, and to provide information that might be required in the analysis and repair of switch problems, especially intermittent ones, each occurrence of a detected circuit malfunction is recorded in the switch error log. This error log is maintained in a portion of the common control memory called PMIDS.

When a periodic test detects an error in the operation of a circuit or functional area, an entry describing the presence and nature of the detected malfunction is made in PMIDS to record that fact. Data stored in PMIDS is used by the alarm thresholding algorithms to flag switch failures.

Periodic Maintenance Information Data Structure (PMIDS)

PMIDS is composed of a set of eight tables, containing a particular type of information about an error entry. The eight tables collectively characterize the malfunction of a particular circuit or function. The eight tables for each function or circuit type are as follows.

a. Circuit identification.

b. Error rate and duration.

c. Time count.

d. Fault signature and alarm information.

e. Beginning time stamp.

f. Alarm time stamp.

g. Ending/resolved time stamp.

h. Error count.

Entries in PMIDS are categorized as new, active, inactive, alarmed, or resolved.

a. New entries are those where no entry for the circuit exists in PMIDS.

b. Active entries are those where errors are recently detected.

c. Inactive entries are those where the time since the most recent error exceeds 20 minutes.

d. Alarmed entries are those where a circuit failure is detected and an alarm sent.

e. Resolved entries are those that represent circuits that were alarmed but are repaired or the alarm manually turned off.

In a system with duplicated common control processors, there are two distinct PMIDS. This allows detection and identification of processor dependent problems. Most periodic tasks which update PMIDS do not run on the off-line processor. However, the addition of time stamps to PMIDS permanently establishes the time of errors, even in the off-line processor.

A facility is provided to allow the manual clearing of entries from the error log. It is possible to selectively clear the entire PMIDS, all entries for a particular circuit type, or an entry for a specific circuit. This capability is provided through two maintenance procedures.

PROC 600 (Alarm Causes/Error Log) allows individual entries or all entries for a particular unit type to be cleared (zeroed), and **PROC 612** (Initialization Causes) allows the clearing (zeroing) of all failure history (entries) in PMIDS.

The ability to manually clear (zero) entries in PMIDS is provided as a maintenance aid.

a. This aid is not intended to be used in the normal course of performing switch maintenance as it destroys all failure history for the entries which are cleared (zeroed).

b. The capability is provided when it is desirable to start with a clean failure history after correcting major problems that caused many alarms and at other times (i.e., installation).

The preferred method for clearing alarms is to **resolve** them using the appropriate maintenance procedure and its associated verification test after performing any necessary repairs.

Manual capabilities for clearing (zeroing) PMIDS entries are not provided in any of the other maintenance procedures.

Resolving of alarms can be accomplished in two ways.

a. The preferred and normal method for clearing alarm causes is to resolve them by using the appropriate maintenance procedure, performing isolation of failures, making necessary repairs, and performing the associated verification test to ensure that the failure is corrected.

b. A manual capability of turning off alarms and resolving the alarm causes is available by using the **CLEAR DATA; EXECUTE** sequence in most maintenance procedures.

Both of the above methods have the same result, they turn off the alarm indicator and update the alarmed entry in PMIDS as resolved. As can be determined by analyzing the above two methods, the alarm is resolved as far as the error log is concerned, but the cause of the alarm has not been determined nor repaired using the manual capability (i.e., **CLEAR DATA; EXECUTE** sequence). In addition, the alarm returns in a matter of minutes unless the cause of the alarm is eliminated.

Demand Maintenance Information Data Structure (DMIDS)

DMIDS is used when demand tests are active. DMIDS records detailed information (in a temporary buffer) concerning the nature of errors when associated maintenance procedures are performed.

Demand tests do not update or in any way alter the contents of PMIDS except for resolving alarmed entries for circuits that pass the demand test.

The information recorded by DMIDS for failing circuits may consist of a unit type, circuit identification, and specific fault code.

The specific fault code contains information that uniquely identifies the point in the decision algorithm at which the diagnosis was completed (diagnosis stopped because of a failure).

ALARM PLAN

The alarm plan is the strategy for notifying the user that a circuit or functional block of the switch is malfunctioning. When the information in PMIDS indicates that a malfunction occurred, this is considered a **failure** and an alarm is raised to serve notice of this condition.

An alarm may be indicated in several ways. It may be a lighted alarm or fault indicator on the alarm panel, a lighted alarm indicator on the attendant console, an immediate automatic call to a remote maintenance facility (if applicable), an affirmative response to a maintenance poll from the user or a remote maintenance facility, or any combination of these.

Alarms are generated for failures detected by operational error processing, periodic tests, time available tests, and/or call processing. Failures detected during maintenance procedure diagnostic testing are not alarmed.

There are two alarm thresholds which may be exceeded. The first, which is intended to flag hard failures, is at least one error detected in each of 3 consecutive minutes. The second, which is aimed at detecting intermittent failures, is achieved when the error rate (peg count) exceeds a set number (typically five errors in 2 hours).

The threshold value is defined in a table by the switch software for each circuit type or functional area. These values may be altered by issuing a patch to the switch tape. In addition, **PROC 275**, Word 4 allows the user to determine if unit type 30 (even port peripherals), unit type 41 (trunk, software), and unit type 45 (auxiliary trunk) are to be alarmed or not alarmed.

In those situations where duplicated circuitry exists, a malfunctioning circuit may need to be alarmed (for a switch of equipment) much more quickly than the normal thresholding algorithms allow. In such cases the normal alarming mechanism may be bypassed and an immediate failure declared.

The routing of alarm indicators is a function of the alarm level. The routing for each alarm level is:

a. Major or minor alarm - Turns on indicator lights at the attendant's console and the alarm panel, and automatically makes a call to a remote maintenance facility (if applicable) to report the failure.

b. Warning alarm - Turns on an indicator light on the alarm panel only and waits for the user or a remote maintenance facility (if applicable) to poll the switch before reporting the failure.

HUMAN INTERFACES

PRECAUTIONS

When performing maintenance or translation procedures on System 85 switch equipment, certain precautions must be observed by user personnel.

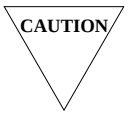
Cautions, warnings, and danger statements contained within the service manual **must** be observed to prevent loss of service, possible equipment damage, and possibility of personnel injury.

In addition, the following precautions regarding electromagnetic interference and static electricity **must** be observed.

a. **Electromagnetic Interference:** This equipment generates, uses, and can radiate radio frequency energy. Electromagnetic fields radiating from the switch may cause noise to be introduced into the customer's equipment. If the equipment is not installed and used in accordance with the instruction manual, interference to radio communications may be caused.

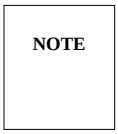
To maintain the Electromagnetic Interference (EMI) integrity of the System 85 switch, maintenance personnel (after performing any translation or maintenance activities) must ensure that all cabinet panels, covers, etc. are firmly secured in place prior to leaving the customer's premises.

b. **Static Electricity:** To prevent or reduce electrostatic discharge, maintenance personnel **must** always attach wrist grounding straps before working on switch components or handling circuit packs.



Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICs).

The electromagnetic compatibility (EMC) wrist strap and cable assembly (cc900698226) is placed in the bottom of the module control cabinet in a poly bag (cc900492372) next to the AC distribution unit.



This wrist strap is to be used whenever troubleshooting or performing maintenance or handling any circuit packs associated with the System 85 switch.

The EMC wrist strap assembly is used in the following manner:

a. Attach the wrist strap to either wrist.

b. Connect the alligator clip to the cabinet frame.

A good ground connection for the alligator clip is:

a. In equipment-coded cabinets that have removable sides, attach the alligator clip to any convenient screw head that fasten the hinges to the cabinet or to the screws that fasten the door latch to the frame.

b. In equipment-coded cabinets that have integrated sides, the alligator clip may be attached to any of the front and rear cabinet formed faces (front door area or back area when viewed in an open position) that are coated with a conductive paint.

c. In either case, an area close to the vertical center of the cabinet should be selected for the alligator clip, allowing a more central position from which to operate.

MAINTENANCE AND ADMINISTRATION PANEL (MAAP)

The **MAAP**, (Figure 1), is the primary interface used by maintenance personnel at the customer's premises to perform maintenance tasks. The stored maintenance programs are represented on the **MAAP** by a series of flipcharts.

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Figure 3-1. MAAP

The **MAAP** provides access to maintenance procedures to perform interrogation, testing, and fault isolation.

Blockage (port contention) on use of the **MAAP** may occur if another facility (user) has the maintenance mode bit set in the **MODE** status display procedure. The maintenance mode bit (and other modes as required) has to be set prior to using the **MAAP** in either the on-line or off-line side (as appropriate) to perform maintenance tasks.

When the switch is duplicated, it may be necessary to examine both the on-line and off-line side to determine the maintenance procedure to be performed. The problem that exists could have caused a switch to the healthier common control. When the problem is corrected, both the on-line and off-line sides should be examined to determine if potential problems exist.

For further information on a description of the **MAAP**, port contention (blockage), and how to use the **MAAP**, read the section entitled MAINTENANCE AND ADMINISTRATION PANEL (MAAP).

ALARM PANEL

The alarm panel (Figures 2 and 3) is located at the top of the common control cabinet.

The alarm panel provides an indication of the seriousness of system problems by displaying the alarm level (major, minor, or warning) of any active alarm. A general indication of the hardware (processor/memory, environment, network, etc.) area that caused the alarm is also displayed.

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Figure 3-2. Unduplicated Common Control Alarm Panel

The system's state of health is provided through the use of alarm and equipment failure indicators. Equipment failure indicators are grouped functionally by their potential importance to system operation and call processing integrity.

TPA-757956

Figure 3-3. Duplicated Common Control Alarm Panel

The alarm panel permits effective use of the maintenance fault isolation and repair procedures. Some indicators on the alarm panel are associated with a number in parentheses adjacent to the indicators. This number designates a **PROC** which may be used to access specific information about system problems, such as the location of faulty equipment or the exact cause of a problem.

Troubleshooting the main processing unit can be done from the alarm panel. Troubleshooting the main processor is accomplished with microdiagnostic tests of the main processor and memory. The results are displayed by **PASS** and **FAIL** indicators on the alarm panel.

In addition to troubleshooting capabilities, the alarm panel provides:

a. Manual control of the emergency transfer capability.

b. Go/halt control of the common control processor.

c. Control over which processor is on-line in a duplicated common control system.

d. Reset of the suicide timer after time-out.

A description of each alarm panel indicator is given in Table A. A description of each alarm panel switch and connector is given in Table B.

MICRODIAGNOSTICS

Overview

Microdiagnostics consist of a series of test programs used by the processor for fault detection and isolation of the main processor and its associated components.

Microdiagnostics are performed because:

a. The switch is down (indicated by **MJ, PROC**, and **FAIL** indicators being lighted).

b. Emergency transfer is indicated on the alarm panel.

c. The generic or X-ray tape can not be loaded.

d. To ensure that the main processor and its associated circuitry is in proper working condition.

e. **PROC 612** (Initialization Causes) indicates the cache is off for recovery (fault code 37) and it is desired to test the cache memory (microdiagnostic test 14).

f. A more complete test of the cache in an off-line common control of a duplicated common control switch is desired (microdiagnostic test 14).

g. **PROC 600** (Alarm Causes/Error Log) indicates diagnostic processor failures (unit type 60) and it is desired to test the diagnostic processor (microdiagnostic test 0).

h. Of unusual circumstances in which hardware or software causes for problems are equally likely.

NOTE

For these cases, successful pass of microdiagnostics indicates that hardware in the common control switch is less likely the cause of these types of problems.

i. When a tape is reloaded and the current memory is not desired.

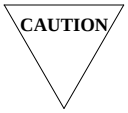
Table 3-1.

ALARM PANEL INDICATORS				
SECTION	INDICATION	COLOR	DEFINITION	ORIGIN
CONTROL	GUARD	red	Warns that processor is halted.	hardware
ALARMS	MAJOR	red	Indicates a major alarm is active.	both
	MINOR	red	Indicates a minor alarm is active.	both
	WARNING	red	Indicates a warning alarm is active.	both
PROCESSOR/ MEMORY	PROC	red	A processor failure has been detected.	hardware
	MEM	red	A memory failure has been detected.	hardware
	DIAG PROC	red	Indicates that the diagnostic processor has failed.	hardware
	CC PWR	red	Indicates that common control power has been interrupted.	hardware
	PASS	green	This LED is used as a system ‘‘heartbeat’’. It also indicates that the processor passed the selected microdiagnostic test.	software
	FAIL	red	Indicates that the processor failed the selected microdiagnostic test or CC suicide.	software
ENVIRON	PWR/TEMP AIR FLOW	red	A power, temperature, or airflow failure has been detected.	software
COMMON CONTROL	TAPE	red	Indicates that tape errors of some kind have been found.	software
	CACHE MEMORY	red	Indicates that cache memory errors have been detected.	software
	I/O CHANNEL	red	Indicates a failure in a CC I/O channel.	software
NETWORK	SWITCH	red	Indicates a failure in a digital network module.	software
	PORT	red	Indicates a failure in a port circuit.	software
	PERIPH EQPT	red	Indicates a network peripheral (e.g., terminal) problem.	software
APPL PROCR	AP INTER	red	Indicates a DCIU or applications processor (adjunct) link failure.	software
	EXT PROC	red	Indicates an external processor problem.	hardware

Table 3-2. (Contd)

ALARM PANEL INDICATORS				
SECTION	INDICATION	COLOR	DEFINITION	ORIGIN
OTHER	OTHER FAILS	red	Indicates some software detected problem not covered by the equipment failure LEDs listed above.	software
	EXT EQPT	red	Indicates a failure outside the system proper which is not detectable by software.	hardware
EMERGENCY TRANSFER	INHIB	yellow	Indicates that an automatic switch to the emergency transfer condition is inhibited.	hardware
	ACT	red	Indicates emergency transfer has been activated.	both
CC ACTIVE	CC0	green	Indicates common control 0 is on-line.	software
	CC1	green	Indicates common control 1 is on-line.	software
LOCK ON LINE	CC0	yellow	Indicates common control 0 has been locked on-line.	hardware
	CC1	yellow	Indicates common control 1 has been locked on-line.	hardware
MAAP	SMT IN USE	red	Indicates System Management Terminal (SMT) is connected to the switch which locks out RMATS or MAAP operation.	hardware
	RMATS DIAG IN USE	red	Indicates Remote Maintenance, Administration and Traffic System (RMATS) is connected to the switch and is executing microdiagnostic test.	hardware

j. After replacing an X-ray tape with a generic tape.



When a tape is reloaded or an X-ray tape is replaced with a generic tape, performing microdiagnostic test 15 does not clear MSTAT memory. False alarms may be service affecting and emergency transfer can occur. Perform all microdiagnostic tests (0 through 15) when reloading a tape or replacing an X-ray tape with a generic tape.

Table 3-3.

ALARM PANEL CONTROLS			
SECTION	CONTROL CONNECTOR	COMPONENT TYPE	REASON FOR USE
CONTROL	GO/HALT	switch	Normally in the GO position for system operation. Halts the common control processor when pressed to HALT position.
	RESET	button	Allows the suicide time in the common control to be reset.
PROCESSOR/ MEMORY	MICRO DIAGNOSTIC TEST SELECT	thumbwheel switch	Allows a microdiagnostic test to be selected for execution.
	ENABLE	switch	Causes the microdiagnostic test selected to be executed.
SYSTEM	EMERGENCY TRANSFER	switch	Allows the emergency transfer capability to be manually activated or inhibited.
	CC LOCK ON LINE	switch	Allows one or the other common control, in a duplicated system, to be locked on-line, which prevents a software switch between common controls.
MAAP	MAAP	connector	This is the connector between the MAAP and a common control processor. In a duplicated system, there is one connector for each common control and one connector for whichever processor is currently on-line.

Sixteen microdiagnostic tests are provided. With the exception of Test 0, each test uses circuits tested by the previous test. The 16 tests are run in numerical order starting with Test 0 and progressing to Test 15.

In testing a particular part of the main processor, each test uses parts outside the area under test. A test may fail and the fault lie outside the part of the main processor under test.

Microdiagnostic tests are described according to increasing interdependencies. Execution of the microdiagnostic tests should follow this same ordering scheme. Microdiagnostic tests invoked from the alarm panel are:

a. Test 0 - Diagnostic processor circuit pack demand test.

b. Test 1 - Maintenance bus demand test.

c. Test 2 - Alarm interface circuit pack demand test.

d. Test 3 - Spare (reserved for future use).

e. Test 4 - Spare (reserved for future use).

f. Test 5 - Spare (reserved for future use).

g. Test 6 - Spare (reserved for future use).

h. Test 7 - 501CC processor circuit packs demand test.

i. Test 8 - System bus and buffered bus demand test.

j. Test 9 - 501CC instruction set demand test.

k. Test 10 - Tape subsystem demand test.

l. Test 11 - Main memory system demand test.

m. Test 12 - Memory protect circuit pack demand test.

n. Test 13 - Spare (reserved for future use).

o. Test 14 - Cache memory circuit pack demand test.

p. Test 15 - An abbreviated test and a forced load.

Microdiagnostics are performed starting with Test 0 and progressing in numerical order to Test 15. If a failure is indicated, corrective action is performed and the test is repeated. If the test passes after corrective action, all tests are repeated starting with Test 0 and progressing through Test 15.

Functional Description

The functions tested by each microdiagnostic test are covered in the following paragraphs.

Test 0 checks the diagnostic processor circuit pack and parts of the remote interface. The diagnostic processor performs self-tests to verify the CRC checksum of the ROM, conducts a memory test of its RAM and data RAM, tests the status register and I/O registers, and performs a preliminary test of the maintenance bus control interface.

Test 1 checks the maintenance bus. The maintenance bus test begins by lighting the **RED** LEDs on all circuit packs in the common control for approximately 3 seconds. The test continues with an inventory of the circuit packs in the common control carrier, writes and reads back the complement of each circuit pack board-select number, tests for stuck-at faults and performs a test of the board select leads.

Test 2 checks the alarm interface circuit pack and the alarm panel. During this test, the alarm panel LEDs may momentarily change. As part of the test, the INIT* lead is set and cleared (causing and canceling the suicide condition). The software controlled alarm register and external alarm register are also tested.

Tests 3 through 6 are spare tests reserved for future use.

NOTE

When Tests 3 through 6 are selected and executed, an immediate **PASS** indication on the alarm panel is provided.

Test 7 checks the 501CC processor circuit packs. The 501CC processor test consists of four Signature Accumulator Chip (SAC) tests, one for each processor circuit pack.

Test 8 checks the ability of the 501CC circuit packs to communicate. Major portions of circuit packs UN153, TN404, and TN491 are tested. Faults are detected on 501CC circuits that affect the ability to communicate over the system and buffered bus.

Test 9 checks the 501CC instruction set. The function of the 501CC instruction set test is to exercise the emulation microcode, verify the correct operation of most of the instruction set, and verify the correct operation of the 501CC at full speed.

Test 10 checks the tape subsystem. The test of the tape subsystem and tape interface (TN430) is performed by a call to the subsystem to perform its own self-tests.

a. Information concerning the success or failure of these self-tests is made available in a status register. The status register bits indicate which part of the tape subsystem is faulty.

b. The **MAAP** displays the value of the status register bits.

Test 11 checks the main memory system. The functions of main memory are tested by performing a main memory test, an Error Correction Circuitry (ECC) test, a memory fabric test, and parity tests.

a. **Main Memory Test:** The main memory test reads the ID chip on each memory circuit pack, translates the code into a memory circuit pack density and decides if ECC is to be tested.

    1. **RED** and **GREEN** LEDs on the memory circuit packs light momentarily as part of the ID chip tests.
    2. If the ID chip contains a code that is not in the testable range, the main memory test fails immediately.
    3. If an empty memory slot between two occupied memory slots exists, the main memory test fails immediately.
    4. The common control carrier must not contain memory circuit packs of different densities, as this also causes the main memory test to fail.

b. **Memory Fabric Test:**

NOTE

The memory fabric test destroys all information in the memory configuration, including the MSTAT data.

    1. The memory fabric test checks many functions on the equipped memory circuit packs in a series (i.e., one function is tested on all circuit packs before testing the next function).
    2. During two of the memory fabric sub-tests, the **GREEN** LED on the memory circuit pack currently being tested is lighted to indicate test progression.

c. **ECC and Parity Tests:**

    1. The test of the error correcting circuitry involves testing the RAM used to store the six check bits.
    2. The **GREEN** LED on the memory circuit pack currently being tested is lighted to indicate test progression.

Test 12 checks the memory protect circuit pack. The memory protect circuit pack (TN368) contains the system write-protect circuit, the system fetch-protect circuit, the system bus mastership-arbitration circuit, the I/O SANITY1 timer, and the power-on and clear flip-flops.

Test 13 is a spare test reserved for future use.

NOTE

When Test 13 is selected and executed, an immediate **PASS** indication on the alarm panel is provided.

Test 14 checks the cache memory circuit pack (TN369) and the bus interface circuit pack (UN153) to the cache memory.

Test 15 performs an abbreviated test and a forced load. When the abbreviated test and forced load sequence is selected, the system is cycled through a number of tests before the load is attempted. Test 15 does **not** clear MSTAT memory.

a. The diagnostic processor circuit pack requests the 501CC to perform the SAC tests (microdiagnostic test 7). Each of the four SAC tests is executed and the results verified.

b. The system bus and buffered bus tests (microdiagnostic test 8) are performed interactively between the 501CC and the diagnostic processor circuit pack.

c. The 501CC instruction set test (microdiagnostic test 9) may be performed.

d. If any of these tests fail, the load from tape is aborted and the diagnostic processor circuit pack forces **suicide**.

e. The forced load is now executed.

NOTE

The forced load procedure does not interrogate main memory before it makes a decision whether or not to load from tape. It assumes main memory is corrupted and initiates a load from tape.

CIRCUIT PACK LEDS

Overview

Except for the DC/DC converter boards, each circuit pack in the digital network and common control carriers contains an ID chip.

a. The ID chip has provision for driving **RED** and **GREEN** LEDs on the circuit pack edge. When lighted, the **RED** LED indicates that the circuit pack is defective (failed) and the **GREEN** LED indicates that the circuit pack is good (passed).

b. There may also be a **GREEN pilot** LED, and possibly one or more **YELLOW in-use** LEDs on the circuit pack edge.

LED Strategy

The **RED** and **GREEN** maintenance LEDs are useful in the demand verification mode, and in the periodic detection mode when the **MAAP** is connected to the switch.

Demand Verification Mode: The two kinds of demand verification are normal and automatic.

a. **Normal Verification:** Maintenance personnel are able to run a verification test on a given circuit pack by using appropriate maintenance procedures.

    1. When the verification test is complete, the results are displayed on the **MAAP** and the **RED** or **GREEN** LED on the circuit pack tested is lighted depending on the outcome of the test; i.e., **GREEN** for pass, **RED** for fail.

2. The lighting of the circuit pack's LED provides additional feedback to maintenance personnel on the outcome of the verification test and aids in locating the faulty circuit pack.

b. **Automatic Verification:** When the diagnostic analysis and verification test is run from appropriate maintenance procedures, a faulty circuit location is displayed that points to the circuit pack to replace.

1. At the same time the **RED** LED on that circuit pack's edge is lighted.
2. While a circuit pack's **RED** LED is lighted in this mode, the circuit pack is scanned at a high rate to determine when it is unseated, and a circuit pack reseated or replaced.
3. After the circuit pack is reseated or replaced, a verification sequence is run on the circuit pack, and the results are displayed. The appropriate LED on the circuit pack edge is lighted.

Periodic Mode: Feedback on the frequency and coverage of periodic tests in the digital network is valuable for isolating serious software problems in the field. Feedback is only provided when the **MAAP** is connected to the switch.

a. To provide this feedback, each periodic test associated with the digital network recognizes when the **MAAP** is connected and lights the **GREEN** LED on the edge of the main circuit pack under test. The LED is left on until the conclusion of the test.

b. This use of the **GREEN** LED provides a maintenance **heartbeat** that indicates the frequency and coverage of periodic test routines in the network.

GREEN Pilot LEDs:

a. **GREEN pilot** LEDs are used to denote that a circuit pack has power and is operational. The power supply boards, High Capacity Minirecorder (HCMR), and 20 Hz ringing generators have **GREEN pilot** LEDs.

b. The tape interface circuit pack (TN430) has a **GREEN** LED which provides a **heartbeat** that indicates the state of the tape subsystem. A fast heartbeat (5 Hz) indicates when TN430 is off the bus. A slow heartbeat (1 Hz) indicates when TN430 is allowed on the bus.

c. The module interface circuit pack (TN480) in the TMS carrier has a **GREEN** LED in position 4 which indicates communication with the associated light guide interface circuit pack (TN481) in the module control carrier.

d. The light guide interface circuit pack (TN481) in the module control carrier has a **GREEN** LED in position 4 which indicates communication with the associated module interface circuit pack (TN480) in the TMS carrier.

YELLOW In-Use LEDs: YELLOW in-use LEDs are used to denote that a circuit pack is in an **idle** or an **in-use** state. The following circuit packs contain **YELLOW in-use** LED indicators:

a. TMS or module control channel (MCC) circuit pack (TN401): The MCC has two **YELLOW** LEDs; one flashes when the MCC is communicating with CC0, and the other flashes when the MCC is communicating with CC1.

b. Duplication channel circuit pack (TN530): The duplication channel circuit pack has one **YELLOW** LED to indicate if it is in the on-line side of the common control carrier.

c. Light guide interface circuit pack (TN481): The light guide interface circuit pack has one **YELLOW** LED to indicate if it is in the on-line side of the module control carrier.

d. Port circuit packs: Except for the tone plant and the touch-tone dialing senders and receivers, each port circuit pack has one **YELLOW** LED that is the **OR** of activity in any of the ports on the circuit pack.

   1. If any one of the ports on a port circuit pack are in-use, then the **YELLOW** LED is lighted. Removal of the circuit pack when the **YELLOW** LED is lighted disrupts service on the circuit(s) in-use.

   2. The touch-tone dialing sender and receiver circuit packs have one **YELLOW** LED per port (four per circuit pack).

System clock synchronizer (SCS) circuit pack (TN463)

The SCS circuit pack has eight LEDs which consist of:

a. A **YELLOW** LED in positions one and two which are dedicated to the primary and secondary synchronization reference sources respectively. If either of these LEDs are lighted, it indicates the associated reference is unusable (out of lock).

b. A **YELLOW** LED in positions 14, 15, and 16 that indicate, when lighted which reference is on-line.

   LED position 14 is for the internal High Accuracy Clock (HAC), position 15 is for the primary synchronization reference, and position 16 is for the secondary synchronization reference.

c. A **YELLOW** LED in position 17 is used for duplicated module control (single module system) or duplicated TMS (multi-module system) carrier applications. When lighted, it indicates that the synchronization reference is receiving clock reference from the synchronization reference in the on-line duplicated carrier. This LED should always be lighted in the off-line carrier.

d. A **RED** and **GREEN** LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a diagnostic test is performed.

Remote Module Interface (RMI) Circuit Pack (TN456)

The RMI circuit pack has seven LEDs which consist of:

a. A **YELLOW** LED in position 7 indicating the on-line status when lighted.

b. A **YELLOW** LED in position 9 indicating the MAAP in-use status when lighted.

c. A **RED** LED in position 11 indicating the LFAIL status when lighted.

d. A **GREEN** LED in position 14 indicating the transmit (FTA) status when lighted.

e. A **GREEN** LED in position 16 indicating the receive (FRA) status when lighted.

f. A **RED** and **GREEN** LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a diagnostic test is performed.

DS-1 Circuit Pack (ANN11)

The DS-1 circuit pack has five LEDs which consist of:

a. A **GREEN** LED in position 7 indicating a red alarm if not lighted.

b. A **GREEN** LED in position 8 indicating a yellow alarm if not lighted.

c. A **YELLOW** LED in position 9 indicating initialization or busy when lighted.

d. A **RED** and **GREEN** LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a diagnostic test is performed.

Remote Carrier Group Circuit Packs

The remote carrier group contains one or two Remote Carrier Control (RCC) circuit packs (ANN16) and from three to six port circuit packs.

The RCC circuit pack has four LEDs which consist of:

a. A **GREEN** LED which provides a **heartbeat** that indicates the state of the remote carrier group. A fast heartbeat indicates that communication with the Remote Carrier Local (RCL) circuit pack in the switch has been lost. A slow **heartbeat** indicates that communications with the RCL is established.

b. A **YELLOW** LED in position 9 indicating initialization or busy when lighted.

NOTE

The **YELLOW** LED on the general purpose port (SN270 or SN271) circuit pack in the remote carrier group is not used.

c. A **RED** and **GREEN** LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a board insertion test is performed.

Except for the **YELLOW** LED on the general purpose port (SN270 or SN271) circuit pack (which is not used) the port circuit packs in the remote carrier group have the same type of LEDs as they do in the local carriers of the switch.

Physical Placement of LEDs

There are 19 LED positions on the edge of each circuit pack. The positions start from the top of the circuit pack (as it sits in a carrier) and extend most of the way down to the circuit pack's connector. The position at the top is number one and at the bottom is number 19.

The standard configuration places the maintenance ID chip **RED** and **GREEN** LEDs in positions 18 and 19, respectively. When there is a single **YELLOW in use** LED it is placed in position nine. If there are several **YELLOW** LEDs they are placed from position one down to as many contiguous positions as are needed. **GREEN pilot** LEDs are placed in position one to prevent confusing the pilot LED with the **GREEN** maintenance LED.

TOOLS AND TEST EQUIPMENT

Tools and test equipment required for maintenance of the System 85 switch consist of:

a. Alarm Panel.

b. **MAAP**.

c. Digital multimeter KS-20599, L4 or equivalent.

d. Loop around test fixtures.

e. Touch-tone telephone set.

f. Rotary dial telephone set.

g. W1AP test cords (2).

h. 249A adapter.

i. Telephone set.

j. 1013 type hand set.

k. ANI Data Link Test Set (J59204AJ) and connector cable (List 4).

The alarm panel and **MAAP** are used with the switch as on-site maintenance tools.

a. The alarm panel provides LED indicators to denote the state of health of the system. The LEDs are used to identify the problem area(s) when a switch failure occurs. The alarm panel also provides controls for processor operation and emergency transfer.

b. The **MAAP** is the basic interface between maintenance personnel and the switch. It provides access to maintenance procedures which are used for interrogation, testing, and fault isolation.

c. The alarm panel and **MAAP** are covered in detail in other sections of this service manual.

A digital multimeter KS-20599, L4 or equivalent is required when performing **PROC 601** (environmental tests) to measure voltages at test points to determine corrective action to be performed.

Looparound test fixtures are required when performing **PROC 650** (DCIU) to perform manual external looparound tests.

A telephone set with W1AP test cords and a 249A adapter or a 1013 hand test set and 249A adapter are required when making terminal-to-trunk test calls or listening to transmitted tones at the test line. These tools are used in performing **PROC 642** (Terminal-to-Trunk Test Call), **PROC 643** (Terminal-to-Tone Test Call), and **PROC 644** (Terminal-to-Auxiliary Tone Test Call).

The ANI Data Link Test Set (J59204AJ) and connector cable (List 4) are required when running Tests 2 through 4 of **PROC 623** (ANI failures) to prevent test messages being sent to the central office. A diagram of the test configuration is shown in Figure 4.

PREVENTIVE MAINTENANCE

Preventive maintenance tasks should be performed as part of the maintenance visit. Maintenance tasks are determined by the user of the switch.

As a minimum, the following maintenance tasks should be performed after maintenance activities are completed.

a. Check with the user of the switch to determine if any type of intermittent problems exist. Perform corrective action as appropriate.

b. Examine the switch error log of the on-line and off-line side (if duplicated) using **PROC 600** Test 2, to determine if potential problems exist. Take corrective action as necessary.

c. If backup batteries are provided, check replacement date(s) and replace batteries if required.

d. Replace Gates batteries comcode 403736291 in the J87462A power unit at least once every 2 years.

e. Replace Gates batteries comcode 403736291 in the 3965-2 battery charger at least once every 2 years.

f. Replace battery comcode 844665836 on the TN492 circuit pack 5 years after date of installation of the TN492 circuit pack.

   The next replacement date of the battery is established by adding 5 years to the date of installation (month and year) of the TN492 circuit pack.

g. Clean high capacity minirecorder tape head.

NOTE

Refer to SWITCH COMPONENT REPLACEMENT for steps on cleaning the high capacity minirecorder tape head.

TPA-757957

Figure 3-4. ANI Data Link Test Set

TROUBLE CLEARING

GENERAL

Overview

There are four ways of indicating a trouble within the switch. The indications may be investigated locally or by a remote maintenance facility. The trouble indications are:

a. Alarmed troubles.

b. User reported troubles.

c. No response from the switch.

d. Maintenance polling.

Trouble clearing is based on the type of indication received and is covered in the paragraphs entitled: **Alarmed Troubles; User Reported Troubles; and No Response from the Switch**.

All of the trouble indications may initially be investigated by user personnel or a remote maintenance facility (depending on the status of the switch).

It is recommended that you read the paragraph entitled: **Recovery** prior to performing trouble clearing on System 85.

Items Affecting Trouble Clearing

1. The customer order document is required to identify the system assignments necessary to perform trouble clearing procedures.
2. Trouble clearing is directed to troubles within the System 85 switch. When troubles involve terminals or trunks, it is assumed that equipment and circuitry external to System 85 is functioning and the trouble is isolated to the System 85 switch.
3. The System 85 service manual is not intended to solve all levels of trouble. It is limited to troubles that can be solved by using the **MAAP**, common test equipment, and component replacements. When the limit of the trouble clearing analysis is reached and the trouble is still not cleared, the user is directed to a source of further trouble clearing information.
4. The equipment frame of the cabinet should always be touched before touching wiring, circuit packs or components to prevent electrostatic damage.

All personnel who handle circuit packs, components, or wiring should be properly grounded. When using a ground wrist strap, the strap should not be worn over clothing but should touch the individual's skin.

5. The electromagnetic compatibility (EMC) wrist strap and cable assembly (cc900698226) is placed in the bottom of the module control cabinet in a poly bag (cc900492372) next to the AC distribution unit.

NOTE

This wrist strap is to be used when troubleshooting or performing maintenance or handling any circuit packs associated with the System 85 switch.

The EMC wrist strap assembly is used in the following manner:

- Attach the wrist strap to either wrist.
- Connect the alligator clip to the cabinet frame.

A good ground connection for the alligator clip is:

- In equipment-coded cabinets that have removable sides, attach the alligator clip to any convenient screw head that fastens the hinges to the cabinet or to the screws that fasten the door latch to the frame.
- In equipment-coded cabinets that have integrated sides, the alligator clip may be attached to any of the front and rear cabinet formed faces (front door area or back area when viewed in an open position) that are coated with a conductive paint.
- In either case, an area close to the vertical center of the cabinet should be selected for the alligator clip, allowing a more central position from which to operate.

6. Option settings (as appropriate) on original and replacement circuit packs must be verified prior to replacement.
7. The service manual assumes that all replacement items and test equipment used are correct and functional, to simplify trouble clearing analysis.
8. When replacement of equipment does not clear the trouble, the original equipment should be installed.
9. The AC circuit breakers on all cabinet power supplies should be checked prior to performing trouble clearing analysis.
10. The DC/DC converter handle should **not** be toggled when replacing circuit packs in the TMS and/or module control carriers.

Trouble Clearing Priority

When more than one category of trouble is either indicated or reported, the no response from switch trouble must be cleared first, followed by alarmed troubles, and then user reported troubles.

Maintenance Polling

Prior to maintenance personnel leaving the user's premises the switch should be polled to determine if potential problems exist. This polling can be accomplished by examining Test 2 of **PROC 600** to determine if any alarms or recorded errors exist for any circuit or unit type.

1. The data displayed for each unit type and circuit should be recorded and maintained for future use.
2. When the entry for a particular unit type and circuit is determined to be severe, the maintenance procedure for that unit type and circuit should be entered and the associated trouble analysis procedure performed.

When the switch is duplicated, both the on-line and off-line side should be examined.

RECOVERY

Overview

System 85 has built in recovery software to restore the switch integrity and availability after power failures and hardware failures.

When some of the longer recovery processes are being executed, maintenance personnel may be tempted to take such actions as operating the **GO/HALT** switch, forcing a reload by depressing the **ENABLE** switch, etc.

NOTE

If such actions are taken, the recovery process may be prolonged. In addition, test equipment (i.e., TN514 scamper) can interfere with the recovery process.

The estimated time for recovery software to rebuild is about 15 seconds per module or a maximum of 5 minutes for a large switch.

Maintenance personnel should wait the appropriate amount of time when the switch is not providing service before taking additional (or premature) trouble clearing actions in the following areas:

a. Short power failures.

b. Long power failures.

c. Use of **GO/HALT** switch or **RESET** switch.

Short Power Failures

When short power failures (less than 10 minutes) are experienced in systems without optional holdover, the common control continues to operate but the modules and TMS processors stop operating after power is removed for more than 100 ms.

In duplicated 501CC switches, the common controls attempt a soft switch.

a. The soft switch takes about a minute in switches with 2 megawords of memory.

b. The modules initialize when power to modules are restored.

NOTE

Maintenance personnel should observe the module processors (TN380) for a heartbeat indicating initialization.

c. Initialization of the modules takes less than 20 seconds for the switch.

d. A rebuild takes place following TMS/module processor initialization.

NOTE

Maintenance personnel should observe the yellow LED on the on-line module control channels (TN401) which indicates the rebuild is taking place.

Long Power Failures

For long power failures, (longer than 312A holdover capacity - about 10 to 30 minutes), the switch recovers by loading from tape and initializing hardware.

The time for the tape load depends on the configuration of the switch and initialization takes about another minute or so. Maintenance personnel should wait about 5 minutes before taking any additional action.

The tape load should be monitored by plugging the **MAAP** into the appropriate connector and observing the LEDs on TN430 in the common control carrier.

a. The **RED** LED in position 2 of TN430 and the **YELLOW** LED at the middle of the circuit pack are lighted to indicate the beginning of the tape load.

b. Next, the **GREEN** LED in position 1 of TN430 starts flashing (indicating tape interface is being initialized).

c. Then the **GREEN** LED in position 1 goes either steady on or off while the tape is moved to a load position.

d. Next, data is read from tape and the **MAAP** is updated. (Encodes 1 through 4.)

e. When the tape load is completed and successful, the **PASS** indicator on the alarm panel flashes at a 1-second on, 1-second off rate.

NOTE

There may be a small delay before the heartbeat appears.

Initialization of the modules takes less than 20 seconds for the switch.

NOTE

Maintenance personnel should observe the module processors (TN380) for a heartbeat indicating initialization.

GO/HALT Switch and RESET Switch

When the system is halted using the **GO/HALT** switch, the recovery action takes about 20 seconds when the switch is returned to the **GO** position.

The same recovery action is taken when the system is removed from suicide or emergency transfer by depressing **RESET** and no serious hardware faults are experienced.

If serious hardware faults are experienced, recovery may take the rebuilding or reloading actions described above.

Before taking additional trouble clearing action, maintenance personnel should try to determine what the switch is doing by:

a. Observing **MAAP** indications.

b. Observing LEDS on the alarm panel, module control carriers (i.e., TN380 and TN401), and critical port circuits (i.e., touch-tone receivers).

c. Waiting the appropriate time for the automatic recovery actions to take place.

ALARM TROUBLES

Overview

Alarms can be visually observed by maintenance personnel on the customer's premises via the alarm panel or on the customer's attendant consoles. In addition, major and minor alarms are automatically reported to a remote maintenance facility (if provided).

The alarm panel contains alarm and fault indicators which are used for determining system status. Various alarms are displayed on the panel such as major, minor, and warning. Fault indicators are associated with major functional areas of the system.

Retiring Alarms

Alarms are retired by investigating, isolating, and repairing the cause of the alarm condition. After making a repair the appropriate verification test is run using the maintenance procedure associated with testing the circuit to ensure that the problem is corrected.

1. When the circuit verification test is successfully run without a failure, the alarmed entry in PMIDS is automatically resolved and the associated fault indicator is turned off (if no other alarmed entries are affecting the same fault indicator).
2. When more than one alarm cause exists at a particular level, all alarm causes must be resolved before the fault indicator is automatically turned off.
3. When it is necessary to further isolate an alarm cause, **PROC 600** (Alarm Causes/Error Log) may be used to manually turn off one or all fault indicators while retaining the failure history. The fault indicator is reactivated by any subsequent errors that cause an alarm threshold to be exceeded.

Trouble Clearing of Alarmed Troubles

Alarms are generated by hardware and/or software detection.

1. Maintenance diagnostics, which are an integral part of the system software, monitor system parameters and turn on alarm indicators when unacceptable limits are exceeded.
2. Specific on- and off-line maintenance procedures which are designated near the fault indicators are used to isolate the cause of the fault indicator being lighted.
3. When multiple fault indicators are lighted on the alarm panel it is difficult for maintenance personnel to determine where to start. One lighted fault indicator may affect or be the cause of other fault indicators being lighted.
4. **Therefore, the primary maintenance aid for investigating and isolating the cause of the lighted fault indicator is PROC 600, Test 1 which provides the sequence of maintenance procedures to be performed**.

Test 1 of **PROC 600** provides a display of alarms by order of severity and by priority (functional areas) within alarm levels.

1. All major alarms are displayed first, then minor alarms, and last is warning alarms. Each level of alarm is displayed by importance of functional area.

2. When two or more alarms of the same level are displayed, the functional area that is most important to the operation of the switch is displayed first. This alarmed entry is investigated first as its cause may affect the rest of the alarmed entries.
3. The maintenance procedure referenced in Field 15 of **PROC 600** is used to diagnose and isolate the cause of the alarm trouble.

Maintenance procedures (in general) consist of at least three types of tests:

1. Failure history - this test displays the results of on-line routine maintenance testing which is active during normal call processing. It is the starting point for alarm indicator trouble analysis. The failing circuits are recorded and maintained for comparison of results in later tests.
2. Active diagnostic testing of all circuits - these tests which are under the control of maintenance personnel can check all circuits of the same type. A list of maintenance failures (if any) is recorded and maintained to determine the corrective action required to clear the alarm indicator. Corrective action to be taken is based upon failure codes, failure patterns, and/or failing circuits.
3. Continuous testing of individual circuits - the primary purpose of this test is to check for intermittent failures and to facilitate checking of wiring problems. Circuits recorded in the failure history, but not in active diagnostic testing, should be checked using this test.

Comparison of results - when corrective action is taken (replacement of circuit pack, etc.) as a result of active diagnostic testing, the active diagnostic test is repeated to determine if the failure is corrected and to turn off the alarm indicator.

1. When failures still exist, a comparison must be made to determine if the **same** failure code, failure pattern, or failing circuit is the problem. This is required because all circuits of the same type may be tested.
2. The comparison can be accomplished by recording each failure and comparing the new list against the original list, or by using **NEXT CIRCUIT** (or another appropriate key) and comparing the failures displayed against those initially recorded.
3. Further corrective action is dependent upon the results of the comparison.

Duplicated Common Control Switches, TMS/Network Control Complexes

When troubles exist in both common controls, the alarm indicator(s) lighted on the active (on-line) common control should be cleared first, unless the maintenance procedure referenced in Field 15 of **PROC 600**, Test 1 can be performed off-line.

PROCs 600 (Alarm Causes/Error Log), 610 (Tape Tests), 611 (Common Control Tests), 612 (Initialization Causes), 614 (Memory Read/Memory Match Tests), 615 **(MAAP** Test), 616 (Alarm Panel Test), 618 (Diagnostic Processor/Remote Interface/Alarm Interface Test) except tests 4 and 5, 650 (DCIU tests), and 652 (Time-of-Day Clock Synchronizer) can be performed on-line and off-line.

When alarm troubles in a duplicated TMS/network complex are indicated, tests should be performed off-line by soft locking the TMS/network complex on-line to prevent unexpected switches (if possible); repair action taken; test on-line (after releasing the soft lock) to verify the trouble is cleared; then switch to the best side of the TMS/network complex (if appropriate or required).

Prior to leaving the user's premises, maintenance personnel should investigate both common controls in a duplicated common control switch by using **PROC 600**, Test 2 to determine if potential problems exist. Corrective action as necessary should be performed when conditions are such that the problem could affect customer service.

Release of Busied Out Circuits

When the **BUSY OUT LED** is lighted on the **MAAP**, the use of **RLS BUSY OUT** may release busied out circuits, trunk groups, or carriers if the capability is provided by the maintenance procedure entered.

1. If the capability is not provided by the maintenance procedure or the **BUSY OUT** LED remains on because some other type of circuit may be busied out, **PROCs 630, 631**, and **632** can be used as necessary to release busy out circuits, trunk groups, or carriers.
2. **PROCs 630, 631**, and **632** (as necessary) should be entered to determine the type and number of circuits, trunk groups, or carriers busied out.
3. If circuits, trunk groups, or carriers are maintenance busied, the reason for their status must be determined and corrective action taken (if required) before they are released from busy.
4. If the **BUSY OUT** indicator on the **MAAP** is still lighted after all terminals, trunk groups, or carriers are released from busy the cause is probably a soft lock of the TMS or network duplication channel or a DCIU link.
    a. **PROC 621** should be entered to determine the soft lock status of the TMS or network duplication channel.
    b. **PROC 650**, Test 3 should be entered to determine the busy out status of DCIU links.

USER REPORTED TROUBLES

Overview

User reported troubles are normally generated as the result of troubles encountered and reported by the user. Reported troubles are normally those problems that concern a single instrument or a service. Some examples of user reported troubles are: loss of dial tone, disconnect, no ringing, or poor transmission.

The user reported trouble can also be caused by an inadvertent translation change, or be of an intermittent nature.

User trouble reports are divided into four separate types of failures: basic call failures (such as terminal or trunk), data module failures, failures of features provided by the switch, and attendant console.

Several methods are used to determine the cause of the user's reported trouble.

1. Determining if errors are recorded against the suspect circuit by using the alarm causes/error log maintenance procedure **PROC 600**, Test 2. The circuit may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.

2. Using the appropriate maintenance procedure for the suspect circuit and testing the circuit on a continuous basis to determine if the reported trouble is intermittent.
3. Performing a functional test of the user's reported trouble, e.g., call terminal extension (if possible).
4. Checking translation to determine if the suspect circuit is properly administered.
5. Using the following **PROCs** at the user's premises to determine the usability of the equipment:

   PROC 642 - Terminal-to-Trunk Test Call.

   PROC 643 - Terminal-to-Tone Test Call.

   PROC 644 - Terminal-to-Auxiliary Tone Test Call.
6. Performing self-tests (if available) for the suspect equipment. The self-test must be performed at the customer's premises.
7. Performing a continuity test of station wiring (whether analog, hybrid, or digital) using the port tester described in **PROC 622**.

The rest of this section covers some of the troubles that may be reported by the user.

72, 73, and 74 Series Terminals

When troubles with terminals connected to the switch are reported by the user, perform the following steps as appropriate.

No Dial Tone

Use **PROC 622**, Test 1 to check for errors recorded against the terminal and perform **PROC 622**, Test 3 to isolate the trouble.

Cannot Dial

Replace the terminal.

Cannot Receive Calls

Use **PROC 622**, Test 1 to check for errors recorded against the terminal and perform **PROC 622**, Test 3 to isolate the trouble.

Does Not Ring

Assuming that there are no other indications of an incoming call, perform the dial-up test for ringer.

NOTE

Refer to **AT&T System 75 and System 85 User's Guide, Terminal Installation and Test, 999-700-214 Issue 1, June 1985** for steps on performing the terminal dial-up test.

1. If the ringer dial-up test does not pass, replace the 72, 73, or 74 series terminal.
2. Repeat the ringer dial-up test. If the ringer dial-up test fails again, use **PROC 620**, Test 4 to check the associated port circuit. Replace the port circuit as necessary.

Indicator Does Not Light

Perform the dial-up test for indicator. In addition, for MFAT or MFDT sets perform a self test. If the indicator dial-up test or self test fails, replace the terminal.

NOTE

Refer to **AT&T System 75 and System 85 User's Guide, Terminal Installation and Test, 999-700-214 Issue 1, June 1985** for steps on performing the terminal dial-up test.

Buttons Do Not Work

Perform the dial-up test for buttons. If the button dial-up test fails, replace the terminal. If the button dial-up test passes, check translation of the buttons assigned to the terminal.

NOTE

Refer to **AT&T System 75 and System 85 User's Guide, Terminal Installation and Test, 999-700-214 Issue 1, June 1985** for steps on performing the terminal dial-up test.

Cannot Hear

Replace the handset or terminal.

Cannot Be Heard

Replace the handset or terminal.

Intermittent Troubles

If intermittent troubles are suspected or reported by the user, perform the following steps:

1. Determine if errors are recorded against the suspect circuit by using **PROC 600**, Test 2. The circuit may have errors recorded against it in Test 2 that do not exceed the threshold to raise an alarm.
2. Use the appropriate maintenance procedure for the suspect circuit, and test the circuit on a continuous basis.

   Take corrective action as necessary.
3. Use the following **PROCs** to determine the usability of the equipment:

   PROC 642 - Terminal-to-Trunk Test Call.

   PROC 643 - Terminal-to-Tone Test Call.

   PROC 644 - Terminal-to-Auxiliary Tone Test Call.

74 Series Terminals Connected to a Personal Computer

When troubles with 74 series terminals connected to a personal computer are reported by the user, the user should be informed to power down the personal computer.

NOTE

It may not be possible for periodic or demand maintenance software to detect a defective 74 series terminal when it is connected to a powered-up personal computer.

A personal computer can consist of an AT&T PC6300, AT&T PC7300, IBM personal computer, or equivalent. The personal computer is connected to a DCPI interface card to allow an interface to the switch.

The signaling channels S1 and S2 from a GPP port are connected to the DCPI interface card and then to the 74 series terminal. However, the terminal probably does not support S2 signaling.

Since the DCPI interface card interprets and responds to S channel messages, even if the 74 series terminal is not connected, maintenance of the terminal is impossible from switch software when the personal computer is powered-up.

Request the customer to power down the personal computer before repeating maintenance on the defective 74 series telephone.

The terminal is not tested if the personal computer is powered up and the DCPI interface card is in the PC control mode.

NOTE

If the personal computer is powered down, **PROC 622** displays a fault code of 28 (odd channel of digital set is stuck in looparound) because the 74 series terminal has no S2 connectivity.

A display of fault code 28 indicates the terminal is good. When a fault code other than 28 is displayed, use the appropriate repair procedure for the terminal being tested.

Data Modules

When troubles with data modules PDM, TDM, or DTDM are reported by the user, perform the following steps as appropriate.

Cannot Originate Calls

Run a self test on the data module and 74 series terminal (if DTDM).

1. If the self test fails, replace the data module or 74 series terminal.
2. If the self test passes, use **PROC 622**, Test 1 to check for errors recorded against the data module or 74 series terminal. Use **PROC 622**, Test 3 to isolate the trouble.

Cannot Receive Calls

Run a self test on the data module and 74 series terminal (if DTDM).

1. If the self test fails, replace the data module or 74 series terminal.
2. If the self test passes, use **PROC 622**, Test 1 to check for errors recorded against the data module or 74 series terminal. Use **PROC 622**, Test 3 to isolate the trouble.

Data Call is Apparently Set Up, But No Data Can Be Sent or Received

Run the following local tests (Steps 1 through 3) on the data module.

1. Self test - If this test fails, replace the data module.
2. Local loop back - If this test fails, there is a problem between the user's terminal equipment and the data module.

   If the data module is optioned for terminal dialing, try to set up a data call. If dialed characters are echoed, the connection is good between the data module and terminal.
3. Remote loop back or remote loop back and self test combined.

   NOTE

   If a remote loop back test using the user's terminal equipment can be performed, it is the preferred test.

   Set up a connection to the remote data terminal and operate the remote loop back button.

   NOTE

   For DTL mode 0 and 1 operation, the remote loop back button must be operated before the call is set up.

   Perform a remote loop back test or operate the self test button.

   If the test fails, the trouble could be in either data module or in any of the circuits between the data modules.

Intermittent Troubles

If intermittent troubles are suspected or reported by the user, perform the following steps:

1. Determine if errors are recorded against the suspect data module by using **PROC 600**, Test 2. The data module may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.
2. Use the appropriate maintenance procedure for the suspect circuit and test the circuit on a continuous basis.

   Take corrective action as necessary.

MPDM or MTDM Self Tests

The MPDM is a DCE-type device used to transmit and receive serial data over a 4-wire DTL link in the System 85. It provides an interconnection (without a voice terminal) between the system and customer-provided data terminal equipment.

The MTDM serves as a data terminal equipment (DTE) to interface the System 85 data capabilities to a private line data channel via a data set or a data service unit, using an RS-232C interface.

Self tests on MPDM (refer to Figure 5) or MTDM (refer to Figure 6) data modules are performed as follows.

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Figure 4-5. Modular Processor Data Module (MPDM)

CAUTION

Operating the SELF TEST switch without operating the REMOTE LOOP BACK switch during a call terminates the call.

Self Test

1. Place the **SELF TEST** switch in the **SELF TEST** position.

   The internal circuits of the MPDM or MTDM are checked.
2. During the test, the **TEST IN PROGRESS** indicator stays on.
3. The **TEST RSLT** indicator is steadily **ON** if the internal circuits test passes.

   The **TEST RSLT** indicator flashes if the internal circuits test fails.

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Figure 4-6. Modular Trunk Data Module (MTDM)

4. If the MPDM or MTDM passes the internal circuits test, a known bit sequence is looped through the internal data path and checked for errors.

   Any bit error causes the **TEST RSLT** indicator to flutter momentarily.

   If no bit errors occur, the **TEST RSLT** indicator is steadily **ON**.

5. At the end of the test, place the **SELF TEST** switch in the **OFF** position.

   The **TEST IN PROGRESS** and **TEST RSLT** indicators are turned **OFF.**

Local Loop Test

CAUTION

If a MPDM or MTDM is placed in a local loop back mode while a call is in progress, the call is terminated.

NOTE

A DTE is required for MPDM testing which provides an internal loop back prior to DTL link interface. A data terminal and a data set or data service unit is required for MTDM testing which provides an internal loop back prior to DTL link interface.

1. Place the **LOC LOOP/REM LOOP** switch in the **LOC LOOP** position.

   The EIA interface is active in this mode and the data transmitted by the terminal is looped back to the terminal.

2. During the test, the **TEST IN PROGRESS** indicator is **on**.

3. Check the data transmitted against the data displayed on the DTE.

   The test passes if no errors are found.

4. At the end of the test, place the **LOC LOOP/REM LOOP** switch in the **OFF** position.

   The **TEST IN PROGRESS** indicator is turned **OFF**.

Remote Loop Test

1. Place the **LOC LOOP/REM LOOP** switch in the **REM LOOP** position during a call.

   Data transmitted by the local DTE is looped back from the remote module prior to its EIA interface.

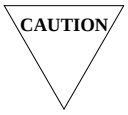
2. During the test, the **TEST IN PROGRESS** indicators on both the local and remote modules are lighted and the remote module is disabled for data transmission and reception.

3. Check the data transmitted against the data displayed on the DTE.

   The test passes if no errors are found.

4. The remote module, if necessary, terminates the call by turning the **CD** interface lead (data terminal ready) **OFF**.

5. Data transmission can be restored by placing the **LOC LOOP/REM LOOP** switch in the **OFF** position.



The call is terminated if the switch is placed in the **LOC LOOP** position.

The **TEST IN PROGRESS** indicator is turned **OFF.**

Remote Loop Back/Self Test

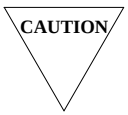
1. Place the **LOC LOOP/REM LOOP** switch in the **REM LOOP** position after a call is set up to put the remote module into remote loop.

2. Place the **SELF TEST** switch in the **SELF TEST** position.

3. The module generates a known bit sequence and transmits it to the remote module where the data is looped back prior to the EIA interface of the remote module.

   The local module, upon receiving the bit sequence, checks it with the transmitted bit sequence for error.

4. The **TEST RSLT** indicator flashes every time an error is detected and stays steadily **ON** if no error bit is detected.



If the REM LOOP switch is placed in the OFF position before the SELF TEST switch is placed in the OFF position, any call is terminated.

5. After test completion, place the **SELF TEST** switch in the **OFF** position.

6. Place the **REM LOOP** switch in the **OFF** position.

DTDM Self Tests

The DTDM (Figure 7) is a data communications equipment (DCE) type device used to transmit and receive serial customer data from an EIA RS-232C interface over a 4-wire DTL link in the System 85.

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Figure 4-7. Voice Terminal with a Digital Terminal Data Module (DTDM)

The DTDM provides an interconnection between the System 85 and customer-provided data terminal equipment (DTE). The DTDM serves as an adjunct module to a digital voice terminal.

The digital voice terminal provides the interconnect function to the DTL link interface. The digital voice terminal and the DTDM integrate both voice and data communications onto the same link allowing for simultaneous transmission.

Self tests on DTDM data modules (refer to Figure 8) are performed as follows.

All incoming calls or call origination requests are not accepted while switches are in the test position. The **DTDM TEST IN PROGRESS** indicator remains **on** for the duration of each test.

CAUTION

Established calls are disconnected when test switches are moved from their OFF position.

NOTE

Placing the **LOCAL LOOP/REMOTE LOOP** switch in the **REMOTE LOOP** position does not disconnect an established call.

Self Test

1. Place the **SELF TEST** switch in the **SELF TEST** position.

   This test first checks the DTDM integrity.
2. If the test fails, the **TEST RESULTS** indicator flashes continuously.

   If the test passes, the **TEST RESULTS** indicator comes **on**.
3. After the DTDM integrity test passes, the self test continues.

   A known bit sequence is looped through the internal data path and checks for errors.
4. Any errors detected cause the **TEST RESULTS** indicator to momentarily flutter.
5. If the data is looped back without any detected errors, the **TEST RESULTS** indicator comes **on**.
6. The indicator remains **on** until the **SELF TEST** switch is returned to the **OFF** position.

Local Loop Test

1. Place the **LOCAL LOOP/REMOTE LOOP** switch in the **LOCAL LOOP** position.

   This test checks the data path prior to the DTL link interface.
2. Enter several DTE keyboard characters.

   The DTE display should show the same characters as entered.
3. When the test is complete, return the **LOCAL LOOP/REMOTE LOOP** switch to the **OFF** position.

Remote Loop Test

1. Place a call to another data module.
2. Place the **LOCAL LOOP/REMOTE LOOP** switch in the **REMOTE LOOP** position.

   This test checks the data path from the DTE to the EIA interface of the called module.
3. Enter several DTE keyboard characters.

   The DTE display should show the same characters as entered.
4. When the test is complete, return the **LOCAL LOOP/REMOTE LOOP** switch to the **OFF** position.

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Figure 4-8. Digital Terminal Data Module (DTDM) with Side Door Open

Remote Loop/Self Test

1. Place a call to a data module.
2. Place the **LOCAL LOOP/REMOTE LOOP** switch in the **REMOTE LOOP** position.
3. Place the **SELF TEST** switch in the **SELF TEST** position.

   A known bit sequence is looped through the data path from the DTDM to the EIA interface of the called module and checks for errors.
4. Any errors detected cause the **TEST RESULTS** indicator to momentarily flutter.

   If the data is looped back without any detected errors, the indicator comes **on**.
5. The indicator remains **on** until the **SELF TEST** switch is returned to the **OFF** position.

CAUTION

The SELF TEST switch must be returned to the OFF position before the REMOTE LOOP switch is returned to the OFF position or the call is terminated.

3270 Data Modules Self Test and Switch Connection Test

The 3270 data module consists of a family of protocol converters that allow 3270-type terminals to communicate with a host computer through the switch using standard twisted-pair building wiring instead of coaxial cable.

The complete family of 3270 data modules consists of the 3270A (Asynchronous) data module or 3270T (Terminal) data module (Figure 9) located at the terminal end of the switch, and the 3270C (Controller) data module (Figure 10) located at the cluster controller end.

The 3270A data module (Figure 9) allows a 3270-type terminal to appear as an asynchronous ASCII terminal to an ASCII endpoint. In ASCII emulation mode, the 3270A data module does not require a 3270 data module at the other end of the switch.

The 3270T data module (Figure 9) appears as a cluster controller to the terminal. The terminal sends messages for the cluster controller in coaxial cable category A protocol, which the data module coverts to DCP protocol.

Data and messages are then sent through the switch to the 3270C data module (Figure 10) at the cluster controller side of the switch. The 3270C data module decodes the DCP information back to coaxial cable protocol and sends it to the cluster controller.

The protocol conversion sequence is reversed for cluster controller messages to the terminal.

NOTE

This method of communicating with a host computer is transparent to the computer system.

3270 Data Modules Self Test

The self test runs automatically whenever the data module is powered on. It may also be run manually by pressing the **RESET** switch on the 3270A or 3270T data module, or the **RSET** button on the 3270C data module.

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Figure 4-9. 3270A and 3270T Data Module (Protocol Converter)

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Figure 4-10. 3270C Data Module (Protocol Converter)

The self test is actually a series of tests designed to check the health of the data module hardware. The tests are initiated by the data module's microprocessor.

Self tests include reading and writing to the Random Access Memory (RAM), performing a timer check, performing a checksum of the Erasable Programmable Read-Only Memory (EPROM), looping test words around the Advanced Data Link Control (ADLC) interface to check the DCP S (signaling) and I (data) channel receiver and transmitter, and looping test words around the Asynchronous Receiver Transmitter and Variable Addressable RAM Controller (ARTVARC) to check the coaxial cable interface.

During the self test, the coaxial cable interface is disabled and the switch Digital Line Interface (DLI) is ignored. The self test may be run without a connection to a terminal, cluster controller, or the switch.

If coaxial cable or switch connections are not in place, the GREEN or YELLOW LEDs will not light. The self test fails if the RED LED remains lit.

NOTE

If the data module's microprocessor or any of its immediate logic is faulty, the self test may not detect an error or may fail to light the RED LED. If a data module appears to be causing problems even though its RED LED fails to light, exchange it with a known good data module to verify if the problem is corrected.

CAUTION

Running the self test disconnects any call that may be in progress. Because the self test momentarily interrupts power to the data module, S channel errors may be recorded by the switch and 3270A data module ASCII emulation options are erased. The self test should only be run when necessary.

3270A and 3270T Data Module Self Test To run the self test on the 3270A or 3270T data module (Figure 9), perform the following steps:

1. **If a terminal is attached:** Turn power on and make sure the **TEST/NORMAL** switch is in the **NORMAL** position.
2. Toggle the **RESET** switch at the rear of the data module.
3. All three LEDs on the front panel should light briefly, then the **RED** LED should light for about 1 second as the data module performs the self test.

   NOTE

   If one of the LEDs fails to light, the data module should be replaced.

4. The **RED** LED should go out and the **GREEN** LED should light, indicating a good coaxial connection to the terminal.

   NOTE

   If the terminal is not connected or if the **TEST/NORMAL** switch is in the **TEST** position, the **GREEN** LED will not light.

5. If the **RED** LED remains lighted, the data module has detected an error and should be replaced.

3270C Data Module Self Test To run the self test on the 3270C data module (Figure 10), perform the following steps:

1. Open the front cover of the 3270C data module assembly to access the LEDs and switches.

   NOTE

   Turn the screw on the springlock latch and unhook the cover on the left.

2. Depress the **RSET** button on the front panel of the port to be tested.
3. All three LEDs on the front panel should light briefly, then the **RED** LED should light for about 4 seconds as the port performs the self test.

   NOTE

   If one of the LEDs fails to light, the circuit pack should be replaced.

4. The **RED** LED should go out and the **GREEN** LED should light, indicating a good coaxial connection to the cluster controller.

   NOTE

   If the 3270C data module is not connected with coaxial cable to the cluster controller, the **GREEN** LED will not light.

5. If the **RED** LED remains lighted, the self test has detected an error. The circuit pack should be replaced.
6. In the event of an error, toggle the **BUSY** switch on the front panel to the up (make-busy) position to prevent 3270A or 3270T data modules from attempting to access the faulty port until the circuit pack can be replaced.
7. After running the self test, place the **BUSY** toggle in the up (make-busy) position a couple of times for each port to synchronize the data module with the switch. The **YELLOW** LED should light for about 10 seconds when the data module is synchronized.

   NOTE

   The toggling action sends an off-hook message to the switch. The switch then sends the equivalent of a **DIAL:** prompt (the **YELLOW** LED lights). Returning the **BUSY** switch to the normal position ensures the switch knows the data module is back on-hook.

8. After tests on all ports are run, close the front cover of the 3270C data module by positioning the cover over the hook on the left, lining up the cover with the front of the assembly, and turning the screw on the springlock latch.

3270 Data Modules Switch Connection Test

The switch connection test tests the connection from the data module through the building wiring to a port on the switch. This test can detect faulty wiring from the 3270 data module to the switch or improper translation of the port board on the switch.

The switch connection test **must** be run without the coaxial cable for a terminal or cluster controller attached to the data module. The port board on the switch must also be correctly administered and translated before this test can be run.

3270A and 3270T Data Module Switch Connection Test The 3270A or 3270T data module must be powered on and attached to the switch through the wall jack to perform the switch connection test.

To run the switch connection test on the 3270A or 3270T data module, perform the following steps:

1. **If a terminal is attached to the data module:** Set the **TEST/NORMAL** switch on the terminal in the **TEST** position and leave it there (this disconnects the coax).

   NOTE

   You may also physically disconnect the coaxial cable from the **TERMINAL** connector to run this test.

2. Depress the Originate/Disconnect button.

   NOTE

   This action sends an **OFF HOOK** message on the DCP S (signaling) channel to the switch port board.

3. The **YELLOW** LED should light for about 10 seconds, indicating a good connection to the switch.

   If the YELLOW LED does not light: Depress the Originate/Disconnect button several times, waiting about 5 seconds between depressions. One of the depressions should cause the **YELLOW** LED to light.

   NOTE

   This action is equivalent to the switch sending a **DIAL:** prompt to a terminal. If no dialing action is taken, the switch times out in 10 seconds.

4. If the **YELLOW** LED still does not light, the switch interface in the data module may be faulty, the wiring to the switch may be faulty, or the port boards may be incorrectly translated.

   NOTE

   See your system administrator if you believe the port boards are the problem.

5. When the test is complete, reattach the coaxial cable to the data module (if the cable was disconnected), or set the **TEST/NORMAL** switch to the **NORMAL** position.

3270C Data Module Switch Connection Test The 3270C data module must be powered on and the **DCP** connector must be attached to the cross-connect field to perform the switch connection test.

To run the switch connection test on the 3270C data module, perform the following steps:

1. **If a cluster controller is attached to the data module:** Disconnect the coaxial cables from the ports on the back of the 3270C data module assembly.

   NOTE The **GREEN** LEDs may take a moment to go out.

2. Remove the front cover to reveal the LEDs and switches.

   NOTE Turn the screw on the springlock latch and unhook the cover on the left side.

3. Toggle the **BUSY** switch to the up (make-busy) position.

   NOTE This action sends an **OFF HOOK** message on the DCP S (signaling) channel to the switch port board.

4. The **YELLOW** LED should light for about 10 seconds, indicating a good connection to the switch.

   If the YELLOW LED does not light: Move the toggle to and from the make-busy position several times, waiting about 5 seconds between toggles. One of the toggling actions should cause the **YELLOW** LED to light.

   NOTE This action is equivalent to the switch sending a **DIAL:** prompt to a terminal. If no action is taken, the switch times out in 10 seconds.

5. If the **YELLOW** LED still does not light, the switch interface in the data module may be faulty, the wiring to the switch may be faulty, or the port boards may be incorrectly translated.

   NOTE See your system administration if you believe the port boards are the problem.

6. When the test is complete, reattach the coaxial cables to the data module connectors.
7. Replace the front cover by positioning it over the hook on the left, lining it up with the front of the assembly, and turning the screw on the latch.

MADU/ADU EIA Port Board (SN238) Looparound Test

The Multiple Asynchronous Data Unit (MADU) provides an RS-232C compatible, full duplex, asynchronous data access to host computers.

The MADU accepts information from the host computer and passes it through its ports to a switch port which converts the data to Digital Communications Protocol (DCP). The digital information is then transferred through the switch to another port that accepts DCP data.

The second port could attach to a variety of data devices, including an MPDM, digital terminal, computer, Z3A Asynchronous Data Unit (ADU), or a MTDM leading to a modem.

Z3A ADUs interface directly with switch EIA port boards that contain a built-in ADU at each port. EIA port boards enable an RS-232C device to access the switch without going through a modem or a data module.

The Z3A ADU is roughly equivalent in function to one of the ports on the MADU board. It can translate the ADU protocol generated by the MADU back to RS-232C protocol required by the attached terminal.

When a user reports a trouble with a terminal connected to an ADU or MADU which cannot access the switch, receives no dial prompt or disconnect prompt, and **PROC 620** and/or **PROC 622** cannot isolate the problem, a looparound test on the EIA (SN238) port board should be performed.

MADU EIA Port Board (SN238) Looparound Test

The following looparound test may be performed on an MADU which is attached to an SN238 EIA port board on the switch.

The looparound test checks the MADU port and the wiring between the MADU and the EIA port board.

The looparound test may be performed even if the EIA port board is not translated.

The looparound test requires an ASCII terminal.

1. Adjust the option switches on the EIA port board if needed to activate keyboard dialing.

   NOTE

   The switches KYBD0 to KYBD3 activate keyboard dialing for the four EIA ports when they are set down away from the label.

2. Attach an ASCII terminal to one of the RS-232C connectors on the octopus cable leading to the MADU port you wish to test.

   NOTE

   Disable parity on the ASCII terminal if enabled.

3. Depress the **BREAK** key on the terminal.

   NOTE

   If auto-baud is enabled, follow the **BREAK** key with a carriage return.

   If the EIA port board is translated and not busy: A **DIAL:** prompt appears on the terminal screen.

   If the EIA port board is busy or not translated: No response is received.

4. Type **L** or **CONTROL-G** (bell) to activate the looparound feature.

   NOTE

   The command varies on different boards.

   If you typed a **CONTROL-G**, the tone indicates you are in looparound mode.

5. Begin typing characters on the ASCII terminal's keyboard.

   The characters should be looped back to the screen exactly as they were typed.

6. If characters do not appear or if errors occur, a problem may exist in the building wiring, the MADU port, or the EIA port board.

   NOTE

   Occasional character errors indicate a parity problem. Make sure parity is disabled for this test.

7. To end the looparound test, depress the **BREAK** key on the terminal for 2 seconds.

   A **DISCONNECTED** message appears on the screen.

8. Reattach the octopus cable to the correct computer port.

   Hook up the next octopus connector to be tested and repeat the test.

9. When testing is complete, return the option switches on the EIA port board to their original settings (if they were adjusted for this test) and reactivate parity on the terminal if desired.

ADU EIA Port Board (SN238) Looparound Test

The following test may be performed on an ADU which is attached to an SN238 EIA port board on the switch.

The looparound test checks the wiring between the ADU and the port board.

The looparound test may be performed even if the EIA port board is not translated.

The looparound test requires an ASCII terminal.

1. Adjust the option switches on the EIA port board if needed to activate keyboard dialing.

   NOTE

   The switches KYBD0 to KYBD3 activate keyboard dialing for the four EIA ports when they are set down away from the label.

2. Make sure the ADU is attached to the RS-232C connector on the ASCII terminal.

   NOTE

   Disable parity on the ASCII terminal if enabled.

3. Depress the **BREAK** key on the terminal or the Originate/Disconnect switch.

   NOTE

   If auto-baud is enabled, follow the **BREAK** key with a carriage return.

   If the EIA port board is translated and not busy: A **DIAL:** prompt appears on the terminal screen.

   If the EIA port board is busy or not translated: No response is received.

4. Type **L** or **CONTROL-G** (bell) to activate the looparound feature.

   NOTE

   The command varies on different boards.

   If you typed a **CONTROL-G**, the tone indicates you are in looparound mode.

5. Begin typing characters on the ASCII terminal's keyboard.

   The characters should be looped back to the screen exactly as they were typed.

6. If characters do not appear or if errors occur, a problem may exist in the building wiring, the ADU, or the EIA port board.

   NOTE

   Occasional character errors indicate a parity problem. Make sure parity is disabled for this test.

7. To end the looparound test, depress the **BREAK** key on the terminal or the Originate/Disconnect switch for 2 seconds.

   A **DISCONNECTED** message appears on the screen.

8. Return the option switches on the EIA port board to their original settings (if they were adjusted for this test) and reactivate parity on the terminal if desired.

Remote Carrier Group Circuit Pack Insertion Test

When the user suspects a trouble with a remote carrier group circuit pack, he may wish to perform a circuit pack insertion test.

The circuit pack insertion test consists of a hardware test for all circuit packs in the remote carrier group and a software test for the RCC (ANN16) circuit pack. In order to perform the software test, the maintenance mode in the **MODE** display procedure **must not** be active.

Indications on the progress and results of the hardware and software tests are given by lighting LEDs on the circuit pack inserted.

The remote carrier group circuit pack insertion test LED indications depend on which circuit pack is inserted; i.e., Remote Carrier Controller (RCC) ANN16 circuit pack or a remote port circuit pack.

RCC (ANN16) Circuit Pack Insertion

When the ANN16 (RCC) circuit pack is inserted in the remote carrier group, the following occurs.

NOTE

When a GPP circuit pack is tested all translated peripherals should be connected and have power on (when required) or the test may fail.

1. The hardware test on the RCC (ANN16) is performed.

   The **RED** LED on the RCC circuit pack is turned on, then off.

   The **GREEN** LED on the RCC circuit pack is turned on, then off.

2. If the RCC hardware test passes, both LEDs remain off.

   If the RCC hardware test fails, the **RED** LED is lighted on the RCC circuit pack.

   NOTE

   The RCC circuit pack's **GREEN heartbeat** LED indicates a fast heartbeat after the firmware test is performed.

3. Then the hardware test on all port boards is performed.

   NOTE

   The hardware test on the port boards is only performed if the hardware test on the RCC passed.

   The **RED** LEDs are lighted on all port boards.

   Then the **GREEN** LEDs are lighted on all port boards.

4. If the port board hardware test passes, both LEDs remain off.

   If the port board hardware test fails, the **RED** LED is lighted on the failing port circuit pack(s).

5. After the hardware test on the RCC and all port boards is completed, communications with the switch is attempted.

   NOTE

   The hardware test on the RCC has to pass before communications with the switch is attempted.

   The RCC circuit pack's **GREEN heartbeat** LED indicates a slow heartbeat and the RCC circuit pack's **YELLOW** LED is lighted indicating communication with the switch is established.

6. If the hardware test on the RCC passes, then the software test is executed on the RCC circuit pack.

   NOTE

   No software test is executed for any port circuit packs.

7. The **GREEN** LED on the RCC circuit pack is lighted during the software test.
8. If the **GREEN** LED is not lighted on the RCC circuit pack within five minutes after the hardware test is completed, the maintenance mode bit is probably activated by another facility.

   Contact the local or remote maintenance facility and ask them to release the maintenance mode bit in the **MODE** display procedure.

9. When the RCC circuit pack being tested passes the software test, both LEDs are turned off.

   The **RED** LED is lighted if the RCC circuit pack fails the software test.

10. If any of the circuit packs fail the hardware test or the RCC circuit pack fails the software test indicated by a **RED** LED being lighted, replace the circuit pack and repeat the circuit pack insertion test.

    NOTE

    If more than one of the circuit packs fail, and one of the circuit packs is the RCC (ANN16), replace the RCC circuit pack first.

Port Circuit Pack Insertion

When a port circuit pack is inserted in the remote carrier group, the following occurs.

NOTE

When a GPP circuit pack is tested, all translated peripherals should be connected and have power on (when required) or the test may fail.

1. The hardware test on the port circuit pack is performed.

   The **RED** LED on the port circuit pack is turned on, then off.

   The **GREEN** LED on the port circuit pack is turned on, then off.

2. If the port circuit pack hardware test passes, both LEDs remain off.

   If the port circuit hardware test fails, the **RED** LED is lighted on the port circuit pack.

   NOTE

   No software test is executed for any port circuit packs.

3. If the port circuit pack fails the hardware test indicated by a **RED** LED being lighted, replace the circuit pack and repeat the circuit pack insertion test.

Features

When troubles with features provided by the switch are reported by the user, perform the following steps:

1. Determine if the feature trouble is isolated to a single terminal or experienced by all terminals.

   If the feature trouble is isolated to a single terminal, proceed to Step 3.

   If the feature trouble is experienced by all terminals, proceed to Step 2.

2. Check the customer order document to determine if the feature is a valid feature.

   If the feature is not valid, check with customer assistance or notify the user.

   If the feature is valid, check switch translation and administer as necessary.

3. Check switch translation for the terminal experiencing the trouble.

   Administer the feature as necessary.

   If the feature is administered, determine from the user if the trouble is intermittent.

4. If the trouble is not intermittent, replace the terminal.

   If the trouble is intermittent, proceed to Step 5.

5. Determine if errors are recorded against the suspect circuit by using **PROC 600**, Test 2. The circuit may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.

6. Use the appropriate maintenance procedure for the suspect circuit and test the circuit on a continuous basis.

   Take corrective action as necessary.

If the feature reported by the user as having trouble is a 74 series terminal connected to a personal computer, the user should be informed to power down the personal computer.

NOTE

It may not be possible for periodic or demand maintenance software to detect a defective 74 series terminal when it is connected to a powered-up personal computer.

A personal computer can consist of an AT&T PC6300, AT&T PC7300, IBM personal computer, or equivalent. The personal computer is connected to a DCPI interface card to allow an interface to the switch.

The signaling channels S1 and S2 from a GPP port are connected to the DCPI interface card and then to the 74 series terminal. However, the terminal probably does not support S2 signaling.

Since the DCPI interface card interprets and responds to S channel messages, even if the 74 series terminal is not connected, maintenance of the terminal is impossible from switch software when the personal computer is powered-up.

Request the customer to power down the personal computer before repeating maintenance on the defective 74 series telephone.

The terminal is not tested if the personal computer is powered up and the DCPI interface card is in the PC control mode.

NOTE

If the personal computer is powered down, **PROC 622** displays a fault code of 28 (odd channel of digital set is stuck in looparound) because the 74 series terminal hs no S2 connectivity.

A display of fault code 28 indicates the terminal is good. When a fault code other than 28 is displayed, use the appropriate repair procedure for the terminal being tested.

Attendant Console

When a continuous audible tone at the attendant console is reported by the user (caused by a system power interruption or the attendant console headset is plugged in), perform the following.

Operate the test switch on the left side of the attendant console to remove the tone.

NOTE

The test switch is located on the front panel of the storage area containing the card for attendant use.

NO RESPONSE FROM SWITCH

Overview

Trouble clearing when there is no response from the switch depends on the symptoms of the total switch failure.

No dial tone, can’t dial out, etc., reported by the customer or loss of communications between the switch and a remote maintenance facility (if provided) are types of total switch failure.

If no dial tone is reported and the common control appears to have the normal heartbeat, a condition of multiple simultaneous seizures that are not followed by dialing may be occurring.

PROC 420 allows maintenance personnel to display processor occupancy to further verify that the lack of dial tone is not the result of an overloaded processor.

If the system has alarmed DS-1 circuit packs, maintenance personnel should consider busying out the alarmed DS-1 circuit packs to eliminate a potential source of multiple seizures.

Contact with the user and examination of the alarm panel helps to determine how the switch is functioning and the type of trouble clearing procedure to perform.

If no LEDs on the alarm panel are lighted, a total switch failure has probably occurred. Perform the trouble clearing steps listed under **System Down - No LEDs Lighted** to restore the switch.

If the switch is in emergency transfer **(EMERGENCY TRANSFER ACT** indicator lighted), perform the trouble clearing steps listed under **Emergency Transfer - Processor Suicide Suspected** to restore the switch.

If a remote maintenance facility (if provided) cannot communicate with the switch, perform the trouble clearing steps listed under **Communications with Remote Maintenance Facility Lost** to restore communications.

System Down - No LEDs Lighted

1. Verify AC power is on at customer provided AC panel.

   If AC power is available, proceed to Step 2.

   If AC power is not available, contact the customer.

2. Visually inspect all fuses, circuit breakers, on/off switches (bulk OLS power supply), and power cables.

   If no problem is found with fuses, circuit breakers, on/off switches, and power cables, proceed to Step 3.

   If a problem is found, replace the fuse(s), reset circuit breaker(s) or on/off switches, or replace power cable(s).

3. Check rectifier, DC/DC converter output voltages, and the **GREEN** LED on bulk OLS power supplies. (Refer to Table C, Cabinet Power Supply Voltage Measurements and Table D, DC/DC Converter Voltage Measurements.)

   If all voltages are within acceptable limits or the **GREEN** LED on bulk OLS power supplies are lighted, proceed to Step 4.

   If abnormal voltages are noted or the **GREEN** LED is not lighted, replace DC/DC converter circuit packs, DC/DC converter, rectifier, or bulk OLS power supply as appropriate.

4. Perform **Microdiagnostic Testing**.

Table 4-4.

CABINET POWER SUPPLY **VOLTAGE MEASUREMENTS**			
CABINET	TYPE OF RECTIFIER	MINIMUM	MAXIMUM
COMMON CONTROL, MODULE CONTROL, PORT, TMS, and RMI	**309A/310**	**-46 V**	**-52 V**
	334A	**-46 V**	**-52 V**
	BATT	**-46 V**	**-52 V**

Table 4-5.

DC/DC CONVERTER VOLTAGE MEASUREMENTS			
CONVERTER	**VOLTAGE**	**MINIMUM**	**MAXIMUM**
490AA	**5 V**	**4.9 V**	**5.3 V**
494GA	**5 V**	**4.9 V**	**5.3 V**
495FA	**5 V**	**4.9 V**	**5.3 V**

Emergency Transfer - Processor Suicide Suspected

1. Inspect the alarm panel.

   If the **EMERGENCY TRANSFER ACT** indicator is lighted and the **PASS** indicator is flashing, ensure that the **EMERGENCY TRANSFER** switch is set to **OFF** and proceed to Step 6.

   If the **EMERGENCY TRANSFER ACT** and **MAJOR** indicators are lighted, and the **CC PWR** indicator is not lighted, proceed to Step 2.

   If the **EMERGENCY TRANSFER ACT, MAJOR**, and **CC PWR** indicators are lighted, proceed to Step 4.

2. Inspect network cabinets for tripped circuit breakers, blown fuses, and on/off switches (bulk OLS power supplies).

   If no problem is found with circuit breakers, fuses, and on/off switches, proceed to Step 3.

   If a problem is found, reset the circuit breakers or on/off switches, and/or replace blown fuses.

3. At network cabinets, measure rectifier and DC/DC converter output voltages and check the **GREEN** LED on bulk OLS power supplies. (Refer to Table C, Cabinet Power Supply Voltage Measurements and Table D, DC/DC Converter Voltage Measurements.)

   If all voltages are within acceptable limits and the **GREEN** LED is lighted, proceed to Step 6.

   If some voltages are out of acceptable limits or the **GREEN** LED is not lighted, replace DC/DC converter circuit packs, rectifier or associated circuit packs, bulk OLS power supply, or wiring (as appropriate) to restore voltages to within acceptable limits. Proceed to Step 6.

4. Inspect common control cabinet for tripped circuit breakers, on/off switches (bulk OLS power supplies) and/or blown fuses.

   If no problem is found with circuit breakers, on/off switches and fuses, proceed to Step 5.

   If a problem is found, reset the circuit breakers, on/off switches and/or replace blown fuses.

5. At the common control cabinet measure rectifier, DC/DC converter output voltages, or check the **GREEN** LED on bulk OLS power supplies.

   If all voltages are within acceptable limits or the **GREEN** LED is lighted, proceed to Step 6.

   If some voltages are out of acceptable limits or the **GREEN** LED is not lighted, replace DC/DC converter circuit packs, rectifier or associated circuit packs, bulk OLS power supply, or wiring (as appropriate) to restore voltages to within acceptable limits. Proceed to Step 6.

6. At the alarm panel, depress **RESET**, and momentarily set **HALT/GO** switch to **HALT**, then to **GO**.

   If the **PASS** indicator is flashing, and the **CC PWR, MAJOR** and **ACT** indicators are not lighted, the processor suicide trouble is corrected. Perform **PROC 600**, Test 1 and 2 to determine the health of the switch.

   If the **PASS** indicator is not flashing, proceed to Step 7.

7. Perform **Microdiagnostic Testing**.

Communications With Remote Maintenance Facility Lost

1. At the common control carrier, verify that circuit breaker **CB2** is not tripped.

   If circuit breaker **CB2** is not tripped, proceed to Step 3.

   If circuit breaker **CB2** is tripped, reset the circuit breaker and proceed to Step 2.

2. Determine if contact with the remote maintenance facility is established.

   If contact is established, corrective action is complete.

   If contact is not established, proceed to Step 3.

3. At the data set associated with the remote maintenance facility, verify that power is provided and appropriate LEDs are lighted.

   If power to the data set is provided and appropriate LEDs are lighted, proceed to Step 5.

   If power to the data set is not available or appropriate LEDs are not lighted, correct the problem and proceed to Step 4.

4. Determine if contact with the remote maintenance facility is established.

   If contact is established, corrective action is complete.

   If contact is not established, proceed to Step 5.

5. At the cross-connect field, visually inspect wiring for the remote maintenance facility.

   If wiring is correct, proceed to Step 7.

   If wiring is not correct, correct wiring and proceed to Step 6.

6. Determine if contact with the remote maintenance facility is established.

   If contact is established, corrective action is complete.

   If contact is not established, proceed to Step 7.

7. Replace TN492, and proceed to Step 8.

   NOTE

   Prior to replacement of circuit pack TN492, ensure that the battery (comcode 844665836) is connected (or connect) to the back side of the circuit pack.

   a. Mark the date of the next battery replacement (month and year) on the **Date Label** that is attached to the battery.

      NOTE

      The battery replacement date is established by adding 5 years to the date of installation of the TN492 circuit pack and associated battery. Example: TN492 circuit pack replaced July 1987; date to be written on the label is July 1992.

   b. Affix the **Date Label** to the faceplate of the TN492 circuit pack.

      NOTE

      If the **YELLOW** LED is lighted, after the circuit pack is replaced, the battery is **not** connected or wired correctly.

8. Determine if contact with the remote maintenance facility is established.

   If contact is established, corrective action is complete.

   If contact is not established, proceed to Step 9.

9. Replace the data set associated with the remote maintenance facility and proceed to Step 10.

10. Determine if contact with the remote maintenance facility is established.

    If contact is established, corrective action is complete.

    If contact is not established, check the wiring between the circuit breaker, cross-connect field, TN492, and data set.

Microdiagnostics - General

Microdiagnostic test execution requires that the common control carrier is operable and can perform the tests.

Circuit packs **TN370B, TN491B**, and **UN152B must** be installed for the microdiagnostics tests to pass.

a. Tests 0 through 6 require power from DC/DC converters in the common control power carrier (slots 1 and 2 for CC0 and slots 4 and 5 for CC1).

b. Tests 7 through 15 require power from all three DC/DC converters for each common control (slots 0, 1, and 2 for CC0 and slots 3, 4, and 5 for CC1).

c. The **HALT/GO** switch associated with the common control being tested **must** be set to the **GO** position.

Microdiagnostics are performed starting with Test 0 and progressing in numerical order to Test 15. If a failure is indicated corrective action is performed and the test is repeated. If the test passes after corrective action, all tests are repeated starting with Test 0 and progressing through Test 15.

Microdiagnostic Tests 3 through 6 and 13 are spare tests which are reserved for future use. Each spare test is executed in microdiagnostic test sequence.

Test 7 requires coordination between vintages of UN151, UN152B, UN153, TN370B, and TN491B circuit packs.

a. Before replacing a circuit pack, check the vintage of the circuit packs.

b. The maintenance control location should be contacted if the corresponding vintages are not known.

Test 10 tests the tape subsystem. For this test, a tape is placed in the transport and the **MAAP** is connected for consultation on failures.

Test 15 provides an abbreviated subset of tests (7, 8, and 9) and a memory load of the data on the tape. For this test, a tape is placed in the transport and the **MAAP** is connected to determine the progress of the memory load.

Test execution is accomplished by:

a. Selecting the test to be executed.

b. Momentarily depressing the **RESET** switch.

c. Momentarily depressing the **ENABLE** switch.

Test execution starts by clearing most of the alarm panel LEDs and lighting the LEDs related to the test.

a. The **PASS** and **FAIL** LEDs are cleared until the test result is determined.

b. If a test passes, the **PASS** LED on the alarm panel is lighted.

c. If a test fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is most likely the cause of the fault.

Other circuit packs that could be causing the test to fail are listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, in the order of their likelihood as causes of the problem.

a. CKT 1 in Table E is the failing circuit with the **RED** LED lighted.

b. The second most likely circuit pack is indicated as CKT 2 in Table E.

c. In some cases, one of the circuit packs listed in Table E may be the same as the circuit pack with the **RED** LED lighted.

d. When a circuit pack is listed in Table E as a replacement which has already been replaced, the sequence in Table E to be followed is the lowest circuit pack **not** replaced.

   If circuit pack 4 (CKT 4) has been replaced, replace CKT 3, then CKT 5, etc.

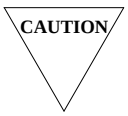
If a test fails and the circuit pack replacements listed in Table E do not correct the problem, the following is performed:

a. Table F, Circuit Packs Required to Perform Microdiagnostic Tests, is checked to determine which circuit packs are required to perform the failing test.

b. Circuit packs **not** required to perform the test are **unseated** and the test repeated.

c. If the test passes, the circuit packs are reseated one-at-a-time, repeating the failing test until the failing circuit pack(s) are located.

Microdiagnostic tests 0 through 10, 13, and 14 can be executed and call processing can be restarted from **INITA** by rocking the **HALT/GO** switch after the test is performed. A reload of the switch is not performed by rocking the **HALT/GO** switch if Test 15 is not performed. This method of testing is not the preferred method of microdiagnostic testing but is helpful to isolate unique problems without taking the switch down.



Transient calls (calls not fully established) are lost when this method of testing is performed. Do not use this method of testing when performing microdiagnostic tests 11, 12, and 15 as memory is destroyed or a forced reload is performed taking the switch down.

Microdiagnostic Testing

Test 0 - Diagnostic Processor Circuit Pack Demand Test

To execute microdiagnostic Test 0:

1. Set **TEST SELECT** switch to 0.

Table 4-6.

MICRODIAGNOSTICS
CIRCUIT PACK REPLACEMENT SEQUENCE

TEST	CKT 1	CKT 2	CKT 3	CKT 4	CKT 5	CKT 6	CKT 7	CKT 8
0	**[1]**	**TN491B Slot 31**	**TN492 Slot 32**	**TN490 Slot 22**				
1	**[1] [2]**	**TN491B Slot 31**	**TN492 Slot 32**	**TN490 Slot 22**				
2	**[1]**	**TN490 Slot 22**	**TN491B Slot 31**	**TN492 Slot 32**				
3	**[1]**	**TN491B Slot 31**	**TN492 Slot 32**	**TN490 Slot 22**				
4	**[1]**	**TN491B Slot 31**	**TN492 Slot 32**	**TN490 Slot 22**				
5	**[1]**	**TN491B Slot 31**	**TN492 Slot 32**	**TN490 Slot 22**				
6	**[1]**	**TN491B Slot 31**	**TN492 Slot 32**	**TN490 Slot 22**				
7	**[1]**	**UN152B Slot 02**	**TN491B Slot 31**	**TN370B Slot 00**				
8	**[1]**	**TN404 Slot 21**	**UN153 Slot 03**	**TN491B Slot 31**	**TN368 Slot 06**			
9	**[1]**	**UN152B Slot 02**	**UN153 Slot 03**	**TN370B Slot 00**	**UN151 Slot 01**	**TN392 Slot 07**	**TN404 Slot 21**	**TN368 Slot 06**
10	**[1]**	**TN430 Slot 20**	**UN153 Slot 03**	**TN392 Slot 07**	**TN368 Slot 06**			
11	**[1]**	**TN368 Slot 06**	**TN404 Slot 21**	**UN153 Slot 03**	**TN370B Slot 00**			
12	**[1]**	**TN368 Slot 06**	**TN404 Slot 21**	**UN153 Slot 03**	**TN370B Slot 00**			
13	**[1]**	**TN370B Slot 00**	**TN491B Slot 31**	**TN492 Slot 32**				
14	**[1]**	**TN369 Slot 04 [3]**	**UN152B Slot 02**	**TN490 Slot 22**	**UN153 Slot 03**	**TN370B Slot 00**		

[1] = Circuit pack with RED LED lighted.

[2] = For Test 1, replace all circuit packs with RED LED lighted and all circuit packs with no LEDs lighted.

[3] = Replace TN369 (Slot 04) if installed.

2. **Depress RESET, ENABLE.**

NOTE

While Test 0 is executing, the MAJOR and DIAG PROC indicators are lighted.

3. If Test 0 fails to affect alarm panel LEDs, power and cabling should be checked.

NOTE

Test 0 requires power from DC/DC converters in the common control power carrier (slots 1 and 2 for CC0 and slots 4 and 5 for CC1).

4. If the **PASS** indicator is lighted, Test 0 executed successfully.

NOTE

The **DIAG PROC** indicator is also lighted when Test 0 passes.

Continue with microdiagnostic Tests 1 through 15.

5. If Test 0 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, continue with microdiagnostic Tests 1 through 15.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 0.

7. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, continue with microdiagnostic Tests 1 through 15.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 0.

8. Repeat Step 7 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 0 are replaced.

9. If Test 0 continues to fail and all circuit pack replacements listed in Table E for Test 0 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 1 - Maintenance Bus Demand Test

To execute microdiagnostic Test 1:

1. Set **TEST SELECT** switch to 1.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 1 is executing, the **MAJOR** indicator is lighted.

3. In Test 1, the **RED** and **GREEN** LEDs (positions 18 and 19 respectively) are lighted on all common control carrier circuit packs.

   NOTE

   After the **ENABLE** switch is depressed, the **RED** LED is lighted for about 3 seconds and the **GREEN** LED is lighted until another test is selected.

4. If any circuit packs fail to light or remain with a **RED** LED lighted in position 18, the circuit pack(s) should be replaced.

   NOTE

   If a circuit pack was replaced in Step 4, repeat all microdiagnostic tests starting with Test 0.

5. If the **PASS** indicator is lighted, Test 1 executed successfully.

   Continue with microdiagnostic Tests 2 through 15.

6. If Test 1 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

7. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 1.

8. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 1.

9. Repeat Step 8 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 1 are replaced.
10. If Test 1 continues to fail and all circuit pack replacements listed in Table E for Test 1 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 2 - Alarm Interface Circuit Pack Demand Test

To execute microdiagnostic Test 2:

1. Set **TEST SELECT** switch to 2.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 2 is executing, the **MAJOR** and **PROC** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 2 executed successfully.

   NOTE

   The **PROC** indicator is also lighted when Test 2 passes.

   Continue with microdiagnostic Tests 3 through 15.

4. If Test 2 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 2.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 2.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 2 are replaced.
8. If Test 2 continues to fail and all circuit pack replacements listed in Table E for Test 2 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 3 - Spare (Reserved for Future Use)

NOTE

Test 3 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 3:

1. Set **TEST SELECT** switch to 3.
2. Depress **RESET, ENABLE**.
3. The **PASS** indicator is always lighted indicating Test 3 executed successfully.

   Continue with microdiagnostic Tests 4 through 15.

Test 4 - Spare (Reserved for Future Use)

NOTE

Test 4 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 4:

1. Set **TEST SELECT** switch to 4.
2. Depress **RESET, ENABLE**.
3. The **PASS** indicator is always lighted indicating Test 4 executed successfully.

   Continue with microdiagnostic Tests 5 through 15.

Test 5 - Spare (Reserved for Future Use)

NOTE

Test 5 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 5:

1. Set **TEST SELECT** switch to 5.
2. Depress **RESET, ENABLE**.
3. The **PASS** indicator is always lighted indicating Test 5 executed successfully.

   Continue with microdiagnostic Tests 6 through 15.

Test 6 - Spare (Reserved for Future Use)

NOTE

Test 6 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 6:

1. Set **TEST SELECT** switch to 6.
2. Depress **RESET, ENABLE**.
3. The **PASS** indicator is always lighted indicating Test 6 executed successfully.

   Continue with microdiagnostic Tests 7 through 15.

Test 7 - 501CC Processor Circuit Packs Demand Test

To execute microdiagnostic Test 7:

1. Set **TEST SELECT** switch to 7.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 7 is executing, the **MAJOR** and **PROC** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 7 executed successfully.

   NOTE

   The **PROC** indicator is also lighted when Test 7 passes.

   Continue with microdiagnostic Tests 8 through 15.

4. If Test 7 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

   NOTE

   Check that the circuit pack being replaced is the correct vintage and type.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 7.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 7.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 7 are replaced.

8. If Test 7 continues to fail and all circuit pack replacements listed in Table E for Test 7 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 8 - System Bus and Buffered Bus Demand Test

To execute microdiagnostic Test 8:

1. Set **TEST SELECT** switch to 8.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 8 is executing, the **MAJOR** and **I/O CHANNEL** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 8 executed successfully.

   NOTE

   The **I/O CHANNEL** indicator is also lighted when Test 8 passes.

   Continue with microdiagnostic Tests 9 through 15.

4. If Test 8 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 8.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 8.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 8 are replaced.

8. If Test 8 continues to fail and all circuit pack replacements listed in Table E for Test 8 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 9 - 501CC Instruction Set Demand Test

To execute microdiagnostic Test 9:

1. Set **TEST SELECT** switch to 9.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 9 is executing, the **MAJOR** and **PROC** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 9 executed successfully.

   NOTE

   The **PROC** indicator is also lighted when Test 9 passes.

   Continue with microdiagnostic Tests 10 through 15.

4. If Test 9 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 9.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 9.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 9 are replaced.

8. If Test 9 continues to fail and all circuit pack replacements listed in Table E for Test 9 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 10 - Tape Subsystem Demand Test

To execute microdiagnostic Test 10:

1. Ensure that a tape is in the High Capacity Minirecorder (HCMR) and is firmly seated.
2. Plug the **MAAP** into the **MAAP** connector for an unduplicated common control switch or connector CC0 or CC1 for the common control being tested in a duplicated common control switch.
3. Set **TEST SELECT** switch to 10.
4. Depress **RESET, ENABLE**.

NOTE

While Test 10 is executing, the **MAJOR** and **TAPE** indicators are lighted.

5. Test 10 takes about 50 to 75 seconds to complete. The LEDs on TN430 can be used to monitor progress of Test 10.

   Initially the **RED** LED in position 2 on TN430 is lighted.

   Next, the **GREEN** LED in position 1 on TN430 is lighted providing a heartbeat while the tape is read.

6. If the **PASS** indicator is lighted, Test 10 executed successfully.

NOTE

The **TAPE** indicator is also lighted when Test 10 passes.

   Continue with microdiagnostic Tests 11 through 15.

7. If Test 10 fails, the **FAIL** LED on the alarm panel is lighted.
8. The left side of the **MAAP** displays eight digits which are designated 1 through 8 reading from left to right.
9. If there is no display (blanked) on the **MAAP**, replace TN403 in Slot 23 and proceed to Step 22.
10. If all eight digits display 00000000, perform the following:

    Verify the tape is in the transport.

    Inspect power and cabling to the HCMR.

    Proceed to Step 22.

CAUTION

If multiple failures are indicated on the MAAP display, a 1 in more than 1 field, perform the following steps in the order listed. Do not replace the HCMR until all circuit packs within the HCMR are replaced when multiple failures are displayed.

11. If digit 1 or digit 8 displays a 1, replace TN430 in Slot 20 and proceed to Step 22.

CAUTION

Prior to replacing circuit packs in the HCMR, the power to the circuit packs must be removed or damage to the tape pin connectors or components on the circuit pack being replaced (or other circuit packs) can occur. Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of HCMR circuit packs.

12. If digit 6 displays a 1, replace SN446 (power supply) in the HCMR and proceed to Step 20.
13. If digit 2 displays a 1, replace SN441 (controller) in the HCMR and proceed to Step 20.
14. If digit 5 displays a 1, replace SN442 (data electronics) in the HCMR and proceed to Step 20.
15. If digit 4 displays a 1, replace SN443 (tape transport and preamp) in the HCMR and proceed to Step 20.
16. If digit 3 displays a 1, replace SN445 (servo) in the HCMR and proceed to Step 20.
17. If digit 7 displays a 1, perform the following:

    Reinsert tape.

    Depress **RESET, ENABLE** and proceed to Step 18.
18. If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

    If the **FAIL** indicator is lighted, replace the tape.

    Depress **RESET, ENABLE** and proceed to Step 19.
19. If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

    If the **FAIL** indicator is lighted, replace SN443 (tape transport and preamp) in the HCMR and proceed to Step 20.
20. Depress **RESET, ENABLE**.

    If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

    If the **FAIL** indicator is lighted, replace the HCMR and proceed to Step 21.
21. Depress **RESET, ENABLE**.

    If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

    If the **FAIL** indicator is lighted, check the wiring between the HCMR and the common control carrier.
22. Depress **RESET, ENABLE**.

    If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

    If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 10 and proceed to Step 23.
23. Depress **RESET, ENABLE**.

    If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

    If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 10 and proceed to Step 24.
24. Repeat Step 23 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 10 are replaced.
25. If Test 10 continues to fail and all circuit pack replacements listed in Table E for Test 10 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 11 - Main Memory System Demand Test

NOTE

TN392 in slots 08 and 09 are tested if installed.

To execute microdiagnostic Test 11:

1. Set **TEST SELECT** switch to 11.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 11 is executing, the **MAJOR** and **MEM** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 11 executed successfully.

   NOTE

   The **MEM** indicator is also lighted when Test 11 passes.

   Continue with microdiagnostic Tests 12 through 15.

4. If Test 11 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 11.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 11.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 11 are replaced.
8. If Test 11 continues to fail and all circuit pack replacements listed in Table E for Test 11 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 12 - Memory Protect Circuit Pack Demand Test

NOTE

TN392 in slots 08 and 09 are tested if installed.

To execute microdiagnostic Test 12:

NOTE

If installed, remove TN514 (scamper) prior to performing Test 12.

1. Set **TEST SELECT** switch to 12.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 12 is executing, the **MAJOR** and **MEM** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 12 executed successfully.

   NOTE

   The **MEM** indicator is also lighted when Test 12 passes.

   Continue with microdiagnostic Tests 13 through 15.

4. If Test 12 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 12.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 12.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 12 are replaced.
8. If Test 12 continues to fail and all circuit pack replacements listed in Table E for Test 12 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 13 - Spare (Reserved for Future Use)

NOTE

Test 13 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 13:

1. Set **TEST SELECT** switch to 13.
2. Depress **RESET, ENABLE**.
3. The **PASS** indicator is always lighted indicating Test 13 executed successfully.

   Continue with microdiagnostic Tests 14 and 15.

Test 14 - Cache Memory Circuit Pack Demand Test

NOTE

TN369 (cache memory) in slot 04 is tested if installed.

To execute microdiagnostic Test 14:

1. Set **TEST SELECT** switch to 14.
2. Depress **RESET, ENABLE**.

   NOTE

   While Test 14 is executing, the **MAJOR** and **CACHE MEMORY** indicators are lighted.

3. If the **PASS** indicator is lighted, Test 14 executed successfully.

   NOTE

   The **CACHE MEMORY** indicator is also lighted when Test 14 passes.

   Continue with microdiagnostic Test 15.

4. If Test 14 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

   Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 14.

6. Depress **RESET, ENABLE**.

   If the **PASS** indicator is lighted, repeat all microdiagnostic tests starting with Test 0.

   If the **FAIL** indicator is lighted, replace the next circuit pack listed in Table E, Microdiagnostics Circuit Pack Replacement Sequence, for Test 14.

7. Repeat Step 6 until the **PASS** indicator is lighted, or until all circuit packs listed in Table E for Test 14 are replaced.

8. If Test 14 continues to fail and all circuit pack replacements listed in Table E for Test 14 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 15 - Abbreviated Test and Forced Load

CAUTION

If microdiagnostic test 15 is executed without performing microdiagnostic tests 0 through 14 during a reload of tape, false alarms and emergency transfer can occur which may be service affecting. MSTAT memory is not cleared by test 15.

To execute microdiagnostic Test 15:

1. Ensure that a tape is in the High Capacity Minirecorder (HCMR) and is firmly seated.
2. Plug the **MAAP** into the **MAAP** connector for an unduplicated common control switch or connector CC0 or CC1 for the common control being tested in a duplicated common control switch.
3. Set **TEST SELECT** switch to 15.
4. Depress **RESET, ENABLE**.

   NOTE

   While Test 15 is executing, the **MAJOR, PROC** and **TAPE** indicators are lighted.

5. Test 15 provides an abbreviated subset of tests (7 through 9).

   If Tests 7 through 9 pass, memory is loaded with the data on the tape.

6. The first signs of a passing sequence are the LEDs on TN430.
   a. The **RED** LED in position 2 and the **YELLOW** LED at the middle of the circuit pack are lighted.
   b. Next, the **GREEN** LED in position 1 of the circuit pack starts flashing (indicating tape interface is being initialized).

c. Then the **GREEN** LED in position 1 goes either steady on or off while the tape is moved to a load position.

7. Next, data is read from tape and the **MAAP** is updated.
8. The area currently being read from tape is indicated in the procedure number field of the **MAAP** as follows:

   Encode 0 = Directory information is being read from tape.

   Encode 1 = Program information is being read from tape and is being written to memory.

   Encode 2 = Translation information is being read from tape and is being written to memory.

   Encode 3 = Patch information is being read from tape and is being written to memory.

   Encode 4 = The reading of information from tape is complete and hardware is being tested and initialized.

   Encode 5 = Hardware tests failed.

   Encode 6 = Tape subsystem was successfully initialized but load attempt failed because an uncorrectable error was encountered (e.g., bad tape, no tape, bad cable to HCMR, etc.).

   Encode 7 = Failed tape subsystem initialization (either HCMR, TN430, or both), of if encode 7 is seen only momentarily followed by an encode 9 then incomplete load.

   Encode 8 = Not enough memory or memory bad.

   Encode 9 = Too many reloads attempted or interrupts during load process after load counter incremented.

9. When the tape load is completed and successful, the **PASS** indicator on the alarm panel flashes at a 1-second on, 1-second off rate.

   In addition, the **GREEN** LED in position 2 of TN430 is flashing (indicating a heartbeat).

   NOTE

   There is a slight delay prior to the heartbeat appearing.

10. If the tape load is not successful, failure indicators **MAJOR, PROC** and **TAPE** are lighted. The **PASS** indicator does not flash.
11. If the **PASS** indicator does not flash or if any of the failure cases (Encodes 5 through 9) are displayed in the procedure number field of the **MAAP**, microdiagnostic tests 0 through 14 **must** be executed in order to find the cause of the failure.

Repair Guide For Microdiagnostic Testing

1. Determine from Table F, Circuit Packs Required to Perform Microdiagnostic Tests, which circuit packs are required to perform the microdiagnostic test being executed.
2. Unseat all circuit packs in the common control carrier that are **not** required to perform the microdiagnostic test being executed.
3. Depress **RESET, ENABLE**.

   If the **FAIL** indicator is lighted, reseat all circuit packs and proceed to Step 11.

   If the **PASS** indicator is lighted, reseat one circuit pack.

4. Depress **RESET, ENABLE**.

   If the **FAIL** indicator is lighted, proceed to Step 5.

   If the **PASS** indicator is lighted, proceed to Step 8.

5. Replace the reseated circuit pack, and depress **RESET, ENABLE**.

   If the **FAIL** indicator is lighted, proceed to Step 6.

   If the **PASS** indicator is lighted, proceed to Step 8.

6. Replace the circuit pack in the same slot.

   Do not replace more than 2 circuit packs in the same slot.

   Proceed to Step 7.

7. Depress **RESET, ENABLE**.

   If the **FAIL** indicator is lighted, reseat any unseated circuit packs and proceed to Step 11.

   If the **PASS** indicator is lighted, proceed to Step 8.

8. Determine if other circuit packs are to be reseated.

   If all circuit packs are reseated, proceed to Step 10.

   If any circuit packs are unseated, reseat the next circuit pack and proceed to Step 9.

9. Depress **RESET, ENABLE**.

   If the **FAIL** indicator is lighted, go to step 5.

   If the **PASS** indicator is lighted, repeat Step 8.

10. Determine if any circuit pack(s) were replaced in Steps 4 through 9.

    If no circuit packs were replaced, proceed to Step 11 and suspect an intermittent trouble.

    If a circuit pack was replaced, repeat all microdiagnostic tests starting with Test 0.

11. If the circuit pack replacements or the power and cabling checks do not reveal the source of the problem, check the backplane wiring.

Table 4-7.

	CIRCUIT PACKS REQUIRED TO PERFORM MICRODIAGNOSTIC TESTS
TEST	CIRCUIT PACKS REQUIRED FOR TEST TO EXECUTE
0	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
1	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
2	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
3	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
4	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
5	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
6	TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
7	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
8	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN404 (Slot 21), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
9	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN404 (Slot 21), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
10	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN430 (Slot 20), TN404 (Slot 21), TN490 (Slot 22), TN403 (Slot 23), TN491B (Slot 31), and TN492 (Slot 32).
11 [1]	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN404 (Slot 21), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
12 [1]	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN404 (Slot 21), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
13	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN404 (Slot 21), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).
14 [2]	TN370B (Slot 00), UN151 (Slot 01), UN152B (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN404 (Slot 21), TN490 (Slot 22), TN491B (Slot 31), and TN492 (Slot 32).

[1] = TN392 in slots 08 and 09 are tested (if installed).
[2] = TN369 in slot 04 is tested (if installed).

MAINTENANCE PROCEDURES

PROCEDURAL FORMAT AND CONTENT

Maintenance procedures presented in this section are divided into three to five parts depending upon the content and purpose of the procedure. The five parts of the procedure, preceded by a flipchart, consist of: purpose, field definitions and codes, test equipment required, operation of procedure, and repair guide. Each procedure consists of at least three parts; i.e., purpose, field definitions and codes, and operation of procedure.

Purpose

States the purpose of the procedure in general terms and briefly covers the contents and purpose of each test.

Field Definitions and Codes

Defines each field and the allowable values that are entered or displayed by the fields.

Test Equipment Required

States the test equipment required in order to execute one or more of the tests. The test equipment is not necessarily required for repair activities, but is required for operation of the procedure.

Operation of Procedure

Provides simplified instructions for calling up and running the procedure. Describes each test that can be run and presents the possible results, including indications that the test ran successfully.

Repair Guide

Based on the failure response provided by the test, this part lists the recommended corrective action to be taken.

a. The recommended corrective action does not represent an exhaustive isolation procedure, but serves as a guide to isolate and repair the suspected items.

b. Isolation and repair of elusive troubles are based primarily on switch familiarity (e.g., applicable schematic diagrams, circuit descriptions, etc.) and is not contained in the repair guide.

c. The repair guide for some maintenance procedures includes a repair procedure table. For a given failure code or indication, a list of corrective action steps are provided. The steps are to be performed in the order listed.

NOTE

When the corrective action lists a circuit pack to be replaced, the first action is to reseat the original circuit pack; repeat the applicable test; and based on the results, replace the circuit pack (if necessary).

d. Each replacement of a component must be followed by a rerun of the applicable test.

e. When replacement of a circuit pack or component does not clear the failure, the original circuit pack or component is reinstalled.

MAINTENANCE PROCEDURE SELECTION

Overview

There are two methods of selecting maintenance procedures. One is the use of Alarm Causes/Error Log maintenance procedure **(PROC 600)** and the other is visual inspection of the alarm panel.

Alarm Causes/Error Log

Maintenance procedure selection is directly related to the contents of PMIDS. Therefore, the starting point to determine which procedure to perform first for alarmed conditions and recorded errors is **PROC 600** (Alarm Causes/Error Log).

a. The reason for starting with **PROC 600** is that **PROC 600** dictates maintenance procedure sequencing (which maintenance procedure to perform and the order in which to perform them) by sorting the contents of PMIDS.

b. **PROC 600** displays the contents of PMIDS by alarm severity and in the order of priority dictated by the importance of the functional area(s) (unit types) which are alarmed. All alarms are displayed: first, major alarms within priority order; second, minor alarms in priority order; and last, warning alarms by priority order.

c. In addition, **PROC 600** provides by unit number (functional area) errors recorded for each circuit identified in PMIDS. This information may be of particular interest in isolating user-reported troubles and during maintenance polling.

d. **PROC 600** references the maintenance procedure (if any) to perform in order to investigate and isolate the cause of alarmed conditions and recorded errors. Also identified is the circuit location (if applicable) of the probable cause for each displayed entry.

   PROC 600 is also valid as the starting point for user-reported troubles and maintenance polling. Maintenance polling should be accomplished prior to maintenance personnel leaving the customer's premises to determine the health of the switch.

Alarm Panel

The fault indicators in the **ALARM, ENVIRON, COMMON CONTROL, NETWORK, APPL PROC**, and **OTHER** sections of the alarm panel reference the following.

a. Maintenance procedures for diagnosis and repair of the failure. For example, the **SWITCH** fault indicator references **PROC 620**.

b. Maintenance procedures that serve as a pointer to other procedures for diagnosis and repair. For example, the **OTHER FAILS** fault indicator references **PROC 600** which in turn references other procedures.

PROC 620 (Network) investigates and isolates multiple unit types and functional areas. As indicated on the alarm panel, **PROC 620** is referenced by two fault indicators: **SWITCH** and **PORT**.

The **OTHER FAILS** fault indicator references **PROC 600** which in turn references other procedures to isolate the cause of the lighted fault indicator. Such causes can be: SMDR, ANI, calling number display, Force Administration Data System (FADS), real time clock synchronizer, attendant console, etc.

General

The maintenance procedures that are not alarm panel oriented are used primarily to test a particular facility, busy out or release busied-out circuits, or make test calls.

The following **PROCs** can be performed both on- and off-line in a duplicated common control switch.

a. **PROC 600** - Alarm Causes/Error Log.

b. **PROC 610** - Tape Tests.

c. **PROC 611** - Common Control I/O Tests.

d. **PROC 612** - Initialization Causes.

e. **PROC 614** - Memory Read/Memory Match Tests.

f. **PROC 615** - **MAAP** Test.

g. **PROC 616** - Alarm Panel Test.

h. **PROC 618** - Diagnostic Processor/Remote Interface/Alarm Interface Test (Tests 1 through 3 only).

i. **PROC 650** - DCIU Tests.

j. **PROC 652** - Time-of-Day Clock Synchronizer.

When the switch is duplicated, it may be necessary to examine both the on-line and off-line side to determine the maintenance procedure to be performed. The problem that exists could have caused a switch to the healthier common control. When the problem is corrected, both the on-line and off-line sides should be examined to determine if potential problems exist.

MAINTENANCE PROCEDURE DESCRIPTION

Overview

Organization of the maintenance procedures is based on:

a. Procedures relating to the entire switch.

b. Procedures organized by functional area according to the area's importance to continued call processing integrity.

Each of the maintenance procedures is briefly described under the following titles:

- General switch procedures.
- Common control procedures.
- Network procedures.
- Common control peripherals procedures.
- Connection status procedures.
- Other procedures.

General Switch Maintenance Procedures

This group of maintenance procedures deals with the entire switch or with switch components that are concerned with the entire switch. General switch maintenance procedures include **PROC 600** and **PROC 601**.

PROC 600 - Alarm Causes/Error Log displays the contents of the current PMIDS error log.

a. The unit type, present alarm status of the circuit, number of failures recorded for the circuit, time of the first and last errors recorded, and time the circuit was alarmed or resolved are displayed.

b. The maintenance procedure used to run further tests on a circuit that is alarmed or has errors recorded is also displayed.

c. **PROC 600** allows entries in the error log to be cleared (zeroed- out) from PMIDS singly or by unit type. Alarmed entries, either resolved or unresolved, can be cleared individually or as a whole.

PROC 601 - Environmental Test displays information as to whether the alarm is caused by a cabinet or TMS/module control carrier power, fuse/circuit breaker, DC/DC converter, frequency generator, memory holdover, airflow, or temperature problem. **PROC 601** displays the location of the trouble and provides other information to assist maintenance personnel in investigating, isolating, and repairing the alarm cause.

Common Control Maintenance Procedures

This group of maintenance procedures tests the common control and associated components. Common control procedures include **PROC 610** through **PROC 616** and **PROC 618**.

PROC 610 - Tape Tests displays the failure history for tape errors, performs an ID chip test and parity checker/generator function test of TN430, resets TN430, and diagnoses the High Capacity Mini-Recorder (HCMR).

PROC 611 - Common Control I/O Tests is used to test the I/O capabilities of the common control and to display the failure history associated with these capabilities. The I/O capabilities tested include the 4 MHz data channels and the dual-speed data channels.

PROC 612 - Initialization Causes displays the failures which caused the common control processor to be initialized. In addition, all error log data (the entire PMIDS table) can be cleared (zeroed-out) when maintenance personnel consider it necessary to further isolate potential troubles.

PROC 613 - Duplicate Processor Control & Test displays the failures associated with processor duplication and tests the common control duplication channel. **PROC 613** allows memory updating in the off-line processor so that a soft switch can be attempted, and performs the soft switch when allowed. The health code indicators of the duplicate processors are displayed as well as the present status of the processor currently being used for testing.

PROC 614 - Memory Read/Memory Match Tests displays the recorded failure history and allows alarmed entries in the error log to be marked resolved. **PROC 614** tests identical areas of memory in both processors of a duplicated switch and provides the ability to test all or any part of main or cache memory. In addition, **PROC 614** reads and displays the contents of one or more memory locations in one processor whether the switch is duplicated or unduplicated.

PROC 615 - MAAP Test is used to test all functions of the **MAAP** which can be tested through the common control and provides indications of the severity and extent of any problems with the **MAAP**.

PROC 616 - Alarm Panel Test is used to test all software controlled LED indicators on the alarm panel and the ACK indicator on the attendant console.

PROC 618 - Diagnostic Processor/Remote Interface/Alarm Interface Test is used to test the capabilities of the diagnostic processor complex and to display the failure history associated with these capabilities. The capabilities tested include the alarm interface, diagnostic processor, remote interface, 1200 baud modem serving RMATS, and maintenance bus. External alarms originated by the external processor, external equipment, and auxiliary equipment are also reported via **PROC 618**.

Network Area Maintenance Procedures

This group of maintenance procedures deals with the digital network and its peripheral devices. Included are testing and recording capabilities for much of the hardware. Some of the network procedures are general purpose types; i.e., busy out procedures, and test calls. Network procedures include **PROC 620** through **PROC 625, PROC 630** through **PROC 632, PROC 640, PROC 642** through **PROC 644, PROC 646**, and **PROC 647**.

PROC 620 - Network Procedure displays the failure history, resolves alarmed entries, turns off alarms, and runs a test or diagnostic on any part of the network down through the port level. Each functional group of circuit packs in the network is assigned a 2-digit designation called the unit type. These unit types correspond with the unit types used in **PROC 600**.

PROC 621 - Network Duplication Channel displays the last seven switches, performs transparent soft switches (transparent to voice users), and performs hard switches of the TMS or module control complex. A re-initialization of the TMS or network module control complex can be performed whether or not the TMS or network module control complex is duplicated. Either side of a TMS or network module control complex can be soft locked off-line.

PROC 622 - Network Peripherals displays the failure history of network peripheral devices and resolves the alarmed entries. Tests necessary for fault isolation and verification of correct equipment operation can be performed.

PROC 623 - ANI Failures displays failure history for and tests ANI circuits. All available information which assists in fault isolation and repair is given.

PROC 624 - Contact Interface Test is a manual test used to determine if a contact interface circuit pack is defective. Any or all relay contacts on a selected contact interface circuit pack can be tested. Verification of relay operation must be visually observed at the customer's premises by monitoring associated LEDs on the circuit pack faceplate.

PROC 625 - Synchronization Reference Monitor displays the time and cause of the last eight reference switches and allows the monitoring of health for all DS-1 trunk interface circuit packs including the synchronization references. **PROC 625** provides the capability to switch between synchronization reference sources, and allows the disabling or re-enabling of the automatic reference switching by both software and hardware.

PROC 630 - Busy Out/Release Busy Out displays the busy out status and provides for the busy out or release busy out of terminals, trunks, and tone plants.

PROC 631 - Trunk Group Busy displays the busy out status for any trunk or trunk group and provides for the busy out or release busy out of trunks individually or by trunk group.

PROC 632 - Carrier Busy is used to busy out or release busy out circuits by the entire carrier or individually within a carrier. **PROC 632** also searches for and displays carriers which are completely or partially busied out. The type of task which maintenance busied the circuit is also displayed.

PROC 640 - Trunk Failures displays failure history for trunks and allows the resolving of alarmed entries singly or as a whole. **PROC 640** also provides dynamic recording and concurrent or later display of single trunk data. Trunk dial access code, type of data on the trunk when a failure occurred, and the trunk equipment location is provided to aid in isolating a trouble.

PROC 642 - Terminal-to-Trunk Test Call is used to test trunks by placing test calls from a specific terminal to the trunk being tested. Trunks can be tested singly, on the basis of dial access code, or on the basis of a trunk group.

PROC 643 - Terminal-to-Tone Test Call is used to transmit tones from the tone plant to the test line to aid in diagnosing user-reported tone failures. All tones generated by the tone plant or a selected set of these tones can be sent sequentially.

PROC 644 - Terminal-to-Auxiliary Tone Test Call is used to transmit tones from the auxiliary tone circuit to the test line to aid in diagnosing user-reported auxiliary tone failures. All tones generated by the auxiliary tone circuit or a selected set of these tones can be sent sequentially.

PROC 646 - Modem Pooling and Facility Testing is used to test the Analog/Digital Facility (ADFTC) test circuit, perform detection and diagnostic tests on modem pool members, digital facilities, EIA and CP interfaces and display the test results.

PROC 647 - Automatic Transmission Measurement System (ATMS) displays failure history from PMIDS and performs demand transmission and supervision testing. Measurement and test results for each trunk tested is displayed.

Common Control Peripherals Maintenance Procedures

This group of maintenance procedures tests any equipment which can directly communicate with the common control through a non-network path. Common control peripheral procedures include **PROC 650** and **PROC 652** through **PROC 656**.

PROC 650 - DCIU Tests is used to display the DCIU failure history, perform an ID chip and parity checker/generator function test on the DCIU circuit packs and execute loop around testing on DCIU data links. A demand reinitialization of the DCIU can also be performed.

PROC 652 - Time-of-Day Clock Synchronizer displays failure history for the time-of-day clock and allows alarmed error log entries to be resolved. The hardware and software clocks can be tested, their boundary conditions checked, and alarms reset if the clocks test good. In addition, the time-of-day clock can be set.

PROC 653 - Attendant Console Tests displays failure history for attendant consoles, allows alarmed error log entries to be resolved and tests all attendant consoles.

PROC 654 - Display Terminals Test displays failure history associated with display terminals, allows alarmed error log entries to be resolved, and tests the display terminals.

PROC 655 - Station Message Detail Recorder (SMDR) Test is used to test the SMDR function and its hardware components connected to the switch only. **PROC 655** also displays failure history associated with the SMDR equipment and resolves alarmed error log entries.

PROC 656 - Network Control Operations Support System (NCOSS) Port Test provides the capability to test NCOSS and LSUs on demand and display the results to assist in fault isolation and repair.

Connection Status Maintenance Procedures

This group of maintenance procedures displays the connection status and provides the capability to trace a call through the switch. Connection status procedures include **PROC 960** through **PROC 962**.

PROC 960 - Queue Activity displays queue information for a particular equipment location or the equipment locations associated with a particular queue.

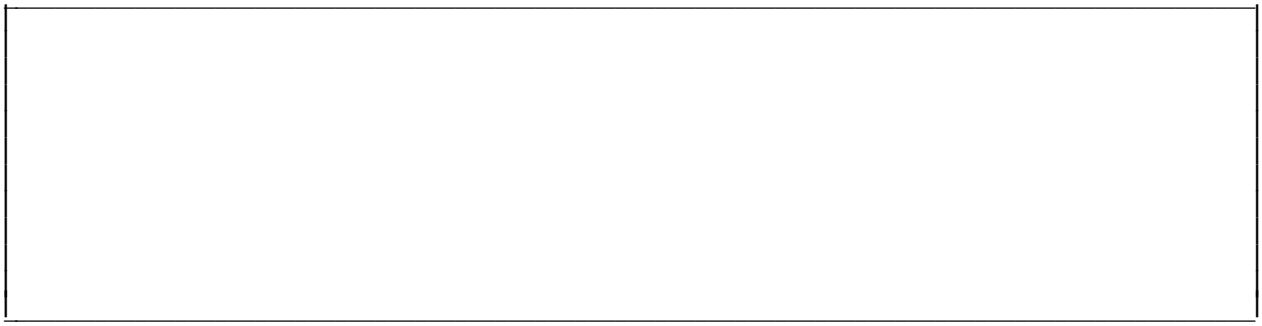
PROC 961 - Connection Activity displays connection information; i.e., connection number, accumulator number, and equipment location.

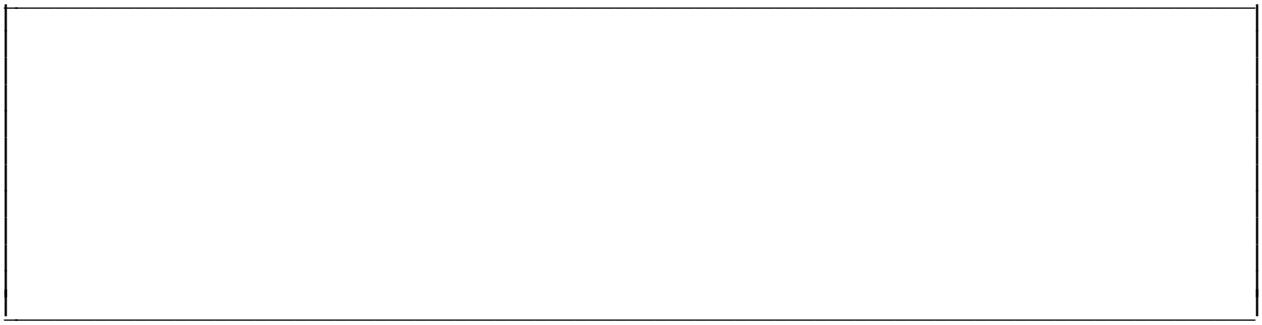
PROC 962 - Facility Connection displays the trunk number linkages for line records and the facility and conference facility linkages for trunk records.

Other Maintenance Procedures

To assist in trouble shooting memory problems, **PROC 999** is provided as an aid in displaying the data contents of a memory address via the software tables.

PROC 600 - ALARM CAUSES/ERROR LOG





Purpose

PROC 600 is the starting point for all maintenance activities.

PROC 600 is used to display the contents of the current PMIDS error log.

Each entry displayed identifies:

a. Unit type.

b. Present alarm status.

c. Number of recorded errors.

d. A time stamp for the first or last recorded error or when the entry was alarmed or resolved.

e. A reference to the maintenance procedure (if applicable) to perform to determine the cause of the error.

PROC 600 dictates maintenance procedure sequencing by sorting the contents of PMIDS, displaying the results in alarm severity order and then by errors recorded.

PROC 600 is used to:

1. Display alarmed entries in descending order with major alarmed entries displayed first, followed by minor alarmed entries, and warning alarmed entries displayed last.

2. Display entries within each alarm category corresponding to the most important functional area to the least important functional area of the switch.

NOTE

Alarmed entries are **not** displayed in numerical order by unit type. The most important functional area unit type is displayed first no matter what the unit type number may be.

3. Display circuits with errors recorded by unit type in numerical order.
4. Display resolved alarm entries by unit type in numerical order.
5. Resolve alarmed entries, individually or all at once (which turns off the associated fault indicator, or turns off all alarms and fault indicators).
6. Clear (zero) the failure history in PMIDS for all entries in a given unit type, or an individual entry for a particular unit type.
7. Clear (zero) resolved alarmed entries, individually or all at once.

When the switch is duplicated, both the on-line and off-line side should be examined using **PROC 600**, Test 2 to determine if potential problems exist.

Field Definitions and Codes

Each field of **PROC 600** flipchart and the possible displays for the fields during execution of the different tests are defined in Table G, PROC 600 - Field Definitions and Codes.

Field 2 is an optional entry field to enter the unit type to be investigated (Test 2 or 3 only) or to enter a null unit (Test 3 only).

Operation of Procedure

Overview

PROC 600 can display which entries are alarmed (causing alarm and fault indicators to be turned on), entries with errors recorded against them, and/or resolved alarm entries.

To call in **PROC 600**, perform the following:

1. Depress **PROC NO; 600; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Alarm order display.
2. Test 2 - Unit type display.
3. Test 3 - Resolved alarm entry display.

Table 5-8.

PROC 600 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	2 (Contd)	18	Cache.
2	1-77	Unit Type: Number designation of the functional unit of equipment that is being displayed.		19	Data Communications Interface Unit (DCIU).
				20	Station Message Detail Recorder (SMDR).
	1	Environment.		21	Automatic Number Identification (ANI).
	2	Tape.		22	Processor duplication (501CC).
	3	Initialization causes.		23	TMS or network duplication channel.
	4	Common control I/O.		24	Touch-tone sender.
	5	Memory.		25	Touch-tone receiver.
	6	Module control channel (MCC).		26	Network I/O.
	7	TMS or module processor.		27	General purpose port (GPP).
	8	Maintenance interface.		28	72 Series (MFET) port.
	9	Module clock.		29	Line circuit.
	10	Time-Slot Interchanger (TSI) - ALU.		30	Even port peripherals.
	11	Time-Slot Interchanger (TSI) - PSTORE.		31	Auxiliary tone plant.
	12	I/O bus interface (IOBI).		32	CO trunk (hardware).
	13	Port data store (PDS).		33	DID trunk (hardware).
	14	Port control interface (PCI).		34	Tie trunk/data port (hardware).
	15	Port data interface (PDI).		35	Digital trunk.
	16	Tone plant.		36	Digital user problem.
	17	Attendant console.			

Table 5-8. (Contd)

PROC 600 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
2 (Contd)	37	Calling number display.	2 (Contd)	57	Light guide interface (LGI).
	38	Real time clock synchronizer.		58	Fan in (FI).
	39	Force administration display system (FADS).		59	TMS maintenance (TMIF).
	40	Non-network peripherals.		60	Diagnostic processor/ remote interface.
	41	Trunk, software.		61	Configuration audits.
	42	Calls aborted.		62	Analog/digital facility test (ADFTC).
	43	Status memory audits.		63	External equipment.
	44	Attendant console interface.		64	External processor.
	45	Auxiliary trunk.		65	Modem pooling.
	46	Attendant conference.		66	Tone detector 2.
	48	Odd port peripherals.		67	Undefined exception FIFO errors.
	49	Maintenance and Administration Panel (MAAP).		68	DS-1.
	50	TMS clock oscillator (TCO).		69	Multifunctional analog terminal (MFAT).
	51	Local clock termination (LCT).		70	Automatic transmission measurement system (ATMS).
	52	System Clock Synchronizer (SCS).		71	Remote Module Interface (RMI).
	53	Multiplexer (MPX).		72	EIA Interface.
	54	Fan out (FO).		73	Dedicated switch connection (DSC).
	55	Module interface (MI).		74	Remote Carrier Group (RCG).
	56	Intermodule data store (IDS).			

Table 5-8. (Contd)

PROC 600 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
3-7		Equipment location of PMIDS error log entry.	3-7		Dedicated switch connection (DSC):
3-7		Status memory error:	3-5	1-1023	Connection number.
3	1-31	Status memory audit encode.	6	Dashed	Not applicable for DSC.
6	0-99	Status memory audit fault code.	7	1-4	DSC fault code.
4,5, & 7	Dashed	Not applicable for status memory entries.	3-7		External equipment error:
3-7		Undefined exception FIFO error:	3	1-32	Unit number of external equipment.
3	0-30	Module number.	4	1-8	External equipment encode.
4-5	Dashed	Not applicable for undefined exception FIFO entries.	5-7	Dashed	Not applicable for external equipment entries.
6	1-12	Undefined exception FIFO encode.	3-7		External processor error:
7	Dashed	Not applicable for undefined exception FIFO entries.	3	1-32	Unit number of external processor.
3-7		Diagnostic processor error:	4-7	Dashed	Not applicable for external processor entries.
3	0-30	Module number.	3-7		Configuration audit error:
4	0-7	Cabinet number.	3	0-99	Configuration audit fault code.
5	0-3	Carrier number.	4-7	Dashed	Not applicable for configuration audit errors.
6	22,31, or 32	Slot number.	3-7		All other PMIDS error log entries:
7	Dashed	Not applicable for diagnostic processor entries.	3	0-30	Network cabinet module.
				99	Common control cabinet module number.

Table 5-8. (Contd)

PROC 600 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
3-7		All other PMIDS error log entries (Contd):	11	1-3	Stamp Index (Time Stamp Index):
4	0-7	Cabinet number.		1	Latest time the displayed error log entry failed a test (Test 1 or Test 2) or time alarm was resolved for the displayed error entry (Test 3).
5	0-3	Carrier number.			
6	0-32	Slot number.			
7	0-7	Circuit number or Dashed.		2	Time of the first recorded error for the displayed error log entry.
8	0-5	Alarm status of displayed error log entry.			
	0	No errors recorded.		3	Time when the displayed error log entry was alarmed.
	1	Major.			
	2	Minor.	12-14		Time stamp: A time stamp showing the day of the month, hour, and minute when the first or last error occurred, or when the alarm was activated or resolved for the displayed error log entry.
	3	Warning.			
	4	Errors recorded.			
	5	Alarm resolved.			
9	0-999	Total failures recorded for displayed error log entry.	12	1-31	Day of the month.
			13	0-23	Hour of the day.
10	0-99	Circuit entry index: Summary of total number of alarmed circuits (Test 1); circuits with recorded errors (Test 2); resolved alarmed entries (Test 3).	14	0-59	Minute.
			15	01-56	PROC reference: The two digits displayed are the last two digits of a maintenance procedure (PROC 6XX) to be performed in order to obtain detailed information about the cause of the displayed error log entry.

Test 1

Test 1 of **PROC 600** is used locally or remotely to investigate an alarmed condition or a user reported trouble.

Test 1 of **PROC 600** is also performed prior to maintenance personnel leaving the customer's premises to ensure that all alarmed conditions (including warning alarms) are cleared.

When Test 1 is executed, any unacknowledged alarms are acknowledged by **PROC 600** causing the attendant console acknowledge (ACK) indicator to be lighted.

1. When **EXECUTE** is depressed in Test 1 of **PROC 600**, the system alarm status (alarm level indicators on the alarm panel) is checked for a **MAJOR** and/or **MINOR** alarm.
2. If the **MAJOR** and/or **MINOR** alarm indicators are lighted, the ACK indicator on the attendant console is lighted (if not already lighted).
3. The ACK indicator on the attendant console only goes off by clearing or resolving the cause of the alarms in PMIDS.

Test 1 displays PMIDS error log data for alarmed entries.

1. Alarmed entries are displayed in descending order with major alarmed entries displayed first, entries with minor alarms second, and entries with warning alarms last.
2. Within each alarm category entries are displayed by unit type priority.
3. Unit type priority is assigned according to the order of their importance to service to the customer (most important to least important functional area) and are **not** in numerical order.
4. Within each unit type and alarm category, (circuits with the same unit type and alarm), alarmed entries are displayed as most recent first.

Test 1 allows for all alarmed entries or an individual alarmed entry to be manually resolved.

Resolving individual alarmed entries or all alarmed entries results in an individual fault indicator or all alarms and fault indicators going off.

Test 1 does not allow clearing (zeroing) of alarmed entries from the PMIDS error log.

1. Test 1 is the default test when entering **PROC 600** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. To start Test 1, depress **EXECUTE**.

   The PMIDS error log is sorted and a summary of the total number of alarmed entries is displayed.

3. If no alarmed entries exist, the following summary is displayed:

   Field 1 - 1.

   Field 10 - 0 (Indicating no alarmed entries).

4. If any alarmed entries exist, the summary displays a 1 in Field 1 and the total number of alarmed entries in Field 10.

5. Depressing **NEXT CIRCUIT** displays the first alarmed entry as follows:

   Field 1 - 1.

   Field 2 - Unit type of alarmed entry (number designation of the type of equipment - See Table G, PROC 600 - Field Definitions and Codes).

   Field 3 - Dashed, unit number of external equipment/processor, or module number of alarmed entry.

   Field 4 - Dashed, external equipment encode, or cabinet number of alarmed entry.

   Field 5 - Dashed or carrier number of alarmed entry.

   NOTE

   Fields 3 through 5 may display the dedicated connection number for unit type 73 (dedicated switch connection).

   Field 6 - Dashed or slot number of alarmed entry.

   Field 7 - Dashed, circuit number of alarmed entry, or fault code for unit type 73 (dedicated switch connection).

   Field 8 - Alarm status of displayed entry (1 = major, 2 = minor, 3 = warning).

   Field 9 - Total number of times alarmed entry failed.

   Field 10 - Total number of alarmed entries.

   Field 11 - 3 (Indicating that Fields 12 through 14 display the time when the entry was alarmed).

   Fields 12 through 14 - Day, hour, and minute the displayed entry was alarmed.

   Field 15 - Dashed or a 2-digit reference to a maintenance procedure.

6. Further diagnosis of the displayed alarmed entry is performed by using the maintenance procedure referenced in Field 15 (if any) to isolate and repair the cause of the alarmed entry displayed in Fields 2 through 7.

7. The two digits referenced in Field 15 are preceded by a 6 to determine the maintenance procedure to be performed. (Example: 20 displayed in Field 15 indicates that **PROC 620** is the maintenance procedure to be performed.)

   NOTE

   When a displayed entry does not reference a maintenance procedure to be performed (Field 15 = dash), refer to the Repair Guide part of **PROC 600** to determine the type of diagnosis or repair action to be performed (if any).

8. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time the first error was recorded for the alarmed entry displayed in Fields 2 through 7.

   Depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 1 indicating that the time displayed in Fields 12 through 14 is the time the last error was recorded for the alarmed entry displayed in Fields 2 through 7.

   Depressing **NEXT DATA** again cycles back to the initial display providing a stamp index of 3 in Field 11, and the time the entry was alarmed in Fields 12 through 14.

9. Depressing **NEXT CIRCUIT** repeatedly displays the remaining alarmed entries in the PMIDS error log.

   Each time **NEXT CIRCUIT** is depressed, Field 10 is decremented by 1 to show the number of remaining alarmed entries to be displayed.

   The circuit entry index (Field 10) includes in its count the alarmed entry currently being displayed.

10. Depressing **NEXT CIRCUIT** after all alarmed entries are displayed dashes Fields 2 through 15.

    Depressing **NEXT CIRCUIT** again causes the display sequence to start over beginning with the summary.

11. The **CLEAR DATA; EXECUTE** sequence can be used to resolve individual alarmed entries or all alarmed entries after **EXECUTE** is used to initiate Test 1.

    NOTE

    When alarmed entries are resolved, the circuits' failure history is not deleted from the PMIDS error log. The failure history is updated to show that the alarm status now equals 5 (alarm resolved).

12. To resolve individual alarmed entries (turn off its associated fault indicator - when no other alarmed entries affect the same fault indicator), perform the following:

    Use **NEXT CIRCUIT** to display the alarmed entry on the **MAAP**.

    The alarmed entry cannot be resolved or the fault indicator turned off unless the alarmed entry is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

13. Field 8 (alarm status) displays a 5, indicating the alarmed entry is resolved.

    The fault indicator associated with the alarmed entry goes off if no other alarmed entries affecting the same fault indicator exist.

14. All alarmed entries can be resolved when the summary is initially displayed; i.e., upon entry to **PROC 600**, Test 1 and after displaying and recording all alarmed entries and then using **NEXT CIRCUIT** to display the summary.

    CAUTION

    The alarmed entries should be displayed and recorded prior to resolving the alarmed entries and turning off their associated alarm and fault indicators in order that a record of the causes of the alarmed entries are available for maintenance personnel.

15. After entering Test 1 and depressing **EXECUTE** (summary is displayed), depress **CLEAR DATA; EXECUTE**.

    The alarmed entries are resolved and all alarms and fault indicators are turned off.

    Field 10 displays a 0, indicating no alarmed entries exist.

16. After displaying and recording all alarmed entries, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

    All alarmed entries are resolved and all alarms and fault indicators are turned off.

    Field 10 displays a 0, indicating no alarmed entries exist.

17. When an alarmed entry equipment location is left displayed in Test 1, the entry can be passed to other maintenance procedures as a default equipment location for further testing.

NOTE

Only **PROC 601, PROC 611, PROC 620, PROC 622, PROC 646**, and **PROC 647** have the capability to accept default equipment locations passed to them by **PROC 600**.

Test 2

Test 2 of **PROC 600** is used to investigate user-reported troubles or to determine if further analysis of potential troubles are to be performed.

Test 2 of **PROC 600** is also performed prior to maintenance personnel leaving the customer's premises to ensure that all potential troubles are investigated and cleared to eliminate future alarm conditions.

Test 2 displays alarmed circuits and circuits with errors recorded against them by unit type in numerical order.

Alarmed circuits are displayed within a unit type; therefore, all of the same type of alarms (i.e., major, minor, or warning) are not displayed by alarm category as in Test 1.

Individual entries within a unit type or all entries for a single unit type may be cleared (zeroed out) from the PMIDS error log. When entries are cleared (zeroed out), the circuit(s) failure history is deleted from the PMIDS error log.

1. Test 2 is selected by use of **NEXT TEST**.

NOTE

Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. To start Test 2, depress **EXECUTE**.
3. The PMIDS error log is sorted and a summary of the total number of circuits with recorded errors for all unit types is displayed.
4. If no circuits with recorded errors exist, the following summary is displayed:

   Field 1 - 2.

   Field 10 - 0 (Indicating no circuits with recorded errors).
5. If any circuits with recorded errors exist, the summary displays a 2 in Field 1 and the total number of entries with recorded errors in Field 10.

NOTE

A display of 99 in Field 10 indicates that 99 or more entries with recorded errors exist in the error log.

6. When the initial summary is displayed, Field 2 (unit type) is flashed indicating it is an optional entry field. To select a particular unit type of interest, enter the following:

   (Unit type); ENTER.

   Proceed to Step 8.

7. A particular unit type of interest may also be selected by use of **NEXT UNIT**.

   Depress **NEXT UNIT** until the unit type of interest is displayed in Field 2.

   Proceed to Step 9.

8. Depress **EXECUTE**.

   NOTE

   EXECUTE must be depressed to display the contents for the unit type entered.

9. The first entry (if any) for the unit type entered is displayed. See Step 11 below for the description of the display.

   Field 10 (circuit entry index) decreases to show the number of remaining entries to be displayed (if any) from the unit type entered, including the entry presently displayed.

   If no recorded entries exist for the unit type entered, Fields 3 through 7, 9, and 11 through 15 are dashed.

   Field 8 (alarm status) displays a 0 and Field 10 displays the number of remaining entries (if any) to be displayed.

10. When the summary is displayed and a particular unit of interest is not selected, use of **NEXT CIRCUIT** or **NEXT UNIT** displays the first PMIDS entry with recorded errors.

    NEXT CIRCUIT is used to step through all individual circuit entries or all entries within a unit type.

    NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.

11. The first entry with recorded errors is displayed as follows:

    Field 1 - 2.

    Field 2 - Unit type of entry with recorded errors (number designation of the type of equipment - See Table G, PROC 600 - Field Definitions and Codes).

    Field 3 - Dashed, status memory audit encode, configuration audit fault code, unit number of external equipment/processor, or module number of entry with recorded errors.

    Field 4 - Dashed, external equipment encode, or cabinet number of entry with recorded errors.

    Field 5 - Dashed or carrier number of entry with recorded errors.

    NOTE

    Fields 3 through 5 may display the dedicated connection number for unit type 73 (dedicated switch connection).

    Field 6 - Dashed, status memory audit fault code, undefined exception FIFO encode, or slot number of entry with recorded errors.

    Field 7 - Dashed, circuit number of alarmed entry, or fault code for unit type 73 (dedicated switch connection).

    Field 8 - Alarm status of entry with recorded errors (1 = major, 2 = minor, 3 = warning, 4 = errors recorded).

    Field 9 - Total number of times entry with recorded errors failed.

    Field 10 - Total number of entries with recorded errors.

Field 11 - 1 (Indicating that Fields 12 through 14 display the time when the last error was recorded for the displayed entry).

Fields 12 through 14 - Day, hour, and minute of the last error recorded for the displayed entry.

Field 15 - Dashed or a 2-digit reference to a maintenance procedure.

12. Further diagnosis of the displayed entry can be performed by using the maintenance procedure referenced in Field 15 (if any) to isolate and repair the cause of the entry displayed in Fields 2 through 7.

    The two digits referenced in Field 15 are preceded by a 6 to determine the maintenance procedure to be performed. (Example: 20 displayed in Field 15 indicates that **PROC 620** is the maintenance procedure to be performed.)

    NOTE

    When a displayed entry does not reference a maintenance procedure to be performed (Field 15 = dash), refer to the Repair Guide part of **PROC 600** to determine the type of diagnosis or repair action to be performed (if any).

13. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time the first error was recorded for the entry displayed in Fields 2 through 7.

    If the displayed entry is an alarmed PMIDS entry (indicated by a 1, 2, or 3 in Field 8), depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 3 indicating that the time displayed in Fields 12 through 14 is the time the entry was alarmed.

14. If the displayed entry is not an alarmed PMIDS entry (or after displaying the time the entry was alarmed), depressing **NEXT DATA** cycles back to the initial display providing a stamp index of 1 in Field 11 and the time of the last recorded error for the entry in Fields 12 through 14.

15. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the next entry with recorded errors in display order or another unit type of interest can be selected for display.

16. To select another unit type of interest after the first unit type is selected or **NEXT CIRCUIT** or **NEXT UNIT** is depressed, perform the following:

    CHANGE FIELD; 2; ENTER; (Unit type); ENTER.

    EXECUTE must be depressed to display the contents of the unit type selected.

17. Each time **NEXT CIRCUIT** is depressed, Field 10 is decremented by 1 to show the number of remaining entries with recorded errors to be displayed.

    The circuit entry index (Field 10) includes in its count the entry currently being displayed.

18. Field 10 is decremented by a multiple corresponding to the number of entries within a unit type when **NEXT UNIT** is used to step from unit to unit without examining the entries within a unit type or a unit type of interest is selected by the **CHANGE FIELD** sequence.

    The circuit entry index (Field 10) includes in its count the entry currently being displayed.

19. When the last entry in a unit is currently displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the first entry of the next unit with recorded errors.

20. Depressing **NEXT CIRCUIT** or **NEXT UNIT** after all entries with recorded errors are displayed dashes Fields 2 through 15.

    Depressing **NEXT CIRCUIT** or **NEXT UNIT** again causes the display sequence to start over beginning with the summary.

21. The **CLEAR DATA; EXECUTE** sequence can be used to clear (zero out) individual entries with recorded errors or all entries with recorded errors in a particular unit type after **EXECUTE** is used to initiate Test 2.

    NOTE

    When an entry with recorded errors is an alarmed entry (indicated by a 1, 2, or 3 displayed in Field 8), the fault indicator associated with that entry goes off if no other entries affecting the same fault indicator exist.

22. To clear (zero out) individual entries with recorded errors from the PMIDS error log, perform the following:

    Use **NEXT CIRCUIT** and/or **NEXT UNIT** to display the entry to be cleared.

    The entry with recorded errors cannot be cleared (zeroed out) from the PMIDS error log unless the entry is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

23. Field 8 (alarm status) displays a 0, indicating the entry is cleared from PMIDS.

    Fields 9 and 11 through 15 are dashed.

    Field 10 displays the number of remaining entries (if any) to be displayed.

    NOTE

    A display of 99 in Field 10 indicates that 99 or more entries with recorded errors still exist in the error log.

24. All entries with recorded errors within a unit type are cleared (zeroed out) in two ways: when the summary is initially displayed and after displaying and recording the entries with recorded errors in the unit type to be cleared.

    CAUTION

    The entries with recorded errors should not be cleared (zeroed out) for a unit type until all entries are displayed and recorded in order that a record of the causes of the entries are available for maintenance personnel.

25. After entering Test 2, depress **EXECUTE** to display the summary, enter the unit type to be cleared (zeroed out) in Field 2, and depress **CLEAR DATA; EXECUTE**:

    (Unit type); ENTER; CLEAR DATA; EXECUTE.

26. Field 8 displays a 0 indicating no entries with recorded errors exist for the unit type displayed in Field 2.

    Fields 9 and 11 through 15 are dashed.

    Field 10 displays the number of remaining entries (if any) to be displayed.

    NOTE

    A display of 99 in Field 10 indicates that 99 or more entries with recorded errors still exist in the error log.

27. After displaying and recording all entries with recorded errors in the unit type to be cleared (zeroed out), use the **CHANGE FIELD** sequence to enter the unit type in Field 2, and depress **CLEAR DATA; EXECUTE**:

    CHANGE FIELD; 2; ENTER; (Unit type); ENTER; **CLEAR DATA; EXECUTE**.

28. Field 8 displays a 0 indicating no entries with recorded errors exist for the unit type displayed in Field 2.

    Fields 9 and 11 through 15 are dashed.

29. Field 10 displays the number of remaining entries (if any) to be displayed.

NOTE

A display of 99 in Field 10 indicates that 99 or more entries with recorded errors still exist in the error log.

30. When an entry with recorded errors is left displayed in Test 2, the equipment location of the entry can be passed as a default equipment location to other maintenance procedures for further testing.

NOTE

Only **PROC 601, PROC 611, PROC 620, PROC 622, PROC 646**, and **PROC 647** have the capability to accept default equipment locations passed to them by **PROC 600**.

Test 3

Test 3 of **PROC 600** is used to investigate which entries in the PMIDS error log are resolved.

Resolved alarmed entries in the PMIDS error log are identical whether an alarmed entry is resolved by isolating, repairing, and testing the circuit or by manually resolving the alarmed entry using **CLEAR DATA; EXECUTE** in Test 1.

Test 3 of **PROC 600** is performed by maintenance personnel to obtain an archive of alarmed entries from the PMIDS error log which are resolved.

1. The resolved alarmed entries display such information as the unit type, circuit identification, time the entry was resolved, time the entry was alarmed, and the time of the first recorded error for the displayed entry.
2. Such information can be beneficial when the same entry is later displayed as an alarmed entry or as an entry with recorded errors.

Test 3 displays resolved alarmed entries by unit type in numerical order.

Individual resolved alarmed entries or all resolved alarmed entries may be cleared (zeroed out) from the PMIDS error log. When entries are cleared (zeroed out), the circuit(s) failure history is deleted from the PMIDS error log.

1. Test 3 is selected by use of **NEXT TEST**.

NOTE

Use of the **CHANGE FIELD** sequence is not valid to select Test 3.

2. To start Test 3, depress **EXECUTE**.

3. The PMIDS error log is sorted and a summary of the total number of resolved alarmed entries is displayed.
4. If no resolved alarmed entries exist, the following summary is displayed:

   Field 1 - 3.

   Field 10 - 0 (Indicating no resolved alarmed entries).
5. If any resolved alarmed entries exist, the summary displays a 3 in Field 1 and the total number of resolved alarmed entries is displayed in Field 10.
6. When the initial summary is displayed, Field 2 (unit type) is flashed indicating it is an optional entry field. To select a particular unit type of interest, enter the following:

   (Unit type); ENTER.

   Proceed to Step 8.
7. A particular unit type of interest may also be selected by use of **NEXT UNIT**.

   Depress **NEXT UNIT** until the unit type of interest is displayed in Field 2.

   Proceed to Step 9.
8. Depress **EXECUTE**.

   EXECUTE must be depressed to display the contents for the unit type entered.

9. The first entry (if any) for the unit type entered is displayed. See Step 11 below for the description of the display.

   Field 10 (circuit entry index) decreases to show the number of remaining entries to be displayed in order (if any) from the unit type entered, including the entry presently displayed.

   If no recorded entries exist for the unit type entered, Fields 3 through 7, 9, and 11 through 15 are dashed.

   Field 8 (alarm status) displays a 0 and Field 10 displays the number of remaining entries (if any) to be displayed.
10. When the summary is displayed and a particular unit of interest is not selected, use of **NEXT CIRCUIT** or **NEXT UNIT** displays the first PMIDS resolved alarmed entry.

    NEXT CIRCUIT is used to step through all individual resolved alarmed entries or all entries within a unit type.

    NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.
11. The first resolved alarmed entry is displayed as follows:

    Field 1 - 3.

    Field 2 - Unit type of resolved alarmed entry (number designation of the type of equipment - See Table G, PROC 600 - Field Definitions and Codes).

    Field 3 - Dashed, unit number of external equipment/processor, or module number of resolved alarmed entry.

    Field 4 - Dashed, external equipment encode, or cabinet number of resolved alarmed entry.

Field 5 - Dashed or carrier number of resolved alarmed entry.

NOTE

Fields 3 through 5 may display the dedicated connection number for unit type 73 (dedicated switch connection).

Field 6 - Dashed or slot number of resolved alarmed entry.

Field 7 - Dashed, circuit number of alarmed entry, or fault code for unit type 73 (dedicated switch connection).

Field 8 - 5 (Indicating alarmed entry is resolved).

Field 9 - Total number of times resolved alarmed entry failed.

Field 10 - Total number of resolved alarmed entries.

Field 11 - 1 (Indicating that Fields 12 through 14 display the time when the alarmed entry was resolved).

Fields 12 through 14 - Day, hour, and minute the displayed entry was resolved.

Field 15 - Dashed.

12. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 3 indicating that the time displayed in Fields 12 through 14 is the time the entry was alarmed.

13. Depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time the first error was recorded for the resolved alarmed entry displayed in Fields 3 through 7.

    Depressing **NEXT DATA** again cycles back to the initial display providing a stamp index of 1 in Field 11, and the time the alarmed entry was resolved in Fields 12 through 14.

14. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the next resolved alarmed entry in display order or another unit type of interest can be selected for display.

15. To select another unit type of interest after the first unit type is selected or **NEXT CIRCUIT** or **NEXT UNIT** is depressed, perform the following:

    CHANGE FIELD; 2; ENTER; (Unit type); ENTER.

    EXECUTE must be depressed to display the contents of the unit type selected.

16. Each time **NEXT CIRCUIT** is depressed, Field 10 is decremented by 1 to show the number of remaining resolved alarmed entries.

    The circuit entry index (Field 10) includes in its count the entry currently being displayed.

17. Field 10 is decremented by a multiple corresponding to the number of entries within a unit type when **NEXT UNIT** is used to step from unit to unit without examining the entries within a unit type, or a unit type of interest is selected by the **CHANGE FIELD** sequence.

    The circuit entry index (Field 10) includes in its count the entry currently being displayed.

18. When the last entry in a unit is currently displayed, depressing **NEXT UNIT** or **NEXT CIRCUIT** displays the first entry of the next unit with resolved alarmed entries.

19. Depressing **NEXT CIRCUIT** or **NEXT UNIT** after all resolved alarmed entries are displayed, dashes Fields 2 through 15.

    Depressing **NEXT CIRCUIT** or **NEXT UNIT** again causes the display sequence to start over beginning with the summary.

20. The **CLEAR DATA; EXECUTE** sequence can be used to clear (zero out) individual resolved alarmed entries or all resolved alarmed entries from PMIDS after **EXECUTE** is used to initiate Test 3.

    CAUTION

    The resolved alarmed entries should not be cleared (zeroed out) until all entries are displayed and recorded in order to provide an archive of resolved alarmed entries.

21. To clear (zero out) individual resolved alarmed entries from the PMIDS error log, perform the following:

    Use **NEXT CIRCUIT** and/or **NEXT UNIT** to display the entry to be cleared.

    The resolved alarmed entry can not be cleared (zeroed out) from the PMIDS error log unless the entry is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

22. Field 8 (alarm status) displays a 0, indicating the entry is cleared from PMIDS.

    Fields 9 and 11 through 15 are dashed.

    Field 10 displays the number of remaining entries (if any) to be displayed.

    NOTE

    A display of 99 in Field 10 indicates that 99 or more resolved entries still exist in the error log.

23. If the **CLEAR DATA; EXECUTE** sequence is performed when the summary is displayed or when a **null** unit is entered in Field 2, all resolved alarmed entries are cleared (zeroed out) from the PMIDS error log.

24. To clear (zero out) all resolved alarmed entries using the **null** unit method, perform the following:

    CHANGE FIELD; 2; ENTER; ENTER; CLEAR DATA; EXECUTE.

    Field 10 displays a 0, indicating that no resolved alarmed entries exist.

25. All resolved alarmed entries can be cleared (zeroed out) when the summary is initially displayed; i.e., upon entry to **PROC 600**, Test 3 and after displaying and recording all resolved alarmed entries.

26. After entering Test 3 and depressing **EXECUTE** (summary is displayed), depress **CLEAR DATA; EXECUTE**.

    Field 10 displays a 0, indicating no resolved alarmed entries exist.

27. After displaying and recording all resolved alarmed entries, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

    Field 10 displays a 0, indicating no resolved alarmed entries exist.

Repair Guide

PROC 600 displays a dash in Field 15 for several unit type entries. A dash in Field 15 indicates that a maintenance procedure is not available to diagnose and isolate these failures.

In general, unit types 42, 43, 61, 67, and 73 are the only unit types that display a dash in Field 15.

Unit type 42 (calls aborted), unit type 43 (status memory audit), unit type 61 (configuration audits), unit type 67 (undefined exception FIFO code), and unit type 73 (dedicated switch connection) do not raise an alarm or reference a maintenance procedure. Entries for these unit types are displayed in Test 2 of **PROC 600**, and Field 15 is dashed.

The following corrective action should be taken when entries in unit types 42, 43, 61, 67, and 73 are displayed by Test 2.

Unit Type 42 (Calls Aborted):

1. Record the information displayed in Fields 2 through 14 of each entry displayed in Test 2 and clear (zero out) the unit type (42) from PMIDS.
2. When excessive entries (based on experience) for unit type 42 are noted, refer the problem to switch software engineers for further diagnosis.

Unit Type 43 (Status Memory Audits):

1. Record the status memory encode displayed in Field 3 and the related information displayed in Fields 9 through 14 of each entry displayed in Test 2, and clear (zero out) the unit type (43) from PMIDS.
2. Table H, PROC 600 - Status Memory Audit Encodes, provides a definition for each status memory encode presently being used.
3. Refer these types of software errors to the switch software engineers for further diagnosis.

NOTE

The remainder of the fault signature data for each status memory audit entry is not displayed in **PROC 600**.

Unit Type 61 (Configuration Audits):

1. Record the configuration audit fault code displayed in Field 3 and the related information displayed in Fields 9 through 14 of each entry displayed in Test 2, and clear (zero out) the unit type (61) from PMIDS.
2. Table I, PROC 600 - Configuration Audit Fault Codes, provides a definition for each configuration audit fault code presently being used.
3. Refer these types of software errors to the switch software engineers for further diagnosis.

NOTE

The remainder of the fault signature data for each configuration audit entry is not displayed in **PROC 600**.

Table 5-9.

PROC 600 - STATUS MEMORY AUDIT ENCODES		
FIELD 3 ENCODE	**FIELD 6 ENCODE**	**DEFINITION**
1	1 64	Error Bad Look PMIDS Cleared by PROC 612
2	4 1	Bad Linkage Digit Error Bad Linkage
3	1	Error No Activity
4	1	Error Stuck Connection Number
5	1	Error Stuck Accumulator
6	1 64	Error Electronic Telephone Tone PMIDS Cleared by PROC 612
7	1	Error Electronic Telephone Status
8	8	DCIU Hardware Error
9	8	DCIU Software Error
10	1 4 2 16	Bad Port Audit Bad Port Digit Bad Port Information Initialization Translation Error
11	1	Bad Time Slot Interchanger Count
12	2 1	Bad Port Equipment Number Bad Port Equipment Number Audit
13	1	Accumulator Zero Error
14	16	Input/Output Selection Error
15	4	Digit Collection Message Error
16	4	Digit Send Error
17	4	Busy Trunk Digit
18	2 32	Bad originating number Invalid module FIFO 15 code
19	2	Bad scanner message
20	1	Queue fault
21	1	Bad Blind Map
22	1	Accumulator inconsistent
23	1	Bad TMS Link error
24	32	Invalid TMS FIFO 15 code
29	29	TSI PSTORE double connect

Table 5-10.

PROC 600 - CONFIGURATION AUDIT FAULT CODES	
FAULT CODE	DEFINITION
1	**Control register on memory board 0**
2	**Control register on memory board 1**
3	**Control register on memory board 2**
4	**Control register on memory board 3**
5	**Control register on memory board 4**
6	**Control register on memory board 5**
7	**Control register on memory board 6**
8	**Control register on memory board 7**
17	**501CC write protect**
18	**Scamper write protect**
19	**Duplicate controller write protect**
23	**Fetch protect boundary**
24	**Double write select register**
25	**Double write enable register (control register)**

Unit Type 67 (Undefined Exception FIFO Code):

1. Record the module number displayed in Field 3, the undefined exception FIFO encode displayed in Field 6, the related information displayed in Fields 9 through 14 of each entry displayed in Test 2 and clear (zero out) the unit type (67) from PMIDS.
2. Table J, PROC 600 - Exception FIFO Encodes, provides a definition for each exception FIFO encode presently being used.
3. Refer these types of software errors to the switch software engineers for further diagnosis.

NOTE

The remainder of the fault signature data for each undefined exception FIFO entry is not displayed in **PROC 600**.

Unit Type 73 (Dedicated Switch Connection):

1. Record the dedicated connection number displayed in Fields 3 through 5, the fault code displayed in Field 7, and the related information displayed in Fields 9 through 14 of each entry displayed in Test 2, and clear (zero out) the unit type (73) from PMIDS.
2. Table K, PROC 600 - Dedicated Switch Connection Fault Codes, provides a definition for each fault code presently being used.
3. If an excessive amount of fault code 1's are recorded, enter **PROC 360**.

   Enter the dedicated switch connection number in Field 2 and perform a **DISPLAY, EXECUTE**.

   Record the port equipment locations displayed in Fields 3 through 8 and 10 through 15 of **PROC 360**.

4. Use **PROC 620** Test 4 and test both port equipment locations, using the appropriate unit type.

   If the port equipment locations fail, take the appropriate corrective action.

   If the port equipment locations pass, proceed to Step 5.

5. Refer these types of software errors to the switch software engineers for further diagnosis.

NOTE

The remainder of the fault signature data for each dedicated switch connection entry is not displayed in **PROC 600**.

Table 5-11.

PROC 600—EXCEPTION FIFO ENCODES		
ENCODE	DEFINITION	
1	PXF_BAD_SPN	Port type incompatible with error code
2	PXF_BAD_CODE	Error code not defined
3	PXF_TTD_SNDR	Touch-tone digit send error
4	PXF_NET_ORD	Network order error
5	PXF_DIG_COLL	Digit collecting on for an inappropriate board type
6	PXF_RING_TYP	Ringing is on for an inappropriate board type
7	MXF_BAD_MIN	Invalid module interface number reported
8	MXF_BAD_CODE	Error code not defined
9	MXF_ILEG_CON	Illegal connection
10	MXF_ILEG_BSY	Illegal busy out
11	MXF_ADMIN_ER	Administration error
12	MXF_NET_ORD	Network order error

Table 5-12.

PROC 600 DEDICATED SWITCH CONNECTION FAULT CODES	
FAULT CODE	DEFINITION
1	Fatal error (connection broken). Repair attempt failed.
2	Non-fatal error (connection intact). Repair attempt failed.
3	Fatal error (connection broken). Repaired by system audit.
4	Non-fatal error (connection intact). Repaired by system audit.

PROC 601 - ENVIRONMENTAL TESTS

Purpose

PROC 601 is used when referenced from **PROC 600** (Alarm Causes/Error Log) or when the **ENVIRON PWR/TEMP AIR FLOW** and **MAJOR** or **MINOR** alarm indicators on the alarm panel are lighted.

PROC 601 is used to:

1. Display environmental failure history for the switch cabinets (system control (TMS and common control) and network cabinets).

   NOTE

   Auxiliary cabinets or any cabinet (other than TMS and common control cabinets) not containing port or module control carriers are not covered by **PROC 601**.

2. Display environmental alarm causes from all equipped cabinets or a selected cabinet in the switch.

   The alarm causes consist of cabinet power, fuse, breaker, DC/DC converter, frequency generator, air flow, temperature, nominal or extended holdover, and module control carrier power trouble conditions.

3. Display environmental alarm causes from both on-line and off-line module control channels (TMS and network) when duplicated module control channels are provided.

4. Automatically turn off the **ENVIRON PWR/TEMP AIR FLOW** fault indicator when all cabinets pass Test 2 and the **MAJOR** or **MINOR** alarm indicator(s) if no other major or minor alarm source(s) exist.

   NOTE

   Environmental alarmed circuit entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 601** flipchart and the possible displays for the fields during execution of the different tests are defined in Table L, PROC 601 - Field Definitions and Codes.

Optional input fields are:

1. Field 2 - Select a specific module to be tested (Test 2 only).
2. Fields 2 and 3 - Select a specific module and cabinet to be tested (Test 2 only).

Table 5-13.

PROC 601 - FIELD DEFINITIONS AND CODES

FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1-2	Test number.	15	0-5	Alarm status of displayed equipment location.
2-3		Equipment location of displayed cabinet.		0	No errors recorded.
2	0-30	Network cabinet module number.		1	Major.
				2	Minor.
	99	System control cabinet module number.		3	Warning.
3	0-7	Cabinet number.		4	Errors recorded.
4	0-1	Status of module control channel.		5	Alarm resolved.
	0	Off-line.	16	0-999	Total number of cabinets in switch or number of cabinets tested.
	1	On-line.			
5-14	0-1	Cabinet alarm cause failure code.	17	0-999	Total number of failed cabinets.
	0	Pass.	18	0-999	Index into failure table.
	1	Alarm condition present.			

Operation of Procedure

Overview

PROC 601 is used to determine the cause of the **ENVIRON PWR/TEMP AIR FLOW** and **MAJOR** or **MINOR** alarm indicators being lighted resulting from an environmental failure.

To call in **PROC 601**, perform the following:

1. Depress **PROC NO; 601; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and Field 16 displays the total number of cabinets in the switch. All other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Displays failure history by order of alarm severity.
2. Test 2 - Tests all cabinets or a range of cabinets for environmental alarm conditions.

Test 1

Test 1 provides a failure history of the environmental alarm causes detected by the on-line software.

Test 1 is also used to manually turn off the **ENVIRON PWR/TEMP AIR FLOW** fault indicator.

1. Test 1 is the default test when entering **PROC 601** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. When Test 1 is initially called in, Field 1 displays a 1, and Field 16 displays the total number of cabinets in the switch.
3. To start Test 1, depress **EXECUTE**.
4. The environmental failure history is sorted, and a summary is displayed.
5. If no environmental failures exist, the following summary is displayed:

   Field 1 - 1.

   Field 16 - Total number of cabinets in the switch.

   Field 17 - 0 (indicating no failures).

6. If any environmental failures exist, the summary displays a 1 in Field 1, the total number of cabinets in the switch in Field 16, and the total number of cabinet failures in Field 17.
7. Depressing **NEXT CIRCUIT** displays the first failure in order of severity, as follows:

   Field 1 - 1.

   Fields 2 and 3 - Equipment location of failing cabinet.

   Field 4 - Dashed.

   Fields 5 through 14 - 0 or 1 (cabinet alarm cause - 0 = passed, 1 = alarm condition present).

   Field 15 - Alarm status of failing cabinet.

   Field 16 - Total number of cabinets in switch.

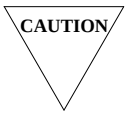
   Field 17 - Total number of failed cabinets.

   Field 18 - 1 (indicating the first failing cabinet).
8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing cabinets in order of severity; i.e., major alarm status first, followed by minor alarm status, and errors recorded but not alarmed.

   Each time **NEXT CIRCUIT** is depressed, Field 18 (failure index) is incremented by 1.

   The failure index includes in its count the failing cabinet currently being displayed.
9. After the last failing cabinet is displayed (indicated by Field 17 equaling Field 18), depressing **NEXT CIRCUIT** again dashes Fields 2 through 18.

   Depressing **NEXT CIRCUIT** once more displays the summary, and the failure history can be stepped through again by use of **NEXT CIRCUIT**.
10. The **CLEAR DATA; EXECUTE** sequence can be used to manually resolve individual environmental failures or all environmental failures after **EXECUTE** is used to initiate Test 1.
11. The failures that are resolved are those failures with an alarm status of 1 or 2 displayed in Field 15.



The environmental failures should be displayed and recorded prior to resolving the environmental circuit alarmed entries in order that a record of the equipment location and cause of the failure(s) is available for maintenance personnel.

12. To resolve individual environmental failures with an alarm status of 1 or 2, perform the following:

    Use **NEXT CIRCUIT** to display the failing cabinet with an alarm status of 1 or 2 on the **MAAP**.

    Individual environmental failures cannot be resolved unless the failing cabinet is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.
13. Field 15 (alarm status) displays a 5, indicating that the failing cabinet is resolved.

    The **ENVIRON PWR/TEMP AIR FLOW** fault indicator goes off if no other environmental failures exist.
14. All environmental failures with an alarm status of 1 or 2 can be resolved when the summary is initially displayed; i.e., upon entry to **PROC 601**, Test 1 and after displaying and recording all environmental failures and then using **NEXT CIRCUIT** to display the summary.

15. After entering Test 1 and depressing **EXECUTE**, the summary is displayed.

    Depress **CLEAR DATA; EXECUTE**.

    All environmental failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the **ENVIRON PWR/TEMP AIR FLOW** fault indicator goes off.

16. After displaying and recording all environmental failures, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

    All environmental failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the **ENVIRON PWR/TEMP AIR FLOW** fault indicator goes off.

17. The **MAJOR** or **MINOR** alarm indicator also goes off when no other sources affecting the **MAJOR** or **MINOR** alarm indicator are present.

Test 2

Test 2 reads the alarm signals from each on-line MCC circuit pack and displays the status of those alarms for each of the MCC's associated cabinets.

Test 2 also reads the off-line module control channel status (TMS and network) when duplicated module control channels are provided.

In addition, Test 2 reads the alarm signals from on-line common controls' alarm interface (TN490).

Test 2 automatically turns off the **ENVIRON PWR/TEMP AIR FLOW** fault indicator when all cabinets that raised an alarm pass Test 2.

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 2 and 3 and the total number of cabinets in the switch is displayed in Field 16.

   Field 2 is blinking, indicating an optional entry field.

   The default equipment location can be the last equipment location displayed in Test 1 of **PROC 601** or can be passed from **PROC 600** (Alarm Causes/Error Log) while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

3. The entire switch, a range of cabinets, a specific cabinet, or the default equipment location can be selected for testing.

4. To test the default equipment location displayed in Fields 2 and 3, proceed to Step 8.

5. A specific cabinet can be selected for testing by use of **NEXT CIRCUIT** or by entering the module and cabinet numbers in Fields 2 and 3 as follows.

   Depress **NEXT CIRCUIT** to step through the cabinets until the cabinet to be tested is displayed in Fields 2 and 3.

   Enter the module and cabinet numbers in Fields 2 and 3 whether or not a default equipment location is displayed:

   (Module number of cabinet to be tested); ENTER; **(Cabinet number); ENTER**.

   Proceed to Step 8.

6. To select a range of cabinets to be tested, a module number must be entered in Field 2.

   If Fields 2 and 3 are dashed (no default equipment location displayed), enter the module number as follows:

   (Module number to be tested); ENTER.

   If a default equipment location is displayed, enter the module number as follows:

   (Module number to be tested); ENTER; CLEAR ENTRY; ENTER.

   All cabinets in the module selected are tested.

   Proceed to Step 8.

7. To select the entire switch to be tested, Fields 2 and 3 must not contain an equipment location.

   If no default equipment location is displayed, proceed to Step 8. If a default equipment location is displayed, perform the **CHANGE FIELD** sequence as follows:

   CHANGE FIELD; 2; ENTER.

   Field 2 is blanked and Field 3 is dashed.

   Test 2 starts with the first module and first cabinet in the switch and runs until the last cabinet in the switch is tested.

   Proceed to Step 8.

8. To start Test 2, depress **EXECUTE**.

   Test 2 operation and display of test results is different when a specific cabinet or default equipment location is tested and when the entire switch or a range of cabinets is tested.

9. For test operation and display of test results for a default equipment location or a specific cabinet, proceed to Step 10.

   For test operation and display of test results for the entire switch or a range of cabinets, proceed to Step 14.

10. When Test 2 is completed for a default equipment location or a specific cabinet, the following is displayed:

    Field 1 - 2.

    Fields 2 and 3 - Equipment location of cabinet being tested.

    Field 4 - 1 (indicating on-line module control channel was read).

    Fields 5 through 14 - Cabinet alarm cause (0 = passed, 1 = alarm condition present).

    Field 15 - Alarm status of cabinet tested.

    Field 16 - 1 (indicating the cabinet selected was tested).

    Field 17 - 0 (indicating no failures were detected for the cabinet tested) or 1 (indicating that the cabinet failed the test).

    Field 18 - Dashed.

11. When testing a specific cabinet or default equipment location, depressing **NEXT UNIT** causes the off-line module control channel's status registers to be read for the cabinet displayed in Fields 2 and 3.

    NOTE

    Depressing **NEXT UNIT** when a duplicated module control channel is not provided results in error code 74 (equipment not part of system) being displayed, or error code 06 (wrong key, press right key and continue) being displayed when a duplicated common control cabinet is displayed in Fields 2 and 3.

    Field 4 changes from 1 to 0 when **NEXT UNIT** is depressed.

    EXECUTE must be depressed to read the off-line status registers.

12. Depressing **NEXT UNIT** again reverts to the on-line status registers (Field 4 = 1) when **EXECUTE** is depressed.

    NOTE

    NEXT UNIT cannot be used to read the off-line MCC status registers when testing a range of cabinets.

13. When another cabinet is to be tested, the **CHANGE FIELD** sequence must be used to select the specific cabinet:

    CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet number); ENTER**.

    EXECUTE must be depressed to test the specific cabinet selected for testing.

14. When the entire switch or a range of cabinets is being tested for environmental failures, the **WAIT** indicator is lighted and the following fields are incremented momentarily:

    Fields 2 and 3 - Equipment location being tested.

    Field 16 - Number of cabinets tested.

    Field 17 - Total failures (if any).

15. **STOP** can be depressed when the entire switch or a range of cabinets is being tested.

    Depressing **STOP** displays the next equipment location to be tested in Fields 2 and 3, the number of cabinets tested in Field 16, and the number of failures detected in Field 17. The **WAIT** indicator goes off.

16. If no failures are detected for the cabinets tested when **STOP** is depressed, a 0 is displayed in Field 17.

    If any failures are detected for the cabinets tested when **STOP** is depressed, proceed to Step 20.

17. When **STOP** is depressed while testing the entire switch or a range of cabinets (halting the test before all cabinets are tested), the range of cabinets or the entire switch must be reentered by using the **CHANGE FIELD** sequence in order to complete the test.

18. When the entire switch or a range of cabinets is tested, the **WAIT** indicator goes off and a summary is displayed.

19. If no cabinets failed, the following summary is displayed:

    Field 1 - 2.

    Field 16 - Number of cabinets tested.

    Field 17 - 0 (indicating no failures).

20. If any cabinets failed, the summary displays a 2 in Field 1, the total number of cabinets tested in Field 16, and the total number of failures in Field 17.

21. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

    Field 1 - 2.

    Fields 2 and 3 - Equipment location of failing cabinet.

    Field 4 - 1 (indicating on-line module control channel was read).

    Fields 5 through 14 - 0 or 1 (Cabinet alarm cause - 0 = passed, 1 = alarm condition present).

    Field 15 = Alarm status of failing cabinet.

    Field 16 - Total number of cabinets tested.

    Field 17 - Total number of failed cabinets.

    Field 18 - 1 (indicating the first failing cabinet).

22. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing cabinets.

    Each time **NEXT CIRCUIT** is depressed, Field 18 (failure index) is incremented by 1.

    The failure index includes in its count the failing cabinet currently being displayed.

23. After the last failing cabinet is displayed (indicated by Field 17 equaling Field 18), depressing **NEXT CIRCUIT** again dashes Fields 2 through 18.

    Depressing **NEXT CIRCUIT** once more displays the summary, and the failing cabinets can be stepped through again by use of **NEXT CIRCUIT**.

24. To select another range of cabinets to test, the **CHANGE FIELD** sequence must be used:

    CHANGE FIELD; 2; (Module number); ENTER.

    All cabinets in the module entered in Field 2 are tested when **EXECUTE** is depressed.

25. The **ENVIRON PWR/TEMP AIR FLOW** fault indicator automatically goes off when Test 2 is completed with no failures detected for all cabinets that had an alarm status of 1 or 2 (major or minor).

    NOTE

    Environmental circuit alarmed entries in PMIDS are marked as resolved.

26. The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting the major or minor alarm indicators.

Repair Guide

Overview

When the **ENVIRON PWR/TEMP AIR FLOW** and **MAJOR** or **MINOR** alarm indicators on the alarm panel are lighted (indicating an environmental failure) or when **PROC 601** is referenced from **PROC 600** (Alarm Causes/Error Log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1, and manually record the failure history generated by the on-line maintenance software.

   Determine the failures that have an alarm status code of 1 or 2 (major or minor).

2. Execute Test 2.

   Test 2 runs a variable length of time depending on the number of cabinets being tested; e.g., the entire switch, a range of cabinets, a specific cabinet, or the default equipment location.

   Test 2 must be run for each equipment location recorded in Test 1 with an alarm status of 1 or 2 (major or minor) and for the default equipment location passed from **PROC 600** Test 1 or 2.

3. The alarm(s) are turned off if no failures are detected in Test 2 from all of the locations for which the alarm status was recorded in Test 1 as 1 or 2 (major or minor).

4. If any failures are detected in Test 2, step through the failures and record the equipment locations and cabinet alarm cause(s).

   The cabinet alarm cause fields (Fields 5 through 14) indicate which function is detected as failing by displaying a 1 in the appropriate cabinet alarm cause field.

5. When more than one cabinet alarm cause is displayed for the failing cabinet, the alarm causes are isolated and repaired from left to right (Field 5 through Field 14).

   One cabinet alarm cause may affect other cabinet alarm causes for the failing cabinet.

6. When multiple cabinet alarm causes exist and the first cabinet alarm cause is corrected, the other causes may not be valid.

   Maintenance personnel must determine the effect one cabinet alarm cause has on other cabinet alarm causes and the appropriate repair action to be taken (if any).

   When repeating Test 2 for one cabinet alarm cause, it may be possible that the other multiple cabinet alarm causes no longer exist.

7. Isolation and repair steps for the cabinet alarm causes are detailed in:

   Cabinet Power AC.

   Cabinet Power 48 Volts.

   Fuse/Breaker.

   DC/DC Converter.

   Frequency Generator.

   Air Flow.

   Temperature.

   Holdover.

   Module Control Carrier Power (Left or Right).

   Other Repair Steps.

8. After making the necessary repair, repeat Test 2 for the appropriate equipment location.

9. In order to turn off the **ENVIRON PWR/TEMP AIR FLOW** fault indicator, all failing cabinets with an alarm status of 1 or 2 (major or minor) must pass Test 2.

10. The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting the major or minor alarm indicator.

Cabinet Power AC

The cabinet power AC alarm cause usually indicates that the power source's internal circuitry is not functioning properly.

1. Determine the type of power source installed in the equipment location displayed in Fields 2 and 3.

   If the equipment location is a duplicated common control cabinet, a Time Multiplexed Switch (TMS) cabinet, or a Remote Module Interface (RMI) cabinet, the power source is a 334A power unit or a Bulk OLS power supply.

   If the equipment location is a module control cabinet or a port cabinet, the power source is a 309A/310A power supply or a Bulk OLS power supply.

2. If the power source is a Bulk OLS power supply, proceed to Step 16.

   If the power source is not a Bulk OLS power supply, proceed to Step 3.

3. At the equipment location displayed in Fields 2 and 3, determine if the circuit breaker on the power source is tripped.

   If the circuit breaker is tripped, proceed to Step 4.

   If the circuit breaker is not tripped, proceed to Step 9.

4. Reset the circuit breaker.

   If the circuit breaker trips again, perform Steps 5 through 8 (as required).

   If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

   If Test 2 does not fail, corrective action is complete.

5. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

   Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

   Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

   Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

   Replace the AEN1 circuit pack.

   Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

   Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **ON**.

6. If the circuit breaker trips again after replacing the AEN1 circuit pack, proceed to Step 7.

   If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, proceed to Step 7.

   If Test 2 does not fail, corrective action is complete.

7. Replace the 334A power unit or 309A/310A power supply (as appropriate).

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

8. If the circuit breaker trips again after replacing the 334A power unit or 309A/310A power supply (as appropriate), check the wiring associated with the 334A power unit or 309A/310A power supply (as appropriate).

   If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

   If Test 2 passes, corrective action is complete.

9. Determine if the proper AC power to the power source is present.

   If AC power to the power source is absent, proceed to Step 10.

   If AC power to the power source is present, proceed to Step 11.

10. If AC power to the power source is absent, correct the problem and measure the power source output voltages at the test points using a digital multimeter. (Refer to Table M, Cabinet Power Supply Voltage Measurements.)

    If the power source voltages are not within tolerance, proceed to Step 12.

    If the power source voltages are within tolerance, repeat Test 2.

    If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

    If Test 2 does not fail, corrective action is complete.

11. Measure the power source output voltages at the test points using a digital multimeter. (Refer to Table M, Cabinet Power Supply Voltage Measurements.)

    If the power source voltages are not within tolerance, proceed to Step 12.

    If the power source voltages are within tolerance, repeat Test 2.

    If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

    If Test 2 does not fail, corrective action is complete.

12. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply by performing the following:

    Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

    Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

    Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

    Replace the AEN1 circuit pack.

    Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

    Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **ON**.

13. Repeat Test 2.

    If Test 2 fails again, proceed to Step 14.

    If Test 2 does not fail, corrective action is complete.

14. Replace the 334A power unit or 309A/310A power supply (as appropriate).

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

15. Measure the power source output voltages. (Refer to Table M, Cabinet Power Supply Voltage Measurements.)

    If the voltages are not within tolerance, check the wiring associated with the power source.

    If the voltages are within tolerance, repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails again, check the wiring associated with the power source.

16. At the equipment location displayed in Fields 2 and 3, determine the status of the Bulk OLS power supply on/off switch.

    If the on/off switch is **OFF**, proceed to Step 17.

    If the on/off switch is **ON**, proceed to Step 18.

17. Turn the on/off switch to **ON**.

    Repeat Test 2. If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

    If Test 2 does not fail, corrective action is complete.

18. Determine if the proper AC power to the Bulk OLS power supply is present.

    If AC power to the Bulk OLS power supply is absent, proceed to Step 19.

    If AC power to the Bulk OLS power supply is present, proceed to Step 20.

19. If AC power to the Bulk OLS power supply is absent, correct the problem and repeat Test 2.

    If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

    If Test 2 does not fail, corrective action is complete.

20. Replace the Bulk OLS power supply.

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the Bulk OLS power supply.

21. Repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails, check the wiring associated with the Bulk OLS power supply.

Table 5-14.

CABINET POWER SUPPLY **VOLTAGE MEASUREMENTS**			
CABINET	TYPE OF RECTIFIER	MINIMUM	MAXIMUM
COMMON CONTROL, MODULE CONTROL, PORT, TMS, and RMI	**309A/310**	**-46 V**	**-52 V**
	334A	**-46 V**	**-52 V**
	BATT	**-46 V**	**-52 V**

Cabinet Power 48 Volts

A **GREEN** pilot LED located on the front panel of the power source is lighted when the power source is producing -48 volts on its output.

The **GREEN** pilot LED does not indicate that the output voltage is within regulation limits.

Appropriate test points are available on the front panel of the power source for measuring the output voltage and determining the power source performance.

NOTE

Output voltage measurements and power supply performance for the Bulk OLS power supply cannot be determined as the Bulk OLS power supply does not have test points.

1. Determine the alarm status (displayed in Field 15) of the failing cabinet.

   If the alarm status displayed in Field 15 is 1 (major), proceed to Step 4.

   If the alarm status displayed in Field 15 is 2 (minor) or 4 (errors recorded), proceed to Step 2.

2. At the rear of the failing cabinet, replace alarm board AEH4.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of alarm board AEH4.

3. Repeat Test 2.

   If Test 2 passes, corrective action is complete.

   If Test 2 fails again, refer to isolation and repair step **Other Repair Steps**.

4. Determine the type of power source installed in the equipment location displayed in Fields 2 and 3.

   If the equipment location is a duplicated common control cabinet, a Time Multiplexed Switch (TMS) cabinet, or a Remote Module Interface (RMI) cabinet, the power source is a 334A power unit or Bulk OLS power supply.

   If the equipment location is a module control cabinet or a port cabinet, the power source is a 309A/310A power supply or Bulk OLS power supply.

5. If the power source is a Bulk OLS power supply, proceed to Step 19.

   If the power source is not a Bulk OLS power supply, proceed to Step 6.

6. At the equipment location displayed in Fields 2 and 3, determine if the **GREEN** pilot LED is lighted at the power source.

   If the **GREEN** pilot LED is not lighted, proceed to Step 7.

   If the **GREEN** pilot LED is lighted, proceed to Step 14.

7. At the equipment location displayed in Fields 2 and 3, determine if the circuit breaker on the power source is tripped.

   If the circuit breaker is tripped, proceed to Step 8.

   If the circuit breaker is not tripped, proceed to Step 14.

8. Reset the circuit breaker.

   If the circuit breaker trips again, perform Steps 9 through 12 (as required).

   If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, proceed to Step 13.

   If Test 2 does not fail, corrective action is complete.

9. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

   Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

   Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

   Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

Replace the AEN1 circuit pack.

Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **ON**.

10. If the circuit breaker trips again after replacing the AEN1 circuit pack, proceed to Step 11.

    If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, proceed to Step 11.

    If Test 2 does not fail, corrective action is complete.

11. Replace the 334A power unit or 309A/310A power supply (as appropriate).

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

12. If the circuit breaker trips again after replacing the 334A power unit or 309A/310A power supply (as appropriate), check the wiring associated with the 334A power unit or 309A/310A power supply (as appropriate).

13. If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

    If Test 2 passes, corrective action is complete.

14. Measure the power source output voltages at the test points using a digital multimeter to determine if voltages are within tolerance, marginal, or fluctuating. (Refer to Table M, Cabinet Power Supply Voltage Measurements.)

    If all voltages are within tolerance without fluctuation, refer to isolation and repair step **Other Repair Steps**.

    If the voltages are marginal or fluctuating, proceed to Step 15.

15. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

    Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

    Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

    Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

    Replace the AEN1 circuit pack.

    Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

    Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **ON**.

16. Repeat Test 2.

    If Test 2 fails again, proceed to Step 17.

    If Test 2 does not fail, corrective action is complete.

17. Replace the 334A power unit or 309A/310A power supply (as appropriate).

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

18. Measure the power source output voltages. (Refer to Table M, Cabinet Power Supply Voltage Measurements.)

    If the voltages are not within tolerance or fluctuate, check the wiring associated with the power source.

    If the voltages are within tolerance, repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails again, check the wiring associated with the power source.

19. At the equipment location displayed in Fields 2 and 3, determine if the **GREEN** pilot LED is lighted at the Bulk OLS power supply.

    If the **GREEN** pilot LED is not lighted, proceed to Step 20.

    If the **GREEN** pilot LED is lighted, proceed to Step 22.

20. Determine the status of the Bulk OLS power supply on/off switch.

    If the on/off switch is **OFF**, proceed to Step 21.

    If the on/off switch is **ON**, proceed to Step 22.

21. Turn the on/off switch to **ON**.

    Repeat Test 2. If Test 2 fails again, refer to isolation repair step **Other Repair Steps**.

    If Test 2 does not fail, corrective action is complete.

22. Replace the Bulk OLS power supply.

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the Bulk OLS power supply.

23. Repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails, check the wiring associated with the Bulk OLS power supply.

Fuse/Breaker

Fuses and circuit breakers provide visual indications when they operate.

1. At the equipment location displayed in Fields 2 and 3, determine if any fuses are blown or circuit breakers tripped.

   If no fuses are blown or circuit breakers tripped, refer to isolation and repair step **Other Repair Steps**.

   If any fuse is blown or circuit breaker tripped, proceed to Step 2.

2. Replace the blown fuse, or reset the circuit breaker.

   If the fuse does not blow again or circuit breaker trip, repeat Test 2.

   If the fuse blows again or circuit breaker trips, proceed to Step 3.

3. The corrective action to be taken depends on the blown fuse or tripped circuit breaker.

   If the circuit breaker is associated with the DC/DC converter, perform isolation and repair step **DC/DC Converter**.

   If the fuse is associated with the frequency generator, perform isolation and repair step **Frequency Generator**.

   If the fuse is associated with the fans, perform isolation and repair step **Air Flow**.

   If the fuse is part of the port carrier, perform Steps 4 through 6 below.

   If the fuse is associated with the consoles, perform Steps 7 through 9 below.

4. Disconnect all circuit packs associated with the blown fuse.

   Replace the blown fuse.

5. Reconnect one circuit pack at a time observing the associated fuse.

   If the fuse blows again, replace the faulty circuit pack.

6. Replace the blown fuse.

   If the fuse does not blow again, reconnect all circuit packs and repeat Test 2.

   If the fuse blows again, check the wiring associated with the faulty circuit pack.

7. Disconnect the console mounting cord associated with the blown fuse.

   Replace the blown fuse.

   If the fuse does not blow again, replace the console and repeat Test 2.

8. If the fuse blows again, disconnect the console connector cable from the common control connector.

9. Replace the blown fuse.

   If the fuse blows again, check the wiring between the fuse and the associated console.

DC/DC Converter

The faulty DC/DC converter is identified within a cabinet by its illuminated **RED** LED.

In the event of protective shutdown, a reset toggle switch is located behind the front panel faceplate of the DC/DC converter.

1. Check the circuit breaker associated with the DC/DC converter.

   If the circuit breaker is tripped, proceed to Step 2.

   If the circuit breaker is not tripped, proceed to Step 4.

2. Reset the circuit breaker.

3. If the circuit breaker does not trip, repeat Test 2.

   If the circuit breaker trips again, check the wiring between the circuit breaker and the DC/DC converter.

4. At the equipment location displayed in Fields 2 and 3, measure the output voltage using a Digital Voltmeter (DVM) at the test points of the failing DC/DC converter with the **RED** LED lighted. (Refer to Table N, DC/DC Converter Voltage Measurements.)

   If the voltage reading is greater than 0, perform Steps 5 through 7.

   If the voltage reading is 0, perform Steps 8 through 12.

Table 5-15.

DC/DC CONVERTER **VOLTAGE MEASUREMENTS**			
CONVERTER	VOLTAGE	MINIMUM	MAXIMUM
490AA	**5 V**	**4.9 V**	**5.3 V**
494GA	**5 V**	**4.9 V**	**5.3 V**
495FA	**5 V**	**4.9 V**	**5.3 V**

5. **Replace the DC/DC converter and repeat Test 2.**

NOTE

Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC/DC converter.

6. If Test 2 fails again, the problem could be in the program resistors on the circuit packs in the 1/2 carrier served by the DC/DC converter.

   Replace circuit packs one-at-a-time in the 1/2 carrier served by the DC/DC converter, repeating Test 2 after each circuit pack is replaced.

7. If Test 2 passes, install the original circuit packs that did not cause the trouble.

   If Test 2 does not pass, install all the original circuit packs and check the wiring associated with the DC/DC converter.

8. Unseat all circuit packs in the 1/2 carrier associated with the failing DC/DC converter.

CAUTION

Ensure that the toggle switch is in the up position before reseating the handle.

   Activate the reset toggle switch by pulling the DC/DC converter handle halfway out without unseating the DC/DC circuit board, and then reseating the handle.

9. Measure the output voltage at the DC/DC converter. (Refer to Table N, DC/DC Converter Voltage Measurements.)

10. If the voltage reading is 0, reseat all circuit packs, replace the DC/DC converter, and repeat Test 2.

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC/DC converter.

    If trouble remains after replacing the converter, check the backplane wiring for a short causing overcurrent shutdown.

11. If the voltage reading is greater than 0, reseat the circuit packs one at a time.

    The **RED** LED lights on the DC/DC converter when the faulty circuit pack is seated.

    Replace the faulty circuit pack, reseat any disconnected circuit packs and repeat Test 2.

12. If Test 2 fails again, check the wiring associated with the faulty circuit pack.

Frequency Generator

1. Determine the type of frequency generator installed in the equipment location displayed in Fields 2 and 3.

   If the frequency generator is a 124B, proceed to Step 4.

   If the frequency generator is a 124B1 or 124B2, proceed to Step 2.

2. Check the reset button (1 amp) at the front of the frequency generator.

   If the reset button is flush (not popped out), proceed to Step 4.

   If the reset button has popped out, proceed to Step 3.

3. Push the reset button in.

   If the reset button pops out again, check the wiring to the output load(s) to determine the cause of the trouble.

   If the reset button does not pop out, repeat Test 2.

4. Check the fuse (2 amp) on the fuse panel associated with the frequency generator.

   If the fuse is blown, proceed to Step 5.

   If the fuse is not blown, proceed to Step 6.

5. Replace the blown fuse.

   If the fuse does not blow, repeat Test 2.

   If the fuse blows again, check the wiring between the fuse and the frequency generator.

6. At the equipment location displayed in Fields 2 and 3, replace the frequency generator.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the frequency generator.

7. Repeat Test 2.

   If Test 2 fails again, replace alarm board AEH4 at the back of the cabinet.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of alarm board AEH4.

8. Repeat Test 2.

   If Test 2 fails again, check the wiring associated with the frequency generator.

Air Flow

Insufficient air flow for cooling the cabinet may be caused by dirty air filters or improperly operating fans.

1. At the equipment location displayed in Fields 2 and 3, inspect for restriction in air flow or a dirty filter.
2. If a restriction in air flow or a dirty filter is found, proceed to Step 3.

   If no restrictions are found and the filter is clean, proceed to Step 4.
3. Clear the restriction or replace the filter.

   Allow sufficient time for cabinet interior to cool and repeat Test 2.
4. Determine if the fans are running.

   If no fans are running, proceed to Step 6.

   If fans are running, proceed to Step 5.
5. Determine if all fans are operating properly.

   If all fans are operating properly, refer to isolation and repair step **Other Repair Steps**.

   Replace any defective fan, allow sufficient time for cabinet interior to cool, and repeat Test 2.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of fans.

6. Check the fuse (F1 or F2) associated with the fans. (F1 controls the upper fan assembly, and F2 controls the lower fan assembly.)

   If the fuse is blown, proceed to Step 7.

   If the fuse is not blown, refer to isolation and repair step **Other Repair Steps**.
7. Replace the blown fuse.

   If the fuse does not blow again, allow sufficient time for cabinet interior to cool and repeat Test 2.
8. If the fuse blows again, replace the fan assembly associated with the blown fuse.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the fan assembly.

9. Replace the blown fuse, allow sufficient time for the cabinet interior to cool, and repeat Test 2.

Temperature

An overtemperature alarm cause signifies that a predetermined cabinet temperature is exceeded.

1. At the equipment location displayed in Fields 2 and 3, determine if fans are provided.

   If no fans are provided, proceed to Step 9.

   If fans are provided, proceed to Step 2.

2. Determine if fans are running.

3. If no fans are running, proceed to Step 5.

   If fans are running, proceed to Step 4.

4. Determine if all fans are operating properly.

   If all fans are operating properly, refer to isolation and repair step **Other Repair Steps**.

   Replace any defective fan and allow sufficient time for cabinet interior to cool before repeating Test 2.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of fans.

5. Check the fuse (F1 or F2) associated with the fans. (F1 controls the upper fan assembly, and F2 controls the lower fan assembly.)

   If the fuse is blown, proceed to Step 6.

   If the fuse is not blown, it may be possible for excessive heat in the room to cause the temperature alarm. Proceed to Step 9.

6. Replace the blown fuse.

   If the fuse does not blow again, allow sufficient time for cabinet interior to cool and repeat Test 2.

7. If the fuse blows again, replace the fan assembly associated with the blown fuse.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the fan assembly.

8. Replace the blown fuse, allow sufficient time for the cabinet interior to cool, and repeat Test 2.

9. When no fans are provided, or excessive heat in the room is suspected, determine if environmental temperature is above maximum for the switch.

   If the environmental temperature is above the maximum, leave the cabinet open to allow cooling, and refer the problem to local engineering.

   If the environmental temperature is not above the maximum, refer to isolation and repair step **Other Repair Steps**.

Holdover

Nominal or extended holdover is provided by a 312 power unit, a J87462A power unit (consisting of a charger and battery system), or a 3965-2 battery charger.

The LEDs on the 312 holdover power unit, J87462A holdover power unit, or 3965-2 battery charger determine whether the switch failed or is drawing battery power because cabinet AC voltage is absent.

Appropriate test points are available on the 312 holdover power unit, J87462A holdover power unit, or 3965-2 battery charger for determining the holdover unit's performance.

1. Determine the type of holdover unit installed in the equipment location displayed in Fields 2 and 3.
2. Determine the type of power source installed in the equipment location displayed in Fields 2 and 3.

   If the equipment location is a duplicated common control cabinet, a Time Multiplexed Switch (TMS) cabinet, or a Remote Module Interface (RMI) cabinet, the power source is a 334A power unit or a Bulk OLS power supply.

   If the equipment location is a module control cabinet or a port cabinet, the power source is a 309A/310A power supply or a Bulk OLS power supply.
3. If the power source is a Bulk OLS power supply, proceed to Step 12.

   If the power source is not a Bulk OLS power supply, proceed to Step 4.
4. At the equipment location displayed in Fields 2 and 3, determine the cause of the holdover alarm by checking the LEDs on the appropriate holdover unit.

   If the **BTY ON LINE** LED is lighted, check the cabinet AC voltage (the cabinet is being powered from the battery system of the appropriate power unit).
5. If the **RSV FAIL** or **RSV ALM** LED is lighted, use the test points on the appropriate holdover unit to determine the cause of the problem.

   Check for -48 volts using a digital voltmeter connected between test points **-48V** and **GRD**.

   Check for BTY (-48 volts) using a digital voltmeter connected between test points **BTY** and **GRD**.
6. If -48 volts is present but BTY is not, proceed to Step 7.

   If -48 volts is absent, check the wiring between the appropriate holdover unit and the voltage source.
7. Replace the CP1 circuit pack (charger and alarm board) in the 312 holdover power unit or the AMC-1 circuit pack (power board) in the J87462A holdover power unit by performing the following.

   NOTE

   If the AMC-1 circuit pack in the J87462A holdover power unit has a AMD-1 circuit pack (logic board) attached to it, replace both circuit packs as a set.

   Set the battery circuit breaker on the 312 holdover power unit or J87462A holdover power unit (as appropriate) to **OFF**.

   Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

   Disconnect the AC power cord from the 334A power unit or 309A power supply (as appropriate).

Remove 4 screws from the front panel of the 312 holdover power unit or J87462A holdover power unit (as appropriate).

NOTE

Do not disconnect the grounding wire from the panel of the J87462A holdover power unit.

Unplug the CP1 or AMC-1 circuit pack (as appropriate) and remove the circuit pack from the 312 holdover power unit or the J87462A holdover power unit (as appropriate).

Replace the CP1 or AMC-1 circuit pack (as appropriate).

Secure the 312 holdover power unit or J87462A holdover power unit front panel (as appropriate) with the 4 screws.

Connect the AC power cord to the 334A power unit or 309A power supply (as appropriate).

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **ON**.

Set the battery circuit breaker on the 312 holdover power unit or J87462A holdover power unit (as appropriate) to **ON**.

8. Repeat Test 2.

   If Test 2 fails again, proceed to Step 9.

   If Test 2 does not fail, corrective action is complete.

9. If the nominal or extended holdover is a 312A or 312C holdover power unit, or a J87462A List 6 or List 7 holdover power unit, repeat Steps 7 through 9 for the other CP1 or AMC-1 circuit pack.

   If the nominal or extended holdover is a 312B holdover power unit or a J87462A List 5 holdover power unit, proceed to Step 10.

   If both CP1 or AMC-1 circuit packs are replaced, proceed to Step 10.

10. At the equipment location displayed in Fields 2 and 3, replace the 312 holdover power unit or J87462A holdover power unit (as appropriate).

11. Repeat Test 2.

    If Test 2 fails again, check the wiring associated with the 312 holdover power unit or J87462A holdover power unit (as appropriate).

    If Test 2 passes, corrective action is complete.

12. At the equipment location displayed in Fields 2 and 3, determine the cause of the holdover alarm by checking the LEDs on the 3965-2 battery charger holdover unit.

    If the **YELLOW** LED is lighted, check the cabinet AC voltage (the cabinet is being powered from the 3965-2 battery charger holdover unit).

13. If the **GREEN** LED is lighted, use the test points on the appropriate holdover unit to determine the cause of the problem.

    Check for -48 volts using a digital voltmeter connected between test points **BATT** and **-**.

14. If the voltage is between 0 and -48 volts, proceed to Step 15.

    If -48 volts is absent, check the wiring between the appropriate holdover unit and the voltage source.

    If -48 volts is present, refer to isolation repair step **Other Repair Steps**.

15. Replace the battery pack.

16. Repeat Test 2.

    If Test 2 fails again, proceed to Step 17.

    If Test 2 does not fail, corrective action is complete.

17. At the equipment location displayed in Fields 2 and 3, replace the 3965-2 battery charger holdover unit.

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 3965-2 battery charger holdover unit.

18. Repeat Test 2.

    If Test 2 fails again, check the wiring associated with the 3965-2 battery charger holdover unit.

    If Test 2 passes, corrective action is complete.

Module Control Carrier Power

The module control carrier power (left or right) cabinet alarm cause indicates that a change in the power to the module control carrier occurred.

1. At the equipment location displayed in Fields 2 and 3, measure the output voltage using a DVM at the test points of the left or right DC/DC converter associated with the cabinet alarm cause (left or right) to determine if the voltages are marginal or fluctuating.

2. If all voltages are within tolerance without fluctuation, refer to isolation and repair step **Other Repair Steps**.

   If the voltages are marginal or fluctuating, proceed to Step 3.

3. Replace the DC/DC converter and measure the output voltages.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC/DC converter.

4. If all voltages are within tolerance and do not fluctuate, repeat Test 2.

   If voltages are not within tolerance, or fluctuate, check the wiring associated with the DC/DC converter.

Other Repair Steps

1. In the event an alarm cause is present but the equipment associated with the alarm cause is functioning properly (or unable to function because of a suspected sensor or detector malfunction), the sensor, detector, or alarm board corresponding to the cabinet alarm cause is probably faulty.
2. At the rear of the failing cabinet, replace alarm board AEH4 (if not already replaced).

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of alarm board AEH4.

3. Repeat Test 2.

   If Test 2 fails again, proceed to Step 4.
4. Check the sensor or detector and replace as appropriate.

   Repeat Test 2 (as applicable). If Test 2 passes, the failure is corrected.
5. If the sensor or detector is functioning correctly or after replacement of the sensor or detector the failure still exists, the wiring between the sensor or detector and the module control channel may be at fault.
6. A correlation of the TMS/module control carrier backplane lead names to the sensor or detector corresponding to the cabinet alarm causes displayed in Fields 5 through 14 are listed below:

   Field 5 - Cabinet power AC = RCTALM (n*).

   Field 6 - Cabinet power 48 Volts = L48ALM (n*).

   Field 7 - Fuse/breaker = FUSALM (n*).

   Field 8 - DC/DC converter = CNVALM (n*).

   Field 9 - Frequency generator = FGNALM (n*).

   Field 10 - Air flow = FANALM (n*).

   Field 11 - Temperature = OTPALM (n*).

   Field 12 - Holdover = HVRALM (n*).

   Field 13 - Module control carrier power left = PFAILL (n*).

   Field 14 - Module control carrier power right = PFAILR (n*).

   n* = Cabinet number 0 through 7.

PROC 610 - TAPE TESTS

Purpose

PROC 610 is used when referenced from **PROC 600** (Alarm Causes/Error Log) or when the **COMMON CONTROL TAPE** and **MAJOR** or **MINOR** fault indicators on the alarm panel are lighted.

PROC 610 is used to:

1. Display failures associated with the tape subsystem.
2. Manually resolve the **COMMON CONTROL TAPE** fault indicator.

   NOTE

   Tape alarmed entries in PMIDS are marked as resolved.

3. Test the tape subsystem. The tape subsystem consists of:

   TN430 - Tape interface circuit pack.

   Cable between the tape interface circuit pack and the High Capacity Minirecorder (HCMR).

   SN441 - HCMR controller circuit pack.

   SN442 - HCMR data electronics circuit pack.

   SN443 - HCMR transport circuit pack.

   SN445 - HCMR servo circuit pack.

   SN446 - HCMR power circuit pack.

   Tape cartridge.

4. Automatically turn off the **COMMON CONTROL TAPE** fault indicator when the tape subsystem passes Test 2.

   NOTE

   Tape alarmed entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 610** flipchart and the possible displays for the fields during execution of the different tests are defined in Table O, PROC 610 - Field Definitions and Codes.

There are no optional input fields for **PROC 610**.

Table 5-16.

PROC 610 - FIELD DEFINITIONS AND CODES

FIELD	CODE	DEFINITION
1	1-2	Test number.
2-8		Equipment.
2		Tape interface:
	-	Not applicable.
	1	Indicates failure (Test 1).
	1-3	Indicates replacement sequence number (Test 2).
3-7		High Capacity Minirecorder (HCMR):
	-	Not applicable.
	1	Indicates failure (Test 1).
	1-3	Indicates replacement sequence number (Test 2).
8		Cartridge:
	-	Not applicable.
	1	Indicates failure (Test 1).
	1-3	Indicates replacement sequence number (Test 2).
9	1-5	Alarm status of displayed failure (Test 1 only).
	1	Major.
	2	Minor.
	3	Warning.
9 (Contd)	4	Errors recorded.
	5	Alarm resolved.
10		Number of failures recorded.
	0-6	Number of failures recorded by the periodic test (Test 1).
	0-9	Number of failures recorded by the demand test (Test 2).
11		Index.
	0-9	Number of failure being displayed (Test 1 or Test 2).
12	0-970	Specific fault code.
13-15		Time stamp of displayed failure (Test 1 only).
13	1-31	Day of month failure was recorded.
14	0-23	Hour of day failure was recorded.
15	0-59	Minute of hour failure was recorded.
16	0-99	Hours since last run tape (99 indicates 99 or more).

Operation of Procedure

Overview

PROC 610 is used to determine the cause of the **COMMON CONTROL TAPE** and **MAJOR** or **MINOR** fault indicators being lighted resulting from a tape failure.

To call in **PROC 610**, perform the following:

1. Depress **PROC NO; 610; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Displays the alarmed tape failures and manually turns off the fault indicator.
2. Test 2 - Performs an ID chip test on TN430 and a parity checker/generator function test. Test 2 performs a single test of the tape subsystem. TN430 is reset if Test 2 cannot be successfully completed.

Test 1

Test 1 provides a failure history of the tape alarm causes detected by periodic on-line maintenance software.

Test 1 is also used to manually turn off the **COMMON CONTROL TAPE** fault indicator.

1. Test 1 is the default test when entering **PROC 610** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. To start Test 1, depress **EXECUTE**.
3. The tape failure history is sorted and a summary is displayed.
4. If no tape failures exist, the following summary is displayed:

   Field 1 - 1.

   Field 10 - 0 (Indicating no failures).

   Field 16 - Hours since last run tape operation.

5. If any tape failures exist, the summary displays a 1 in Field 1, the total number of failures in Field 10, and the number of hours since the last run tape operation in Field 16.
6. Depressing **NEXT CIRCUIT** displays the first failure in order of severity, as follows:

   Field 1 - 1.

   Fields 2 through 8 - Dashed or 1 (indicating equipment failure area).

   Field 9 - Alarm status of displayed failure.

Field 10 - Number of failures recorded.

Field 11 - Index (number of fault codes for displayed failure).

Field 12 - Specific fault code.

Fields 13 through 15 - Beginning time stamp of displayed failure (indicates day, hour, and minute when the failure was first recorded by periodic on-line software).

Field 16 - Hours since last run tape operation.

7. Depressing **NEXT DATA** displays the ending time stamp (indicates day, hour, and minute when the failure was last recorded by periodic on-line maintenance software).

   Depressing **NEXT DATA** again displays the beginning time stamp.

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures in order of severity.

   Each time **NEXT CIRCUIT** is depressed, Field 10 (number of failures) decrements by 1.

   Depressing **NEXT DATA** steps through the beginning and ending time stamp associated with the failure displayed.

9. Depressing **NEXT CIRCUIT** after all failures are displayed dashes Fields 2 through 16.

   Depressing **NEXT CIRCUIT** once more displays the summary, and the failure history can be stepped through again by use of **NEXT CIRCUIT** and **NEXT DATA**.

10. The **CLEAR DATA; EXECUTE** sequence can be used to manually resolve individual tape failures or all tape failures after **EXECUTE** is used to initiate Test 1.

    The tape failures that are resolved are those failures with an alarm status of 1 or 2 displayed in Field 9.

11. To manually resolve individual tape failures with an alarm status of 1 or 2, perform the following:

    Use **NEXT CIRCUIT** to display the tape failure with an alarm status of 1 or 2 on the **MAAP**.

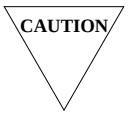
    Individual tape failures cannot be resolved unless the tape failure is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

    Field 9 (alarm status) displays a 5, indicating the tape failure is resolved in PMIDS.

    The **COMMON CONTROL TAPE** fault indicator goes off if no other tape failures exist.

12. All tape failures with an alarm status of 1 or 2 can be manually resolved when the summary is initially displayed; i.e., upon entry to **PROC 610**, Test 1 and after displaying and recording all tape failures and then using **NEXT CIRCUIT** to display the summary.



The tape failures should be displayed and recorded prior to resolving all tape failure alarmed entries in order that a record of the cause of the failure(s) is available for maintenance personnel.

13. After entering Test 1 and depressing **EXECUTE**, the summary is displayed.

    Depress **CLEAR DATA; EXECUTE**.

    All tape failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the **COMMON CONTROL TAPE** fault indicator goes off.

14. After displaying and recording all tape failures, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

    All tape failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the **COMMON CONTROL TAPE** fault indicator goes off.

15. The **MAJOR** or **MINOR** alarm indicator also goes off when no other sources affecting the **MAJOR** or **MINOR** alarm indicator are present.

Test 2

Test 2 performs an ID chip test on the tape interface (TN430). The **GREEN** and **RED** LEDs are checked for shorts and opens. A parity/checker function is performed on TN430. If Test 2 cannot be successfully completed, TN430 is reset and the tape subsystem is initialized. A diagnostic opcode with read/write option is invoked and self-tests are performed on the tape subsystem.

Test 2 automatically turns off the **COMMON CONTROL TAPE** fault indicator when all alarmed tape failures pass Test 2.

If a tape cartridge is not in the HCMR prior to performing Test 2 the test fails, and an invalid replacement sequence is indicated in Fields 2 through 8.

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator is lighted.

3. When Test 2 is completed, the **WAIT** indicator goes off and a summary is displayed.
4. If no tape failures exist, the following summary is displayed:

   Field 1 - 2.

   Field 10 - 0 (Indicating no failures).

5. If any tape failures exist, the summary displays a 2 in Field 1 and the total number of failures in Field 10.
6. Depressing **NEXT CIRCUIT** displays the first failure as follows:

   Field 1 - 2.

   Fields 2 through 8 - replacement sequence of failing equipment (1, 2, or 3 if appropriate).

   Field 9 - Dashed.

   Field 10 - Number of failures recorded.

Field 11 - Index (number of fault codes for displayed failure).

Field 12 - Specific fault code.

Fields 13 through 16 - Dashed.

7. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures.
8. Depressing **NEXT CIRCUIT** after all failures are displayed dashes Fields 2 through 16.

   Depressing **NEXT CIRCUIT** once more displays the summary, and the failure history can be stepped through again by use of **NEXT CIRCUIT**.
9. The **COMMON CONTROL TAPE** fault indicator automatically goes off when Test 2 is completed with no failures detected for all failures that had an alarm status of 1 or 2.

NOTE

Tape alarmed entries in PMIDS are marked as resolved.

10. The **MAJOR** or **MINOR** alarm indicator also goes off when no other sources affecting the alarm indicator(s) is present.

Repair Guide

When the **COMMON CONTROL TAPE** and **MAJOR** or **MINOR** fault indicators on the alarm panel are lighted (indicating a tape failure) or when **PROC 610** is referenced from **PROC 600** (Alarm Causes/Error Log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1.

   Step through the failure history and record the specific fault code for each failure.

   If a tape cartridge is not in the HCMR prior to performing Test 2 the test fails, and an invalid replacement sequence is indicated in Fields 2 through 8. In addition, ensure that the power switch located on SN446 is in the **ON** position.

2. Execute Test 2 and record the test results including the specific fault code for each tape failure.

   If no tape failures exist, the **COMMON CONTROL TAPE** fault indicator goes off.

NOTE

Tape alarmed entries in PMIDS are marked as resolved.

   If alarmed tape entries are displayed in Test 1 and no failures are detected in Test 2, perform microdiagnostic 10 when traffic permits to determine if intermittent tape failures exist.

3. If any failures are detected in Test 2, display the tape failure on the **MAAP**.

NOTE

If TN430 (tape interface) is failing, the **RED** LED in position 18 of TN430 is lighted.

4. Fields 2 through 8 indicate the replacement sequence to be performed in correcting the tape failure by displaying a 1, 2, and 3 in the appropriate fields.

   NOTE

   The replacement sequence for tape failures may not have 3 units to replace.

5. Replace the type of equipment indicated by a 1 displayed in one of the equipment type fields (2 through 8).
6. Repeat Test 2.

   If Test 2 passes, the **COMMON CONTROL TAPE** fault indicator goes off and the tape alarmed entries in PMIDS are marked as resolved.
7. If Test 2 fails, replace the next type of equipment (if any) indicated by a 2 displayed in one of the equipment type fields (2 through 8).

   NOTE

   Replacement sequence 1 may now be different than the original replacement 1 sequence (indicating the original replacement corrected part but not all of the problem). If replacement sequence 1 is different, replace the type of equipment indicated by a 1 in one of the equipment type fields (2 through 8) instead of the type of equipment indicated by a 2.

   If no other replacements are indicated, proceed to Step 10.
8. Repeat Test 2.

   If Test 2 passes, the **COMMON CONTROL TAPE** fault indicator goes off and the tape alarmed entries in PMIDS are marked as resolved.
9. If Test 2 fails, replace the next type of equipment (if any) indicated by a 3 displayed in one of the equipment type fields (2 through 8).

   NOTE

   Replacement sequence 2 may now be different than the original replacement 2 sequence (indicating the original replacement corrected part but not all of the problem). If replacement sequence 2 is different, replace the type of equipment indicated by a 2 in one of the equipment type fields (2 through 8) instead of the type of equipment indicated by a 3.

   If no other replacements are indicated, proceed to Step 10.
10. Replace the HCMR.

    NOTE

    Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the HCMR.

11. Repeat Test 2.

    If Test 2 passes, the **COMMON CONTROL TAPE** fault indicator goes off and the tape alarmed entries in PMIDS are marked as resolved.

12. If Test 2 fails, further isolation of a tape failure may be accomplished by analyzing the specific fault codes recorded from Test 1 (PMIDS) and Test 2 (DMIDS).

    Determine from Table P, PROC 610 - Specific Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

    Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code(s) recorded) and the cabling between the tape interface (TN430) and the HCMR (especially when SN441 and SN446 are indicted).

Table 5-17.

PROC 610 - SPECIFIC FAULT CODE DEFINITIONS

FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
791	SN443	SN445	SN442	Tape failed to open.
792	TN430			Waiting for read directory following an auto open.
793	CART			Tape cartridge not fully inserted.
794	TN430			Diagnose opcode timed out, no response.
795	SN446	SN441	TN430	INIT_TAP opcode timed out, did not initialize.
796	TN430			TN430 mailbox not initialized.
797	TN430			Write with good parity failed.
798	TN430			CMD with bad parity on high byte failed.
799	TN430			CMD with bad parity on low byte failed.
800	TN430			Access to TN430 failed over maintenance bus.
801	TN430			Access to TN430 failed over system bus.
802	TN430			Access denied to tape monitor.
803	TN430			Tape subsystem is shutdown.
804	TN430			Tape subsystem recovery in progress.
805	TN430			Initialization failed.
806	TN430			INIT_TAP opcode not preceded by reset.
807	TN430			Write protect check failed in initialization.
808	TN430			Parity check failed in initialization.
809	TN430			Mailbox test failed in initialization.
810	TN430			Memory mapper failed in initialization.
811	TN430			TN430 bit set in maintenance register.
812	SN441	SN446		HCMR controller bit set in maintenance register.
813	SN445	SN443		HCMR servo bit set in maintenance register.
814	SN443	CART	SN445	HCMR transport bit set in maintenance register.
815	SN442	SN441		HCMR data electronics bit set in maintenance register.
816	SN446			HCMR power bit set in maintenance register.
817	CART			Tape present bit is set.
818	TN430			Maintenance register copies do not match.

Table 5-17. (Contd)

PROC 610 - SPECIFIC FAULT CODE DEFINITIONS				
FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
819	SN441	SN446	TN430	No reply from HCMR from diagnose opcode.
820	*	*	*	Error in HCMR from diagnose opcode.
920	TN430			Monitor detector error in TN430 while processing tape request.
921	TN430			Monitor I/O failure, time-out, or too many resets attempted.
922	SN441			Monitor detector error in HCMR while processing tape request.
923	CART			Monitor detector error with tape cartridge while processing tape request.
924	TN430			Patch run-tape failed.
925	TN430			Run tape failed (On- or off-line).
940	TN430	SN441		Illegal command to HCMR. Problem may not be in tape subsystem.
941	CART	SN443	SN442	Error in block header.
942	CART			Block number error. Problem may not be in tape subsystem.
943		SN441	TN430	HCMR bus parity error. Problem may not be in tape subsystem.
944	CART	SN443	SN445	Tape motion error.
945	SN441	SN442	SN443	HCMR diagnostic error.
946	CART	SN445	SN443	Correctable data error on tape.
947	CART	SN445	SN443	Reread was done.
948	CART			Uncorrectable data error on tape.
949		CART		Unable to locate block. Problem may not be in tape subsystem.
950	SN441	SN443	SN445	Tape opening failures.
951				Retensions since TN430 reset.
952	SN446	SN441	TN430	No reply from HCMR to a command.
953	SN441	TN430		HCMR resets.
954	SN446	TN430	SN441	HCMR power supply out of tolerance.
955		TN430		System bus time-outs 1. Problem may not be in tape subsystem.
956		TN430		System bus single 1-byte parity error. Problem may not be in tape subsystem.

Table 5-17. (Contd)

PROC 610 - SPECIFIC FAULT CODE DEFINITIONS				
FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
957	TN394	SYSBUS		System bus double 1-byte parity error. Problem may not be in tape subsystem.
958	TN430			TN430 sanity time-outs 1.
959		TN430		System bus write aborts 1. Problem may not be in tape subsystem.
960		TN430		Illegal opcode from system. Problem may not be in tape subsystem.
961		TN430		Illegal block range. Problem may not be in tape subsystem.
962		TN430		Inconsistent block range. Problem may not be in tape subsystem.
963	CART	SN445	SN443	Retensions in excess of limits.
964		TN430		Opcode aborted. Problem may not be in tape subsystem.
965	TN430	TN394		Comparison failures between shared buffer and switch processor memory.
966	SN443			Tape insertions since reset.
967	TN430			Timer audit errors.
968	TN430	CART	SN443	Directory audit errors.
969	TN430			Memory mapper audit errors.
970	SN446	TN430		HCMR power up failures. Problem may not be in tape subsystem.

* = Refer to Fields 2 through 8 (equipment) for replacement sequence.

PROC 611 - COMMON CONTROL TESTS

Purpose

PROC 611 is used when referenced from **PROC 600** (Alarm Causes/Error Log) or when the **COMMON CONTROL I/O CHANNEL** and **MAJOR** fault indicators on the alarm panel are lighted.

PROC 611 is used to:

1. Display the failure history for 4-MHz channels and dual-speed data channels.
2. Manually turn off the fault indicator(s) activated because of 4-MHz channel and/or dual-speed data channel failures.

NOTE

Common control I/O alarmed circuit entries in PMIDS are marked as resolved.

3. Perform good data test with loop around; serial parity test with loop around; serial parity test with no loop around; and good data test with no loop around on 4-MHz channels and dual-speed data channels.
4. Display 4-MHz and dual-speed data channel failures and indict the I/O buffer circuit when over 50 percent of translated I/O channels fail the tests.
5. Continuously test a specific 4-MHz channel or dual-speed data channel to determine if intermittent failures exist.
6. Automatically turn off the **COMMON CONTROL I/O CHANNEL** fault indicator when all circuits pass Test 2.

NOTE

Common control I/O alarmed circuit entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 611** flipchart and the possible displays for the fields during execution of the different tests are defined in Table Q, PROC 611 - Field Definitions and Codes.

Optional input fields are: Fields 2 through 6 - Select equipment location of 4-MHz channel or dual-speed data channel to be tested continuously (Test 3 only).

Table 5-18.

PROC 611 - FIELD DEFINITIONS AND CODES

FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1-3	Test number.	8	1-3	Circuit type.
2-6		Equipment location.		1	4 MHZ channel.
2	0-99	Module number.		2	Dual speed channel.
3	0-7	Cabinet number.		3	I/O buffer board.
4	0-3	Carrier number.	9	0-64	Failure index.
5	21, 23-30	Slot number.		0-6	Index into PMIDS failures (Test 1 only).
6	Dash, 0-15	Channel number.		0-64	Index into DMIDS failures (Test 2 only).
7	0-5	Alarm status.	10	0-912	Specific fault code.
	0	No errors recorded.	11	0-128	Number of translated I/O Channels (Test 1 only).
	1	Major.		0-999	Number of times tested (Test 3 only).
	2	Minor.			
	3	Warning.	12	0-9	Number of I/O channel circuit packs installed (Test 1 only).
	4	Errors recorded.			
	5	Alarm resolved.		0-99	Number of times failed (Test 3 only).

Operation of Procedure

Overview

PROC 611 is used to determine the cause of the **COMMON CONTROL I/O CHANNEL** and **MAJOR** fault indicators being lighted resulting from a common control 4-MHz channel and/or dual-speed data channel failure.

To call in **PROC 611**, perform the following:

1. Depress **PROC NO; 611; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Tests all 4-MHz channels and dual-speed data channels.
3. Test 3 - Tests a specific 4-MHz channel or dual-speed data channel continuously.

Test 1

Test 1 provides a failure history of 4-MHz channels, dual-speed data channels, and I/O buffer failures. The failure history is recorded by the on-line periodic software tests.

Test 1 is also used to manually turn off the **COMMON CONTROL I/O CHANNEL** fault indicator.

1. Test 1 is the default test when entering **PROC 611** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. To start Test 1, depress **EXECUTE**.
3. The failure history is sorted first by alarm status and then by circuit type, and a summary is displayed.
4. If no failures occurred, the summary displays a 1 in Field 1, a 0 in Field 9 (indicating no channel failures), the total number of translated channels in Field 11, the total number of I/O circuit packs in Field 12, and all other fields are dashed.
5. If one or more failures occurred, the following summary is displayed:

   Field 1 - 1.

   Fields 2 through 8 - Dashed.

   Field 9 - Total number of channel failures (maximum of 6).

   Field 10 - Dashed.

   Field 11 - Total number of translated channels.

   Field 12 - Total number of 4-MHz and dual-speed circuit packs.

6. Depressing **NEXT CIRCUIT** displays the first failure in order of severity, as follows:

   Field 1 - 1.

   Fields 2 through 6 - Equipment location of the first failing channel.

   NOTE

   If the failure displayed is the I/O buffer circuit pack, Field 6 is dashed.

   Field 7 - Alarm status of failing channel.

   Field 8 - Circuit type (1 = 4-MHz channel, 2 = dual-speed data channel, 3 = I/O buffer).

   Field 9 - Failure index (total number of failures recorded in PMIDS).

   Field 10 - Specific fault code recorded for the failing channel.

   Field 11 - Total number of channels translated.

   Field 12 - Total number of 4-MHz and dual-speed circuit packs.

7. Depressing **NEXT CIRCUIT** repeatedly displays the failure histories of the remaining failing channels.

   Each time **NEXT CIRCUIT** is depressed, Field 9 (failure index) is decremented by one.

8. Depressing **NEXT CIRCUIT** after all failing channels are displayed, dashes all fields except Field 1.

   Depressing **NEXT CIRCUIT** once more causes Test 1 to be executed, reading and sorting the failure history in PMIDS, and displaying a new summary.

9. The **CLEAR DATA; EXECUTE** sequence can be used to manually resolve individual common control I/O channel failures or all common control I/O channel failures after **EXECUTE** is used to initiate Test 1.

   The failures that are resolved are those failures with an alarm status of 1, 2, or 3 displayed in Field 7.

10. To resolve individual common control I/O channel failures with an alarm status of 1, 2, or 3, perform the following:

    Use **NEXT CIRCUIT** to display the failing common control I/O channel with an alarm status of 1, 2, or 3 on the **MAAP**.

    Individual common control I/O channel failures cannot be resolved unless the failing common control channel is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

11. Field 7 (alarm status) displays a 5, indicating that the failing common control I/O channel is resolved.

    The **COMMON CONTROL I/O CHANNEL** fault indicator goes off if no other common control channel failures exist.

12. All common control I/O channel failures with an alarm status of 1, 2, or 3 can be resolved when the summary is initially displayed; i.e., upon entry to **PROC 611**, Test 1 and after displaying and recording all common control I/O channel failures and then using **NEXT CIRCUIT** to display the summary.

    CAUTION

    The common control I/O channel failures should be displayed and recorded prior to resolving the common control I/O channel alarmed entries in order that a record of the equipment location and specific fault code of the failure(s) is available for maintenance personnel.

13. After entering Test 1 and depressing **EXECUTE**, the summary is displayed.

    Depress **CLEAR DATA; EXECUTE**.

14. All common control I/O channel failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the **COMMON CONTROL I/O CHANNEL** fault indicator goes off.

    Field 9 (failure index) displays a 0, indicating no alarmed common control I/O failures exist.

15. After displaying and recording all common control I/O channel failures, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

16. All common control I/O channel failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the **COMMON CONTROL I/O CHANNEL** fault indicator goes off.

    Field 9 (failure index) displays a 0, indicating no alarmed common control I/O failures exist.

17. The **MAJOR** alarm indicator also goes off when no other sources affecting the alarm indicator are present.

Test 2

Test 2 performs the following tests to determine the status of 4-MHz channels and dual-speed data channels.

1. Good data test with loop around (data with accurate parity is looped from output to input on the circuit pack without affecting the peripheral) on 4-MHz channels and dual-speed data channels.
2. Serial data-channel parity test with loop around (bad parity is generated and sent with serial data while loop around is in effect) on 4-MHz channels and dual-speed data channels.
3. Good data test with no loop around (correct parity is generated and sent with serial data through the peripheral) on 4-MHz channels only.
4. Serial data-channel parity test with no loop around (bad parity is generated and sent with serial data when loop around is not in effect) on 4-MHz channels only.
5. Buffered bus parity check test with loop around (bad parity is forced on the system and buffered busses) on 4-MHz channels and dual-speed data channels.
6. ID chip test on all 4-MHz channels and dual-speed data channels.

Test 2 also indicts the I/O buffer circuit when over 50 percent of translated channels fail the tests.

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

3. While the **WAIT** indicator is lighted, Test 2 can be halted by depressing **STOP**.

   The **WAIT** indicator goes off and the results of the test up to the time **STOP** was depressed are available beginning with a summary.

   Proceed to Step 5.

4. When Test 2 completes, the **WAIT** indicator goes off and a summary is displayed.

NOTE

The **GREEN** LED is lighted for any circuit pack that passes Test 2 (TN402, TN403, and/or TN404) if the I/O buffer circuit pack is not failing.

5. If no failures occurred, the summary displays a 2 in Field 1, a 0 in Field 9 (indicating no channel failures), and all other fields are dashed.
6. If one or more failures occurred, the following summary is displayed:

   Field 1 - 2.

   Fields 2 through 8 - Dashed.

   Field 9 - Total number of channel failures.

   Fields 10 through 12 - Dashed.
7. Depressing **NEXT CIRCUIT** displays the first failure as follows:

   Field 1 - 2.

   Fields 2 through 6 - Equipment location of the first failing channel.

NOTE

If the failure displayed is the I/O buffer circuit pack, Field 6 is blank.

   Field 7 - Dashed.

   Field 8 - Circuit type (1 = 4-MHz channel, 2 = dual-speed data channel, 3 = I/O buffer).

   Field 9 - Failure index (total number of failures recorded in DMIDS).

   Field 10 - Specific fault code recorded for the failing channel.

   Fields 11 and 12 - Dashed.
8. While the failing channel is displayed on the **MAAP**, the **RED** LED on the failing circuit pack is lighted. The **RED** LED goes off when the display on the **MAAP** no longer corresponds to it.

NOTE

If over 50 percent of the translated channels fail Test 2, the **RED** LED on the I/O buffer circuit pack is lighted instead of the **RED** LEDs on the channels that failed because of the failing I/O buffer circuit pack.

9. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing channels.

NOTE

The **RED** LED on the original circuit pack goes off and the **RED** LED on the displayed circuit pack in Fields 2 through 5 is lighted. The **RED** LED goes off when the display on the **MAAP** no longer corresponds to it.

   Each time **NEXT CIRCUIT** is depressed, Field 9 (failure index) is decremented by one.

10. Depressing **NEXT CIRCUIT** after all failing channels are displayed, dashes all fields except Field 1.

    Depressing **NEXT CIRCUIT** once more causes the failure summary information to be displayed again.

11. The **COMMON CONTROL I/O CHANNEL** fault indicator automatically goes off (indicating the common control I/O alarm cause is resolved) when all common control channels pass Test 2.

    NOTE

    Common control I/O alarm entries in PMIDS are marked as resolved.

12. When no other alarm sources affecting the **MAJOR** alarm indicator are present in the switch, the **MAJOR** alarm indicator also goes off.

Test 3

Test 3 is used to continuously test any 4-MHz channel or dual-speed data channel suspected of having intermittent failures, when using test equipment to further isolate a problem, or to trace wiring problems.

NOTE

I/O buffer circuit packs are not tested in Test 3.

1. Test 3 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 3.

2. When Test 3 is initially called in, a default equipment location may be displayed in Fields 2 through 6.

   The alarm status and specific fault code associated with the default equipment location may be displayed in Fields 7 and 10.

   Field 2 (module) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Test 1 or 2 of **PROC 611** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

   Either the default equipment location can be tested, or another 4-MHz channel or dual-speed data channel can be selected for testing.

4. A specific 4-MHz channel or dual-speed data channel can be selected for testing by entering the equipment location in Fields 2 through 6 whether or not a default equipment location is displayed:

   (Module number of 4-MHz channel or dual-speed data channel to be tested); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Channel number to be tested); ENTER**.

   Proceed to Step 8.

5. A specific 4-MHz data channel or dual-speed data channel can also be selected for testing by use of **NEXT CIRCUIT**.

6. Depress **NEXT CIRCUIT** until the 4-MHz channel or dual-speed channel to be tested is displayed in Fields 2 through 6.

   Proceed to Step 8.

7. To test the default equipment location displayed in Fields 2 through 6, proceed to Step 8.

8. To start Test 3 after selecting the 4-MHz channel, dual-speed data channel, or default equipment location to be tested, depress **EXECUTE**.

   The **WAIT** indicator is not lighted during Test 3 execution.

9. When a default equipment location, 4-MHz channel, or dual-speed data channel is being tested continuously in Test 3, the following fields are updated:

   Field 10 - Specific fault code (if any).

   Field 11 - Number of times the 4-MHz channel or dual-speed data channel is tested.

   NOTE

   If the circuit is tested more than 999 times, Field 11 starts counting over from 0 (i.e., 998, 999, 0, 1, 2, etc.).

   Field 12 - Number of times the 4-MHz channel or dual-speed data channel failed Test 3 (if any).

   NOTE

   Test 3 stops automatically if the 4-MHz channel or dual-speed data channel tested reaches 99 failures.

10. While Test 3 is executing, the **RED** and **GREEN** LEDs on the circuit pack corresponding to the 4-MHz channel or dual-speed data channel being tested is updated.

    If Test 3 continues to pass, the **GREEN** LED is lighted.

    At the first failure detected, the **RED** LED is lighted.

    If the channel being tested passes Test 3 after failing, the **GREEN** LED is lighted.

    NOTE

    Only one LED is lighted at a time. If the channel being tested is failing intermittently, the **RED** and **GREEN** LEDs turn on and off to correspond with the failing and passing interactions of each test (as appropriate).

11. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

12. When Test 3 stops automatically (after 99 failures) or after depressing **STOP** while testing a default equipment location, a specific 4-MHz data channel, or dual-speed data channel, the following summary is displayed:

    Field 9 - Failure index (number of failure records if any).

    Field 11 - Number of times the 4-MHz channel or dual-speed data channel is tested.

    Field 12 - Number of times the 4-MHz channel or dual-speed data channel failed Test 3 (if any).

    NOTE

    The **GREEN** LED is lighted on the corresponding circuit pack if the 4-MHz channel or dual-speed data channel passed Test 3.

13. When the 4-MHz channel or dual-speed data channel fails Test 3 (indicated by Fields 9 and 12), depressing **NEXT FAULT** displays the first failure record as follows:

    Field 1 - 3.

    Fields 2 through 6 - Equipment location of 4-MHz channel or dual-speed data channel tested.

    Field 7 - Dashed.

    Field 8 - Circuit type (1 = 4-MHz channel, 2 = dual-speed data channel).

    Field 9 - Failure index (number of failure records).

    Field 10 - Specific fault code.

    Field 11 - Number of times the 4-MHz channel or dual-speed data channel was tested.

    Field 12 - Number of times the 4-MHz channel or dual-speed data channel failed Test 3.

    NOTE

    The **RED** LED is lighted on the corresponding circuit pack if the 4-MHz channel or dual-speed data channel failed Test 3.

14. Depressing **NEXT FAULT** repeatedly displays all the failure records for the 4-MHz channel or dual-speed data channel being tested.

    Field 9 (failure index) is decremented each time **NEXT FAULT** is depressed.

15. Depressing **NEXT FAULT** after all failure records are displayed dashes Fields 9 through 12.

    Depressing **NEXT FAULT** once more displays the summary information (failure index, number of times tested, and number of times failed).

16. When another 4-MHz channel or dual-speed data channel is to be continuously tested, **NEXT CIRCUIT** or the **CHANGE FIELD** sequence can be used to select the specific circuit:

    Depress **NEXT CIRCUIT** until the 4-MHz channel or dual-speed data channel to be tested is displayed in Fields 2 through 6.

    CHANGE FIELD; 2; ENTER; (Module number of 4-MHz channel or dual-speed data channel to be tested); ENTER; (Cabinet number); **ENTER; (Carrier number); ENTER; (Slot number); ENTER**; **(Channel number to be tested); ENTER**.

17. **EXECUTE** must be depressed to test the 4-MHz channel or dual-speed data channel selected for testing.

Repair Guide

When the **COMMON CONTROL I/O CHANNEL** and **MAJOR** fault indicators on the alarm panel are lighted (indicating a common control channel failure) or when **PROC 611** is referenced from **PROC 600** (Alarm Causes/Error Log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1.

   Step through the failure history and record the specific fault code for each failure.

2. Execute Test 2 and record the test results including the specific fault code for each common control I/O channel failure.

3. If all common control I/O channels pass Test 2 the common control I/O channel alarm cause(s) is resolved, and the **COMMON CONTROL I/O CHANNEL** fault indicator goes off.

   NOTE

   Common control I/O channel alarmed entries in PMIDS are marked as resolved.

   When Test 2 passes and 4-MHz channel or dual-speed data channel failures are recorded in Test 1 with an alarm status of 1, 2, or 3 (major, minor, or warning) proceed to Step 9 for further testing to ensure that no intermittent failures exist.

4. If any failures are detected in Test 2, display the common control I/O channel failure on the **MAAP**.

   NOTE

   While the failing channel is displayed on the **MAAP**, the **RED** LED on the failing circuit pack is lighted.

5. If over 50 percent of the translated channels fail Test 2, the **RED** LED on the I/O buffer circuit pack is lighted instead of the **RED** LEDs on the channels that failed because of the failing I/O buffer circuit pack.

6. Replace the circuit pack with the **RED** LED lighted.

7. Repeat Test 2.

   If Test 2 passes, the **COMMON CONTROL I/O CHANNEL** fault indicator goes off.

   NOTE

   Common control I/O channel alarmed entries in PMIDS are marked as resolved.

8. If Test 2 fails, step through the failures to determine if the same failure exists.

   If different failures exist, repeat Steps 3 through 7 (as appropriate).

   If the same failure exists, proceed to Step 11.

9. Execute Test 3 and continuously test the suspect 4-MHz channel or dual-speed data channel to determine if it fails.

   If the 4-MHz channel or dual-speed data channel passes Test 3, corrective action is complete.

   If the 4-MHz channel or dual-speed data channel fails Test 3, replace the circuit pack with the **RED** LED lighted at the equipment location displayed in Fields 2 through 5.

10. Repeat Test 3.

    If Test 3 passes, repeat Test 2 to retire the cause of the **COMMON CONTROL I/O CHANNEL** fault indicator.

    If Test 3 fails, proceed to Step 11.

11. If Test 2 or 3 fails, further isolation of a common control channel failure may be accomplished by analyzing the specific fault codes recorded from Test 1 (PMIDS) and Test 2 (DMIDS).

    Determine from Table R, PROC 611 - Specific Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

    Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code (s) recorded).

Table 5-19.

PROC 611—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
0	No failure.
1	SIO error from a maintenance routine.
826	Invalid software-generated fault.
827	Cannot set board test status for good data test with loop-around.
828	Cannot clear board test status for good data test with loop-around.
829	Cannot write test vector for good data test with loop-around.
830	Echo check failure for good data test with loop-around.
831	Cannot read status register for good data test with loop-around.
832	Read failed from data not ready for good data test with loop-around.

Table 5-19. (Contd)

PROC 611—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
833	Read failed from unknown cause for good data test with loop-around; however, the data echo check was good.
834	Read failed from unknown cause for good data test with loop-around, and the data echo check was bad.
835	Read failed from serial parity error for good data test with loop-around; however, the data echo check was good.
836	Read failed from serial parity error for good data test with loop-around, and the data echo check was bad.
837	Cannot set board test status for serial data channel parity test with loop-around.
838	Cannot clear board test status for serial data channel parity test with loop-around.
839	Cannot write test vector for serial data channel parity test with loop-around.
840	Read did not fail for serial data channel parity test with loop-around.
841	Cannot read status register for serial data channel parity test with loop-around.
842	Read failed from data not ready for serial data channel parity test with loop-around.
843	Read failed from unknown cause for serial data channel parity test with loop-around; however, the data echo check was good.
844	Read failed from unknown cause for serial data channel parity test with loop-around, and the data echo check was bad.
845	Echo check failed for serial data channel parity test with loop-around.
846	Cannot set board test status for serial data channel parity test with no loop-around.
847	Cannot clear board test status for serial data channel parity test with no loop-around.
848	Cannot write test vector for serial data channel parity test with no loop-around.
849	Cannot read status register for serial data channel parity test with no loop-around.
850	Read did not fail for serial data channel parity test with no loop-around.
851	Read failed from data not ready for serial data channel parity test with no loop-around.
852	Read failed from unknown cause for serial data channel parity test with no loop-around; however, the data echo check was good.
853	Read failed from unknown cause for serial data channel parity test with no loop-around, and the data echo check was bad.
854	Echo check failed for serial data channel parity test with no loop-around.
855	Cannot set board test status for good data test with no loop-around.
856	Cannot clear board test status for good data test with no loop-around.

Table 5-19. (Contd)

PROC 611—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
857	Cannot write test vector for good data test with no loop-around.
858	Echo check failure for good data test with no loop-around.
859	Cannot read status register for good data test with no loop-around.
860	Read failed from data not ready for good data test with no loop-around.
861	Read failed from unknown cause for good data test with no loop-around; however, the data echo check was good.
862	Read failed from unknown cause for good data test with no loop-around, and the data echo check was bad.
863	Read failed from serial parity error for good data test with no loop-around; however, the data echo check was good.
864	Read failed from serial parity error for good data test with no loop-around, and the data echo check was bad.
865	Cannot set board test status for buffered bus parity check test with loop-around.
866	Cannot clear board test status for buffered bus parity check test with loop-around.
867	Buffered bus low byte error not detected.
868	Buffered bus high byte error not detected.
869	Buffered bus both bytes in error not detected.
898	Common control carrier I/O buffer board failure.
900	Control status register read failure for good data test with loop-around.
901	Control status register echo check failure for good data test with loop-around.
902	Control status register read failure for serial data channel parity test with loop-around.
903	Control status register echo check failure for serial data channel parity test with loop-around.
904	Control status register read failure for serial data channel parity test with no loop-around.
905	Control status register echo check failure for serial data channel parity test with no loop-around.
906	Control status register read failure for good data test with no loop-around.
907	Control status register echo check failure for good data test with no loop-around.
908	Control status register read failure for buffered bus test.
909	Control status register echo check failure for buffered bus test.
910	Buffered bus low byte echo failure.
911	Buffered bus high byte echo failure.
912	Buffered bus both bytes echo failure.

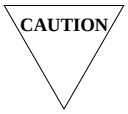
PROC 612 - INITIALIZATION CAUSES

Purpose

PROC 612 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS, MEM** and/or **CACHE** fault indicator(s) resulting from an initialization cause.

PROC 612 is used to:

1. Display the reasons that caused the common control processor to be initialized.
2. Manually turn off the **OTHER FAILS, MEM** and/or **CACHE** fault indicator(s).
3. Clear all maintenance data (failure history) in memory, and turn off all lighted fault indicators (if any) and the **MAJOR, MINOR**, and/or **WARNING** alarm indicators if lighted.



PROC 612 provides a special feature to clear (zero) all maintenance data (failure history) in the PMIDS portion of memory. Use of this feature removes all failure indications that would normally be investigated by the procedure associated with the failure. This feature is not used in normal troubleshooting activities.

Field Definitions and Codes

Each field of **PROC 612** flipchart and the possible displays for the fields during execution of the procedure are defined in Table S, PROC 612 - Field Definitions and Codes.

Field 1 is an optional input field for clearing the maintenance data in PMIDS.

Operation of Procedure

PROC 612 is used to determine the cause of the **OTHER FAILS, MEM** and/or **CACHE** fault indicator(s) being lighted resulting from an initialization cause.

Table 5-20.

PROC 612 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	0-99	Initialization number:	3 (Contd)	12	Bus time out.
	0	Summary.		13	Duplication channel receive.
	1-18	Different causes.		14	Duplication illegal instruction.
	99	Used only to clear all failure history in PMIDS.		15	Cache parity low.
2	3, 5, 18	Unit type:		16	Cache parity high.
	3	Initialization.		17	Cache parity both.
	5	Main memory.		18	501CC diagnostic register loaded while 501CC running.
	18	Cache.		19	Recovery from suicide.
3	1-42	Fault code: Initialization causes associated with codes 1 through 18 in Field 1:		20	Hold/Get overflow.
	1	Short power failure.		21	Long power failure.
	2	Micro memory parity.		22	Microdiagnostic Test 15 executed.
	3	Sanity time out.		23	Hold get area overflow or underflow.
	4	Input/output sanity time out.		24	Branch to zero error.
	5	Memory parity low.		25	Interrupt area.
	6	Memory parity high.		26	False identification.
	7	Memory parity both.		27	Two processors (common control) on-line.
	8	Illegal operation code.		28	Processor (common control) suicide.
	9	Fetch abort.		29	Five short initializations.
	10	Write protect.			
	11	Illegal micro instruction.			

Table 5-20. (Contd)

PROC 612 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
3 (Contd)	30	Duplication memory match failure.	6-8		Time stamp: A beginning time stamp showing the day of the month, hour, and minute when the first error occurred for the fault logged in PMIDS.
	31	Parity error during audit.			
	32	X-ray program detected processor failure.	6	1-31	Day of the month.
	33	X-ray program detected memory failure.	7	0-23	Hour of the day.
			8	0-59	Minute.
	34	Microdiagnostic detected failure.	9	0-5	Count to reload: An indicator of the seriousness of the initialization causes leading to a reload of memory.
	35	Processor (common control) switch.			
	36	Halt/Go.			
	37	Cache turned off for recovery.	10	0-3	Processor health status:
				0	No failure.
	38	Memory error correction turned off for recovery.		1-3	Codes 1 through 3 apply to duplicated systems only.
	39	Emergency transfer.		1	Software A failure: Minor.
	40	Network test controller.			
	41	Duplication channel bad.		2	Software B failure: Possible problem in switching processors.
	42	I/O			
4	0-77	Failed memory block.			
5	0-777777	Octal address in memory block.		3	Hardware failure.

To call in **PROC 612**, perform the following:

1. Depress **PROC NO; 612; ENTER**.
2. A 0 is displayed in Field 1, and all other fields are dashed.

NOTE

There is no test selection in this procedure.

Determining Initialization Causes

Depressing **EXECUTE** takes a summary of the failure history and displays it on the **MAAP**.

1. If no failures occurred, Fields 1 and 10 display a 0.
2. If one or more failures occurred, the following is displayed:

   Field 1 - Init fault number = 1.

   Field 10 - Processor health (0 = pass, 1 = Soft A, 2 = Soft B, 3 = Hardware).
3. Depressing **NEXT FAULT** updates the display as follows:

   Field 1 - Init fault number = 1.

   Field 2 - Unit type (3 = initialization, 5 = main memory, 18 = cache).

   Field 3 - Fault code (initialization cause).

   Field 4 - Memory block location (or dashed).

   Field 5 - Octal address in memory block (or dashed).

   NOTE

   Only certain types of initialization causes display memory block location and octal address in Fields 4 and 5.

   Field 6 - Day of the month when the initialization fault code displayed in Field 3 began.

   Field 7 - Hour of the day when the initialization fault code displayed in Field 3 began.

   Field 8 - Minute of the hour when the initialization fault code displayed in Field 3 began.

   Field 9 - Count to reload (indication of the seriousness of the initialization fault code displayed in Field 3 in leading to a reload of memory).

   Field 10 - Processor health (0 = Pass, 1 = Soft A, 2 = Soft B, 3 = Hardware).
4. Depressing **NEXT FAULT** displays additional initialization fault codes if more than 1 was logged for the init fault number displayed in Field 1.

   Depressing **NEXT FAULT** after all initialization fault codes are displayed, dashes Field 3.

   Depressing **NEXT FAULT** once more displays the first initialization fault code starting the sequence over.
5. Depressing **NEXT FAULT** repeatedly sequences the display through the init fault numbers, in chronological order, until the last one is displayed.

   Depressing **NEXT FAULT** after all init fault numbers are displayed dashes the display.

   Depressing **NEXT FAULT** once more starts the sequence over with the failure history summary.

Turning Off Fault Indicator

To manually turn off the **OTHER FAILS, MEM** and/or **CACHE** fault indicator(s) (assuming no other sources are affecting the **OTHER FAILS** fault indicator), perform the following:

1. Depress **CLEAR DATA; EXECUTE**.
2. Fields 1 and 10 display a 0 and all other fields are dashed.

NOTE

Initialization causes are marked as resolved in PMIDS.

Clear all Maintenance Data

Failure history contained in PMIDS can be cleared (zeroed) when **PROC 612** is loaded from tape without first depressing **EXECUTE**, or when initialized by **RESET**, or after investigating the initialization causes.

CAUTION

Using the following sequence removes all failure indications (alarmed entries and entries with recorded errors) that would normally be investigated with the procedure associated with the failure. This sequence is not used in normal troubleshooting activities.

To clear (zero) maintenance data from PMIDS, perform the following:

1. For **RESET** and after initialization causes are investigated use:

   CHANGE FIELD; 1; ENTER; 99; ENTER; CLEAR DATA; EXECUTE.

2. Prior to entering **PROC 612** use:

   PROC NO; 612; ENTER; CHANGE FIELD; 1; ENTER; **99; ENTER; CLEAR DATA; EXECUTE**.

3. The **WAIT** indicator goes off when the maintenance data is cleared from memory - several seconds after depressing **CLEAR DATA; EXECUTE**.
4. The **MAAP** displays a 0 in Field 10 (processor health status) and all other fields are dashed indicating the maintenance data is cleared from PMIDS.

   All lighted fault indicators (if any) and the **MAJOR, MINOR**, or **WARNING** alarm indicators (if lighted) go off.

5. The only code that can be entered in Field 1 is 99.

   Attempting to enter other codes causes special error code 03 (data wrong) to be displayed in the **MAAP** error code field.

Repair Guide

Initialization causes do not usually point to a faulty circuit pack.

1. Maintenance personnel should be aware of what has recently occurred in the switch to determine the corrective action to be taken.
2. Some causes of initialization may be a result of other repair action performed.

   In such cases, no repair action is required and the alarm cause may be resolved, after recording pertinent maintenance data using **PROC 612**, by performing the **CLEAR DATA; EXECUTE** sequence.

3. For those situations when further investigation is required for the initialization causes, primary and secondary suspect circuit packs, or other possibilities that should be investigated are listed in Table T, PROC 612 - Initialization Causes Repair Procedure.

Table 5-21.

PROC 612 - INITIALIZATION CAUSES REPAIR PROCEDURE			
FAULT CODE	INITIALIZATION CAUSE	PRIMARY SUSPECT	SECONDARY SUSPECT
1	Short power failure	Primary dropout	
2	Micro memory parity	TN370, UN151, UN152, UN153	Software
3	Sanity time-out	UN152	Software
4	I/O sanity time-out	TN368	
5	Memory parity—low	TN392	
6	Memory parity—high	TN392	
7	Memory parity—both	TN392	
8	Illegal operation code	TN370, UN151, UN152, UN153	
9	Fetch abort	Look for other init causes	Software, TN368
10	Write protect	Look for other init causes	Software, TN368
11	Illegal micro instruction	TN370, UN151, UN152, UN153	
12	Bus time out	UN153, anything on bus	Software
13	Duplication channel receive	UN158	Cable between channels
14	Duplication illegal instruction	Software	
15	Cache parity—low	TN369	UN153
16	Cache parity—high	TN369	UN153
17	Cache parity—both	TN369	UN153
18	501CC diagnostic register loaded while 501CC running	TN491	
19	Recovery from suicide	Look for other init causes	
20	Hold/Get overflow	Software	UN151
21	Long power failure	Power outage	Power supply

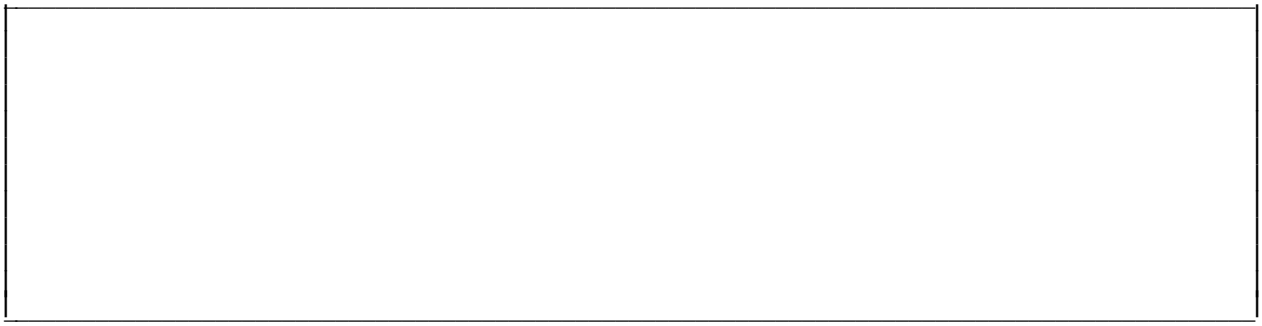
Table 5-21. (Contd)

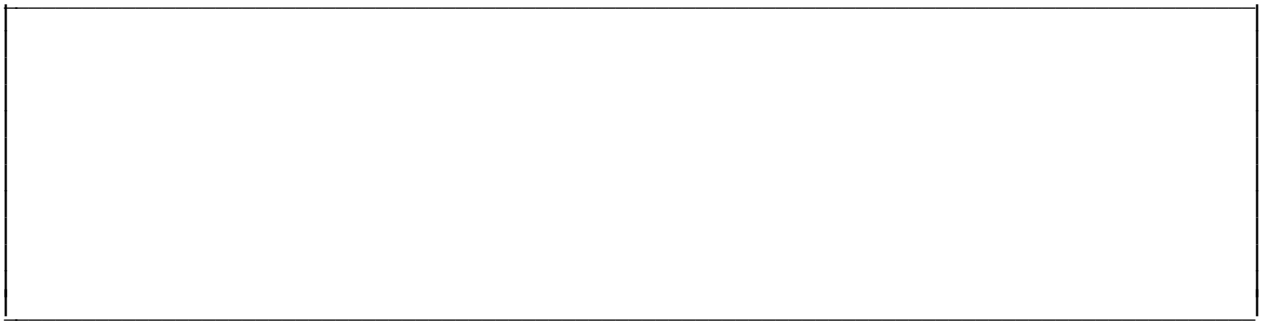
PROC 612 - INITIALIZATION CAUSES REPAIR PROCEDURE			
FAULT CODE	INITIALIZATION CAUSE	PRIMARY SUSPECT	SECONDARY SUSPECT
22	Microdiagnostic Test 15	Reload from microdiagnostic Test 15	
23	Hold get area underflow	Software	UN151
24	Branch to zero error	Software	TN370, UN151, UN152, UN153
25	Interrupt area	Software	TN370, UN151, UN152, UN153
26	False identification	Software	TN370, UN151, UN152, UN153
27	Two processors (common control) on-line	UN158	TN490
28	Processor (common control) suicide. Note: processor suicide is caused by entering long initialization four times; two processors (common controls) on-line; or I/O failures in at least 75 percent of the cabinets.	Look for other init causes	
29	Five short initializations (Init B)	Look for other init causes	
30	Duplication memory match failure	Software (i.e., patches not in both machines, etc.)	TN390, UN158
31	Parity error during audit	TN392	TN370, UN151, UN152, UN153
32	X-ray program detected processor failure	TN370, UN151, UN152, UN153	
33	X-ray program detected memory failure	TN392	TN368
34	Microdiagnostic detected failure	TN370, UN151, UN152, UN153	
35	Processor (common control) switch	23-hour switch	Manual switch (PROC 613, Test 3), software recovery. (Refer to PROC 600.)
36	Halt/Go	Switch toggled	
37	Cache turned off for recovery	TN369	UN153

Table 5-21. (Contd)

PROC 612 - INITIALIZATION CAUSES REPAIR PROCEDURE			
FAULT CODE	INITIALIZATION CAUSE	PRIMARY SUSPECT	SECONDARY SUSPECT
38	Memory error correction turned off for recovery	Look for other init causes	No other init causes, refer to PROC 600
39	Emergency transfer	Ensure module processor is working	Ensure TMS is working
40	Network test controller	Software error	Sanity time out
41	Duplication channel bad	Check duplication circuit pack UN158	
42	I/O	Check SIO or TPIO failure	Check circuit pack indicated by address displayed in PROC 612, or check circuit pack TN404

PROC 613 - DUPLICATE PROCESSOR CONTROL AND TEST





Purpose

PROC 613 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a duplicate processor control and test failure.

PROC 613 is used to:

1. Display duplication channel failures.
2. Perform various tests on the duplication circuitry in both processors.
3. Initiate a soft switch from the on-line processor.

Field Definitions and Codes

Each field of **PROC 613** flipchart and the possible displays for the fields during execution of the different tests are defined in Table U, PROC 613 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

Table 5-22.

PROC 613 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	9 (Contd)	2	Minor.
2	0,1	Processor status:		3	Warning.
	0	Off-line.		4	Errors recorded.
	1	On-line.		5	Alarm resolved.
3	0,1	Health code (hardware):	10	0,1	Switch status:
	0	Healthy.		0	Switch permitted.
	1	Bad hardware.		1	Switch not permitted.
4	0,1	Health code (soft B):	11		Fault index:
	0	Healthy.		1-6	Index into failure table.
	1	Major software problem.	12	899-988	Specific fault code (Test 1 only).
5	0,1	Health code (soft A):	12	0-99	Failure codes (Test 2 and 3 only).
	0	Healthy.		0	No failures.
	1	Minor software problem.		1-9	Processor status:
6	0,1	Health code of other processor (hardware):		1	Processor status inconsistency.
	0	Healthy.		2-9	Unused.
	1	Bad hardware.		11-19	Double write flip-flop:
7	0,1	Health code of other processor (soft B):		11	Double write FF cannot be cleared (CDBL fails).
	0	Healthy.		12	Double write FF cannot be set (SDBL fails).
	1	Major software problem.		13-19	Unused.
8	0,1	Health code of other processor (soft A):		21-29	Memory update flip-flop:
	0	Healthy.		21	Memory update FF CF = 0 after CMU.
	1	Minor software problem.		22	Memory update FF cannot be cleared (CMU fails).
9	1-5	Alarm status.			
	1	Major.			

Table 5-22. (Contd)

PROC 613 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
12 (Contd)		Failure codes (Contd)	12 (Contd)	41-49	Block transfer:
	21-29	Memory update flip-flop (Contd):		41	Block XFER CF = 0 after DBLK.
	23	Memory update FF CF = 0 after SMU.		42	Cannot read CF = 0 after RWD.
	24	Memory update FF cannot be set (SMU fails).		43	Data mismatch between on-line and off-line memories.
	25-29	Unused.		44-49	Unused.
	31-39	Read/write:		51-59	ID chip:
	31	Read double word CF = 0 on RWD of data X (5555).		51	ID chip test failure.
	32	Read double word CF = 0 on RWD of data X (AAAA).		52-59	Unused.
	33	Read double word CF = 0 on RWD of data X (FFFF).		61-69	Parity:
	34	Read double word CF = 0 on RWD of data X (0000).		61	Parity checker/ generator failed on good parity test.
	35	Read double word data does not match X (5555).		62	Parity checker/ generator failed on bad parity low byte test.
	36	Read double word data does not match X (AAAA).		63	Parity checker/ generator failed on bad parity high byte test.
	37	Read double word data does not match X (FFFF).		64-69	Unused.
	38	Read double word data does not match X (0000).		71-94	Unused.
	39	Unused.		95	Switch attempt failed.
				96	Off-line DCIU not initialized.
				97	Unresolved duplication failure.

Table 5-22. (Contd)

PROC 613 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
12 (Contd)	98	Duplication status register failure.	14 (Contd)	3	Time when the displayed failure was alarmed.
	99	Off-line processor in process of reloading.	15-17		Time stamp: A time stamp showing the day of the month, hour, and minute when the first or last error occurred, or when the alarm was activated for the displayed failure (Test 1 only).
13	0-999	Times failed: Total number of times the specific fault code displayed in Field 12 occurred (Test 1 only).			
14	1-3	Stamp Index (Test 1 only).			
	1	Latest time the displayed failure failed a test.	15	1-31	Day of the month.
			16	0-23	Hour of the day.
	2	Time of the first recorded error for the displayed failure.	17	0-59	Minute.

Operation of Procedure

Overview

PROC 613 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a duplicate processor control and test failure.

To call in **PROC 613**, perform the following:

1. Depress **PROC NO; 613; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Displays processor status and health code of both processors, and tests the duplication channel.
3. Test 3 - Allows updating of the memory and performs a soft switch of processors.

Test 1

Test 1 provides a failure history of duplicate processor control and test failures.

Test 1 can also be used to manually turn off the **OTHER FAILS** fault indicator.

1. Test 1 is the default test when entering **PROC 613** or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.

3. A summary of the failure history is displayed.

   If no failures (or entries with errors recorded) occurred, the summary displays a 1 in Field 1, a 0 in Field 11 (fault index), and all other fields are dashed.

   If one or more failures (or entries with errors recorded) occurred, the summary displays a 1 in Field 1, the total number of failures in Field 11, and all other fields are dashed.

4. The failure history is displayed in alarm order severity. All major alarm failures are displayed first, then entries with errors recorded are displayed.

5. Depressing **NEXT FAULT** displays the first failure (or entry with errors recorded) as follows:

   Field 1 - 1.

   Field 2 - Processor status (0 = off-line, 1 = on-line).

   Fields 3 through 8 - Dashed.

   Field 9 - Alarm status of displayed failure (1 = major or 4 = errors recorded).

   Field 10 - Dashed.

   Field 11 - Total number of failures (maximum of 6).

   Field 12 - Specific fault code.

   Field 13 - Total number of times the specific fault code displayed in Field 12 occurred.

   Field 14 - Stamp index of 1 if alarmed status displayed in Field 9 = 4 (errors recorded) or 3 if alarmed status displayed in Field 9 = 1 (major).

   NOTE

   A 1 in Field 14 indicates that Fields 15 through 17 display the time the last error was recorded for the displayed failure. A 3 in Field 14 indicates that Fields 15 through 17 display the time the failure was alarmed.

   Fields 15 through 17 - Day, hour, and minute the last error for the displayed failure was recorded in PMIDS or the displayed failure was alarmed.

6. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 14 (stamp index) displays a 2 indicating that the time displayed in Fields 15 through 17 is the time the first error was recorded for the displayed failure.

7. If the displayed failure is alarmed (indicated by a 1 displayed inn Field 9), depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 14 (stamp index) displays a 1 indicating that the time displayed in Fields 15 through 17 is the time the last error was recorded for the displayed failure.

8. If the displayed failure is not alarmed, depressing **NEXT DATA** again cycles back to the initial display providing a stamp index of 1 or 3 in Field 14, and the time the last error was recorded or the displayed failure was alarmed in Fields 15 through 17.
9. Depressing **NEXT FAULT** repeatedly displays the remaining failures in the PMIDS error log.

   Each time **NEXT FAULT** is depressed, Field 11 is decremented by 1 to show the number of remaining failures to be displayed.

   The fault index (Field 11) includes in its count the failure currently being displayed.
10. **NEXT DATA** can be used to display the stamp index for each failure in the PMIDS error log.
11. Depressing **NEXT FAULT** after all failures are displayed dashes Fields 2 through 17.

    Depressing **NEXT FAULT** again causes the display sequence to start over beginning with the summary.
12. The **CLEAR DATA, EXECUTE** sequence is used to manually resolve individual alarmed duplicate processor control failures after **EXECUTE** is used to initiate Test 1.

NOTE

When alarmed failures are resolved the circuits' failure history is not deleted from the PMIDS error log. The failure history is updated to show that the alarm status now equals 5 (alarm resolved).

13. To resolve individual alarmed failures with an alarm status of 1, perform the following:

    Use **NEXT FAULT** to display the alarmed failure on the **MAAP**.

    Individual duplicate processor control failures cannot be resolved unless the failure is displayed on the **MAAP**.

14. Depress **CLEAR DATA; EXECUTE**.
15. Field 9 (alarm status) displays a 5, indicating that the duplicate processor control failure in PMIDS is marked as resolved.

    The **OTHER FAILS** fault indicator goes off if no other sources affecting the same fault indicator exist.

Test 2

Prior to performing Test 2, verify the following:

1. The **MAAP** is connected to the processor that is on-line; i.e., **CC0** or **CC1**.
2. The off-line processor is not halted.
3. An off-line procedure is not in the off-line processor.

NOTE

Test 2 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The **LOCK ON LINE** switch on the alarm panel is set to the **OFF** position.

Test 2 tests the duplication channel with five diagnostic tests.

CAUTION

The off-line processor may reload if a procedure is requested in the off-line processor while Test 2 is executing.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.
2. To start Test 2, depress **EXECUTE**.
3. Depressing **EXECUTE** begins the diagnostic tests and brings up the following display:

   Field 1 - 2.

   Field 2 - Processor status (0 = off-line, 1 = on-line).

   Fields 3 through 8 - Health codes of both processors.

   Field 12 - Dashed or failure code.
4. Test 2 can be stopped and restarted by depressing:

   STOP; EXECUTE.
5. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.
6. When **STOP** is depressed, the results of the test are displayed in Field 12.

   Zero (0) displayed in Field 12 - Indicates the test passed.

   One (1) through 99 displayed in Field 12 - Indicates the test failed.

   NOTE

   If 99 is displayed in Field 12, Test 2 should be repeated when the off-line processor completes reloading.

7. The **OTHER FAILS** fault indicator automatically goes off (indicating the duplicate processor alarm cause is resolved) when Test 2 passes and all other sources of the **OTHER FAILS** fault indicator are cleared.

Test 3

A soft switch of the common controls **cannot** be performed if the local **MAAP/SMT**, remote ports, or run tape port contention modes are active (other than the access point **PROC 613** is using).

Prior to performing Test 3, verify the following:

1. The **MAAP** is connected to the processor that is on-line, i.e., **CC0** or **CC1**.
2. The off-line processor is not halted.
3. An off-line procedure is not in the off-line processor.

   NOTE

   Test 3 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The **LOCK ON LINE** switch on the alarm panel is set to the **OFF** position.
5. The port contention modes are not active.
   a. Depress **MODE**.
   b. Examine Fields 9 through 13 of the **MODE** display procedure to determine if encodes 0 through 4 are displayed.

      If encode 0 is displayed, it should be the local **MAAP's** current port that you are using.

      If encode 3 or 4 is displayed, determine from Fields 6 and 7 if the agent encode displayed is 10 (runtape).
   c. If any of the encodes are displayed, obtain full release of all remote ports, and the pseudo port performing a **RUNTAPE** by contacting the appropriate users.

NOTE

After the soft switch is completed and the necessary repair action is performed, notify the previous users that you have completed your task in order for them to perform their task(s).

Test 3 allows for the memory updating of the off-line processor and the soft switching of processors.

CAUTION

The off-line processor may reload if a procedure is requested in the off-line processor while Test 3 is executing.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.
2. To start Test 3, depress **EXECUTE**.
3. Depressing **EXECUTE** allows operation of **NEXT UNIT** and displays the following:

   Field 1 - 3.

   Field 2 - Processor status (0 = off-line, 1 = on-line).

   Fields 3 through 8 - Health code of both processors.

   Field 10 - Processor switch status.

   Field 12 - Dashed or failure code.
4. Depressing **NEXT UNIT** enables a processor switch if the switch status displayed in Field 10 allows a switch to be made.
5. To perform a soft switch of processors, check the switch status in Field 10.

6. If Field 10 equals 1, a soft switch cannot be performed.

NOTE

If a switch of processors is still required, a hard switch using the **HALT/GO** switch on the alarm panel **must** be used.

CAUTION

A hard switch causes a disruption of service.

7. If Field 10 equals 0, a soft switch of processors is possible.
8. Depress **NEXT UNIT** to initiate the switch.

NOTE

Special error code 09 (PROC must run on on-line processor) is displayed in the **MAAP** error code field if **NEXT UNIT** is depressed while the **MAAP** is connected to the off-line processor. Special error code 80 (illegal switch attempt) is displayed in the **MAAP** error code field if **NEXT UNIT** is depressed and the off-line processor is unhealthy or the remote ports and runtape port contention modes are active.

9. The **WAIT** indicator on the **MAAP** is lighted while the status memory is being transferred from the on-line memory to the off-line memory.

   The **PASS** indicator (heartbeat) of the off-line common control goes off while the status memory is being transferred.

10. If, after the **WAIT** indicator goes off, the switch status in Field 10 equals 0 and Fields 2 through 8 and 12 are dashed, the switch is successful.

    The **PASS** indicators on both common controls are flashing and the **CC** active indicator changes to the new on-line processor.

11. The processor is now off-line and the **OTHER FAILS** fault indicator automatically goes off if a switch failure was its only cause.
12. The original off-line **MAAP** (if provided and connected to the alarm panel) displays **PROC 613**, Test 3 with a 1 displayed in Field 2 (processor status), 0s displayed in Fields 3 through 5 (health codes), and a 0 displayed in Field 10 (switch status).

NOTE

The now on-line **MAAP** is operational, however any translation or maintenance procedure (including **PROC 613**) to be used **must** be called in.

13. If the switch failed, indicated by a 1 displayed in Field 2 (processor status) and failure code 95 (switch attempt failed) displayed in Field 12 (failure code), the off-line processor is probably reloading.
14. After the off-line processor has reloaded (as the result of a switch failure), select Test 2, depress **EXECUTE**, and check the status of the duplication channel.

    In addition, use the **MODE** display procedure to ensure that the remote ports and the runtape agent are not active.

Repair Guide

When a duplicate processor control and test failure is indicated; **PROC 613** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted; or when a soft switch is attempted and fails, perform the following steps in the order listed to isolate and repair the faulty unit.

Prior to performing the repair procedure, verify the following:

1. The **MAAP** is connected to the processor that is on-line; i.e., **CC0** or **CC1**.
2. The off-line processor is not halted.
3. An off-line procedure is not in the off-line processor.

NOTE

Test 2 or 3 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The **LOCK ON LINE** switch on the alarm panel is set to the **OFF** position.

CAUTION

The off-line processor may reload if a procedure is requested in the off-line processor while Test 2 or 3 is executing.

5. The port contention modes are not active.
   a. Depress **MODE**.
   b. Examine Fields 9 through 13 of the **MODE** display procedure to determine if encodes 0 through 4 are displayed.

      If encode 0 is displayed, it should be the local **MAAP's** current port that you are using.

      If encode 3 or 4 is displayed, determine from Fields 6 and 7 if the agent encode displayed is 10 (runtape).
   c. If any of the encodes are displayed, obtain full release of all remote ports and the pseudo port performing a **RUNTAPE** by contacting the appropriate users.

NOTE

After the soft switch is completed and the necessary repair action is performed, notify the previous users that you have completed your task in order for them to perform their task(s).

Duplicate Processor Control and Test Failure Indicated

1. Execute Test 1 and record the failure history including the specific fault code for each failure.
2. Execute Test 2 and record the failure codes (if any).
3. If no failures are recorded in Test 2, attempt a soft switch of processors using Test 3.

   If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

   If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.
4. If the soft switch fails, indicated by a 1 in Field 2 (processor status) and failure code 95 (switch attempt failed) displayed in Field 12 (failure code), proceed to Step 2 of the **Soft switch failure indicated** repair procedure (listed below).
5. When failures are recorded, refer to Table V, PROC 613 - Duplicate Processor Control and Test Repair Procedure, and perform the corrective action indicated for the failure code recorded.
6. After circuit pack replacement, use **PROC 612** to clear the health code of the off-line processor.
7. Enter **PROC 613** Test 3, and attempt a soft switch.

Table 5-23.

PROC 613 DUPLICATE PROCESSOR CONTROL AND TEST REPAIR PROCEDURE	
FAILURE CODE	CORRECTIVE ACTION
1	Replace the following components in the order listed, testing after each replacement, until the failure is corrected: A. UN158 in the on-line processor. B. UN158 in the on-line processor. C. Cabling between the UN158 circuit packs. D. TN491 in the on-line processor.
11, 12, 51, 61 through 63, and 98	Replace UN158 in the on-line processor.
21 through 24	Replace UN151 in the on-line processor.
31 through 34, 41, and 42	Perform the necessary checking, then replace the following components in the order listed, testing after each replacement, until the failure is corrected: A. Investigate off-line common control failures using PROC 600 (Unit type 4). Take corrective action as appropriate. B. UN158 in the off-line processor. C. UN158 in the on-line processor. D. Cabling between the UN158 circuit packs.
35 through 38, 43, and 97	Replace the following components in the order listed, testing after each replacement, until the failure is corrected: A. UN158 in the off-line processor. B. UN158 in the on-line processor. C. Cabling between the UN158 circuit packs.
96	Check off-line DCIU status using PROC 650.
99	Stop and re-execute Test 2 after the off-line processor has completed reloading.

8. If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

   If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

9. If Test 2 or the soft switch fails (indicated by a 1 in Field 2 and a failure code of 95 in Field 12), repeat Steps 5 through 8 until all circuit packs listed in Table V, PROC 613 - Duplicate Processor Control and Test Repair Procedure for the failure code recorded are replaced.

10. If the soft switch still fails and Test 2 passes, perform Steps 2 through 7 of the **Soft switch failure indicated** repair procedure (listed below).

    If Test 2 still fails, refer to **Specific Fault Codes** for further isolation techniques.

Soft Switch Failure Indicated

1. Execute Test 2 and record the results.

   If Test 2 fails, perform steps 5 through 10 of the **Duplicate processor control and test failure indicated** repair procedure (above).
2. Use the **MODE** display procedure to ensure that the remote ports and the runtape agent are not active.
3. If the fault was not found in Test 2, replace the following circuit packs in the order listed:

   UN158 - In the off-line processor.

   UN158 - In the on-line processor.
4. After each circuit pack replacement, use **PROC 612** to clear the health code of the off-line processor.
5. Enter **PROC 613** Test 3, and attempt a soft switch.
6. If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

   If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.
7. If Test 2 or the soft switch fails (indicated by a 1 in Field 2 (processor status) and a failure code of 95 (switch attempt failed) in Field 12), repeat Steps 4 through 6 until all circuit packs listed in Step 3 are replaced.

   If Test 2 or the soft switch still fails, refer to **Specific Fault Codes** for further isolation techniques.

Soft A or Soft B

After all repair actions are performed and soft A or soft B failure indications are still displayed (1 in Fields 4, 5, 7, and/or 8), execute **PROC 600** Test 2 to determine if any common control problems exist.

Specific Fault Codes

A specific fault code is a number used to provide a description of a failure.

1. This description provides more detail about the failure associated with a circuit.
2. Specific fault codes are recorded during periodic or time available testing in PMIDS.

Table W, PROC 613 - Specific Fault Code Definitions, lists the specific fault codes in numerical sequence with a definition for each specific fault code.

Further isolation of a failure may be accomplished as follows:

1. Analyze the specific fault codes recorded from PMIDS.
2. Determine from the specific fault codes recorded (using Table W, PROC 613 - Specific Fault Code Definitions) if any additional corrective action can be performed (i.e., cabling, connectors, etc.).
3. Check the wiring associated with the circuit pack(s) and/or components replaced (point to point depending upon specific fault codes recorded).

Table 5-24.

PROC 613 - SPECIFIC FAULT CODE DEFINITIONS

FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
899	UN158			Unable to switch common controls.
915	UN158			Off-line common control not equipped identically to on-line common control.
934	UN158			Periodic switch of common control failed.
973	UN158/F [1]			RWD CF failure because the off-line system bus was busy.
974	UN158			Attempt to switch because of I/O failures failed.
975	UN158/F [1]	UN158/N [2]	Cable	UN158 double-write failure error flag found by the maintenance periodic test.
976	UN158/F [1]	UN158/N [2]	Cable	UN158 instruct far processor failure or read double-word failure error flag found by the maintenance periodic test.
977	UN158/F [1]	UN158/N [2]	Cable	UN158 near-end failure error flag found by the maintenance periodic test.
978	UN158/F [1]	UN158/N [2]	Cable	UN158 double-write failure error flag set by the maintenance periodic test.
979	UN158/F [1]	UN158/N [2]	Cable	UN158 instruct far processor failure or read double-word failure error flag set by the maintenance periodic test.
980	UN158/F [1]	UN158/N [2]	Cable	UN158 near-end failure error flag set by the maintenance periodic test.
981	UN158/N [2]			Unable to set double-write capability.
982	UN158/N [2]	UN158/F [1]	Cable	Read double-word instruction failed by returning a condition flag of zero.
983	UN158/F [1]	UN158/N [2]	Cable	Read double-word instruction failed to execute properly, setting the read double-word failure error flag.

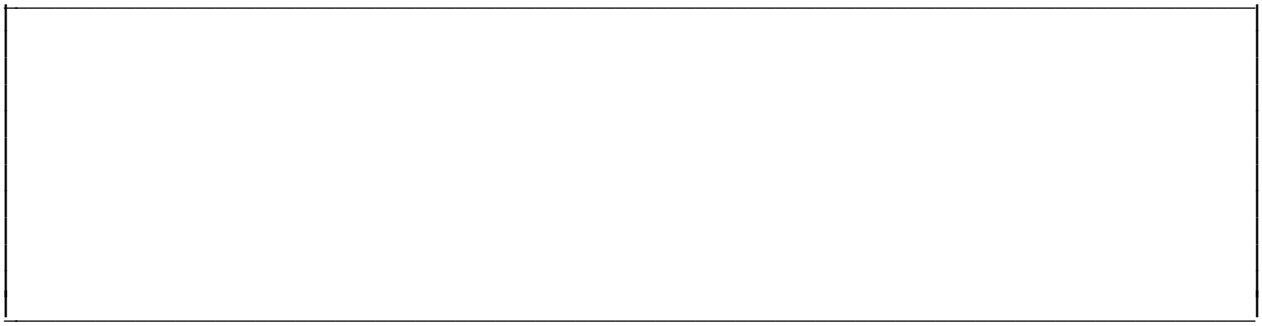
Table 5-24. (Contd)

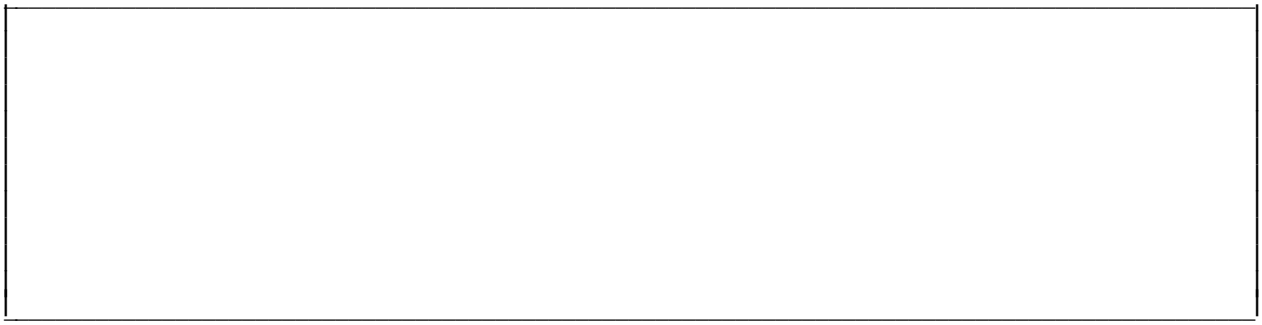
PROC 613 - SPECIFIC FAULT CODE DEFINITIONS				
FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
984	**UN158/F [1]**	**UN158/N [2]**	**Cable**	**Double-written test vector failed the echo check.**
985	**UN158/N [2]**			**Unable to clear the status register.**
986	**UN158/N [2]**			**UN158 control register and status register disagree as to double-write status.**
987	**UN158/N [2]**			**Unable to read the UN158 double-write select register.**
988	**UN158/N [2]**			**Unable to write to the UN158 double-write select register.**

[1] F = Far end of the duplication channel (Most likely in the off-line common control)

[2] N = Near end of the duplication channel (Most likely in the on-line common control)

PROC 614 - MEMORY READ/MEMORY MATCH TESTS





Purpose

PROC 614 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s) resulting from a memory and/or cache failure.

PROC 614 is used when the mismatch flag is set or to read the contents of a memory location.

The mismatch flag is set when any of the following conditions exist:

1. The on-line memory comparison test detects a mismatched memory condition.
2. A double write operation fails to function correctly.
3. The run tape program detects a mismatch.

PROC 614 tests main and cache memory subsystems:

1. All main memory circuit packs and the processor memory interface are tested.
2. The cache memory circuit pack is tested.

Field Definitions and Codes

Each field of **PROC 614** flipchart and the possible displays for the fields during execution of the different tests are defined in Table X, PROC 614 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 and 3 - Select a specific memory block and address within the memory block to begin testing (Tests 3 through 5 only).
3. Field 3 - Select a specific cache superset to test (Test 6) only.
4. Field 4 - Select a specific memory block to end the test (Tests 4 and 5 only).

Operation of Procedure

Overview

PROC 614 is used to determine the cause of the **MEM** and/or **CACHE MEMORY** fault indicator(s) being lighted resulting from a memory or cache failure.

To call in **PROC 614**, perform the following:

1. Depress **PROC NO; 614; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Six tests are available:

1. Test 1 - Displays main memory and cache memory failures detected by the on-line memory read/memory match and cache memory programs.
2. Test 2 - Provides a picture of the switch's overall memory (main and cache) health.
3. Test 3 - Provides specific groups of unbroken failure blocks and displays the contents of each of the failed main memory locations within the failed block for each processor.
4. Test 4 - Allows continuous testing of a specified range of main memory locations.
5. Test 5 - Reads the contents of any main memory location, or any range of main memory locations, for each processor in a duplicated switch.
6. Test 6 - Tests a specified range of supersets of cache memory.

Tests 2 and 3 perform an ID chip and parity check test on each memory circuit pack.

Tests 2 through 4 (memory match tests) compare the contents of corresponding locations in duplicated common controls. The range of memory compared in Tests 2 through 4 is restricted to the program, patch, and translation areas.

In addition, Tests 2 through 4 perform a hard fault test over the full range of main memory.

Test 5 is not restricted and displays the contents of memory to be read over the full range of main memory.

Table 5-25.

PROC 614 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-6	Test number.	7		Memory area code:
2	0-77	Octal memory block number (1 block = 256K).		1	Program only.
				2	Patch only.
				3	Program and patch.
				4	Translation only.
3	0-777777	Octal address within the memory block of Field 2.		5	Program and translation.
				6	Patch and translation.
				7	Program, patch, and translation.
	0-255	Cache superset failing in decimal.		8	Other.
				9	Program and other.
4	0-77	Octal memory block number (1 block = 256K).		10	Patch and other.
				11	Program, patch, and other.
				12	Translation and other.
5		Processor memory is being read from:		13	Program, translation, and other.
				14	Patch, translation, and other.
	0	On-line common control.			
	1	Off-line common control.		15	Program, patch, translation, and other.
6	0-16777215	Total number of failed words in decimal (Test 2); total number of failed words in decimal which displays upon test completion (Test 3).	8	0-77	Total failed blocks (Test 2); total failed blocks which are displayed at the completion of the test (Test 3).
	0-177777	Octal contents of memory location in Fields 2 and 3 are displayed when NEXT DATA is pressed (Test 3); octal contents of memory location in Fields 2 and 3 are displayed when EXECUTE or NEXT DATA is pressed (Test 5).			Failure code (Tests 1, 3, 4, and 6):
				0	No failures.
				1	Memory mismatches.
				2	Parity errors.
				3	Memory scrub error.
				4	Duplication channel errors.

Table 5-25. (Contd)

PROC 614 - FIELD DEFINITIONS AND CODES		
FIELD	**CODE**	**DEFINITION**
8 (Contd)		Failure code (Tests 1, 3, 4, and 6) (Contd):
	5	Memory I/O errors.
	6	Memory ID chip errors.
	7	Parity check errors.
	8	Hard failure.
	9	ECC turned off.
	10	Cache not present.
	11	Cache turned off.
	12	Cache ID chip error.
	13	Less than 50% supersets failed.
	14	50% or more supersets failed.
	15	Tag/valid error counter failure.
	16	Cache I/O failure.
	17	Cache invalidation failure.

All tests can be executed on an unduplicated switch. For an unduplicated switch, Tests 2 through 4 do not perform the memory comparison test.

Test 1

Test 1 provides a history of all failed memory locations (main and cache) recorded by the on-line memory read/memory match and cache memory programs.

Test 1 can also be used to manually turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).

1. Test 1 is the default test when entering **PROC 614** or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. If the on-line program has not detected memory (main and cache) failures, a 0 is displayed in Field 8.
4. If failures are recorded, the following summary is displayed:

   Field 1 - 1.

   Fields 2 through 7 - Dashed.

   Field 8 - Total failed blocks recorded.

5. Depressing **NEXT FAULT** displays the first failure as follows:

   Field 1 - 1.

   Field 2 - Starting block number or dashed.

   Field 3 - 0 (main memory location for block number displayed in Field 2) or 1-255 (cache superset indicator).

   Fields 4 through 7 - Dashed.

   Field 8 - Failure code.

   NOTE

   Main memory failures are displayed first then cache memory failures. If no main memory failures are recorded, the initial display is a cache failure.

6. Depressing **NEXT FAULT** repeatedly displays the remaining failures.

   When all failures are displayed, Fields 2 through 8 are dashed.

   Depressing **NEXT FAULT** once more starts the sequence over displaying the failure summary.

7. Depressing **NEXT UNIT** when the summary is displayed or after displaying the first main memory failure (etc.) displays cache memory failures (if any).

   Depressing **NEXT UNIT** when the summary is displayed decrements Field 8 corresponding to the number of main memory failures passed over (if any).

   NEXT FAULT is used to display the cache memory failures.

8. To manually turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s) after Test 1 is executed at least once, perform the following:

   Depress **NEXT FAULT** until a summary is displayed (Field 1 = 1, Field 8 = total number of failures and all other fields are dashed).

   Depress **CLEAR DATA; EXECUTE**.

   NOTE

   Memory read/memory match failures are marked as resolved in PMIDS.

Test 2

Test 2 performs an ID chip and parity check test, then runs a single pass test of all testable main memory. If the common control is duplicated, a comparison of the two memories is performed by Test 2.

A memory area code (Field 7) indicates the area of memory where the failures occurred (i.e., program, patch, translation, other, or any combination of the four areas).

Test 2 automatically turns off the **MEM** and/or **CACHE MEMORY** fault indicator(s) when all testable main memory locations are tested successfully.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is initially called in, Fields 2 and 3 display a 0 (first block and address in memory) and Field 4 displays the last memory block in the switch.

3. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

   NOTE

   Test 2 takes about 5 minutes to test each block of 256K words. The total amount of time for Test 2 depends on the memory configuration of the switch (i.e., about 5 minutes times the number of 256K blocks).

4. While Test 2 is executing, Field 3 (address within the main memory block being tested) is updated every second.
5. The following fields are updated every second if failures occur:

   Field 6 - Number of failed words.

   Field 7 - Area of memory where the failure occurred.

   Field 8 - Number of failed blocks.

   NOTE

   Field 2 (memory block) is updated when a memory block is tested (about every 5 minutes).

6. When Test 2 is completed, the **WAIT** indicator goes off and the following summary is displayed:

   Field 1 - 2.

   Fields 2 and 3 - Memory location of last location tested (block number and address in block).

   Field 4 - Last memory block tested (equal to last memory block in the switch configuration).

   Field 5 - Dashed.

   Field 6 - Total number of failed words (if any).

   Field 7 - Area of memory where the failure occurred (if any).

   Field 8 - Total number of failed blocks (if any).

   NOTE

   Special error code 74 (memory match test not performed) is displayed in the **MAAP** error code field when Test 2 is performed on an unduplicated switch, indicating that tests other than the memory match test was performed.

7. If all testable memory locations are tested successfully, 0s are displayed in Fields 6 and 8.
8. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field after Test 2 completes if failure code 4 (duplication channel error) is detected.

   NOTE

   PROC 613 is used to correct duplication channel errors.

9. Depressing **STOP**, while Test 2 is executing, halts the test and displays the last memory block and memory address in the block tested in Fields 2 and 3. Field 4 displays the last testable memory block in the switch configuration.

   Field 6 displays the total number of failed words (if any), and Field 8 displays the total number of failed blocks (if any).

10. Depressing **EXECUTE** after depressing **STOP** starts Test 2 over from the beginning of memory.
11. The **MEM** and/or **CACHE MEMORY** fault indicator(s) automatically goes off when Test 2 completes with no failures detected for all testable main memory locations.

Test 3

Test 3 is used to test all main memory locations of the program, patch, translation, and other areas from the first memory location to the end of testable memory. Test 3 also performs an ID chip and parity check test.

Test 3 stops when a contiguous block of failed main memory locations is identified. (A contiguous block may be as small as one memory location or as large as all of testable main memory.)

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.
2. When Test 3 is initially called in, Fields 2 and 3 display a 0 (first block and address in memory) and Field 4 displays the last memory block in the switch configuration.

   Field 2 is blinking indicating an optional entry field.
3. A starting memory block and memory location can be selected for testing or the entire main memory can be tested.
4. To test the entire main memory, proceed to Step 6.

   NOTE

   Test 3 takes about 5 minutes to test each block of 256K words. The total amount of time for Test 3 depends on the memory configuration of the switch (i.e., about 5 minutes times the number of 256K blocks).

5. A specific starting memory block and memory location can be selected for testing by performing one of the following:

   (Starting memory block to be tested); ENTER; (Memory location); ENTER.

   CHANGE FIELD; 2; ENTER; (Starting memory block to be tested); ENTER; (Memory location); ENTER.

   NOTE

   Special error code 80 (location out of memory range) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if the specific memory block and memory location are not in the range of testable memory.

   Proceed to Step 6.
6. To start Test 3 after selecting the main memory to be tested, depress **EXECUTE**.
7. While Test 3 is executing, Field 3 (address within the main memory block being tested) is updated every second.

   NOTE

   Field 2 (memory block) is updated when a memory block is tested (about every 5 minutes).

8. When the first failure is located, the data in Fields 2 and 3 remains constant displaying the first memory location of the failed block.
9. Test 3 continues to execute until the end of the failed block is identified, and then stops.
10. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field after Test 3 stops if failure code 4 (duplication channel error) is detected.

NOTE

PROC 613 is used to correct duplication channel errors.

11. When Test 3 stops (after a failure is detected), the following is displayed:

    Field 1 - 3.

    Field 2 - Block number of failing block.

    Field 3 - Last memory location to fail in the block.

    Field 4 - Ending block number.

    Fields 5 and 6 - Dashed.

    Field 7 - Area of memory where the failure occurred.

    Field 8 - Type of failure found (failure code).
12. Depressing **NEXT FAULT** causes Test 3 to continue from the location displayed in Field 4, plus one.
13. When Test 3 is completed (after the starting block and memory location entered or the entire main memory is tested), the following is displayed:

    Field 6 - 0 or total number of failed words.

    Field 7 - 0 or memory area of failure.

    Field 8 - 0 or total number of failed memory blocks.

NOTE

Special error code 74 (memory match test not performed) is displayed in the **MAAP** error code field when Test 3 is performed on an unduplicated switch, indicating that tests other than the memory match test were performed.

14. Depressing **STOP** while Test 3 is executing halts the test.

    If Test 3 is halted by use of **STOP** in the middle of a failed block of memory locations, Field 4 displays the last testable memory block number for the switch configuration and Field 8 defines the type of failure detected.
15. If Test 3 is halted by use of **STOP** and no failures are detected, a dash is displayed in Field 8.

    Field 4 displays the last testable main memory block location for the switch configuration and Fields 2 and 3 display the last tested memory location.
16. Depressing **NEXT FAULT** any time after Test 3 stops on its own (failure detected) causes the test to continue from where it was halted.

NOTE

If **STOP** is depressed to halt Test 3, **EXECUTE** must be depressed to restart Test 3. Test 3 will start from the beginning of memory after the **STOP; EXECUTE** sequence is used.

17. Depressing **NEXT DATA** after a failed block is identified displays the contents of the first failing memory location within a block of contiguous failures beginning at the memory location displayed in Fields 2 and 3.

    The contents of the failing memory location for the on-line common control (indicated by a 0 in Field 5) are displayed in Field 6.

18. Depressing **NEXT DATA** again displays (in Field 6) the contents of the off-line common control (indicated by a 1 in Field 5) for the same memory location.

19. Depressing **NEXT DATA** once more steps to the next failing memory location.

    Field 6 displays the contents of the memory location, alternating between the on-line common control (0 in Field 5) and the off-line common control (1 in Field 5) each time **NEXT DATA** is depressed.

20. When all failing main memory locations are displayed, depressing **NEXT DATA** once more dashes the display.

    Depressing **NEXT DATA** again starts the display over from the first failing main memory location.

Test 4

Test 4 is used to continuously test a specific range of main memory locations of the program, patch, translation, and other areas.

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default range of main memory may be displayed in Fields 2 through 4. Field 2 is blinking, indicating an optional entry.

   Either the default range of memory can be tested or another range of memory can be selected for testing.

   NOTE

   The default memory locations are the last block of failures displayed in Test 3.

   To test the default range of memory, proceed to Step 5.

3. If no failures are found in Test 3, Fields 2 through 4 display the entire range of testable memory. Field 2 is blinking, indicating an optional entry.

   If starting and ending memory locations are not entered, Test 4 tests the entire range of testable main memory (i.e., program, patch, translation, and other areas).

4. A specific range of main memory can be selected for testing by entering the following:

   (Starting memory block); ENTER; (Starting address); **ENTER; (Ending memory block); ENTER**.

   NOTE

   Special error code 80 (location out of memory range) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if the specific memory block, memory location, and ending block selected are not in the range of testable memory.

   Proceed to Step 5.

5. To start Test 4, depress **EXECUTE**.

NOTE

Test 4 takes about 5 minutes to test each block of 256K words. The total amount of time for Test 4 depends on the memory configuration of the switch (i.e., about 5 minutes times the number of 256K blocks).

6. While Test 4 is executing, Fields 7 and 8 (memory area and failure code) are updated after every pass through the range of memory selected for testing.
7. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

NOTE

Special error code 74 (memory match test not performed) is displayed in the **MAAP** error code field when Test 4 is performed on an unduplicated switch, indicating that tests other than the memory match test was performed.

8. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field when Test 4 is stopped if failure code 4 (duplication channel error) is detected.

NOTE

PROC 613 is used to correct duplication channel errors.

9. If no failures are detected, Fields 2 through 4 display the original range selected for testing, and Fields 7 and 8 display a 0.
10. If any failures are detected, the following is displayed:

    Field 1 - 4.

    Fields 2 and 3 - Lowest failed memory location within the range of memory selected for testing.

    Field 4 - Highest failed memory block within the range of memory selected for testing.

    Fields 5 and 6 - Dashed.

    Field 7 - Area of memory where the failure occurred.

    Field 8 - Failure code for the failed memory location.
11. Test 4 can be repeated from the same range of main memory entered by depressing **EXECUTE** or another range of main memory can be selected for testing by using the **CHANGE FIELD** sequence and depressing **EXECUTE**.

Test 5

Test 5 is used to read the contents of a single main memory location, or any range of main memory locations.

Test 5 can be used with either duplicated or unduplicated common controls.

1. Test 5 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 5; ENTER.

2. When Test 5 is initially called in, a default range of main memory may be displayed in Fields 2 through 4. Fields 2 and 3 (memory block and address) are blinking indicating an optional entry.

   Either the default range of memory can be tested or another range of memory can be selected for testing.

   NOTE

   The default memory locations are the last block of failures displayed in Test 3.

   To test the default range of memory, proceed to Step 6.

3. If no failures are found in Test 3 or if an unduplicated switch is being tested, Fields 2 through 4 display the entire range of testable memory.

4. If starting and ending memory locations are not entered, Test 5 will test the entire range of testable memory.

5. A specific range of main memory can be selected for testing by entering the following:

   (Starting memory block); ENTER; (Starting address); **ENTER; (Ending memory block); ENTER**.

   NOTE

   Special error code 80 (location out of memory range) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if the specific memory block, memory location, and ending block selected are not in the range of testable memory.

6. To start Test 5, depress **EXECUTE**.

7. When **EXECUTE** is depressed, the contents of the first memory location selected for testing is displayed in Field 6 for the on-line common control (indicated by a 0 in Field 5). The memory area of the memory location is displayed in Field 7.

8. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field if failure code 4 (duplication channel error) is detected.

   NOTE

   PROC 613 is used to correct duplication channel errors.

9. Depressing **NEXT DATA** displays (in Field 6) the contents of the off-line common control (indicated by a 1 in Field 5) for the same memory location.

   NOTE

   If the switch is unduplicated, only the on-line common control can be read.

10. Depressing **NEXT DATA** steps through the memory range selected for testing (displayed in Fields 2 through 4) one at a time, alternating between the on-line common control (0 in Field 5) and the off-line common control (1 in Field 5), each time **NEXT DATA** is depressed.

11. When all main memory locations selected for testing are displayed, depressing **NEXT DATA** once more dashes Fields 2 and 3. Field 4 displays the ending memory block selected for testing.

    Depressing **NEXT DATA** again starts the display over at the first memory location selected for testing.

Test 6

Test 6 performs an ID chip test then tests the supersets of cache memory continuously.

1. Test 6 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 6; ENTER.

2. When Test 6 is initially called in, Field 3 displays a 0.

   Field 3 is blinking, indicating an optional entry field.

3. A starting cache superset can be selected for testing or the entire cache superset can be tested.

   To test the entire cache superset, proceed to Step 5.

4. To start Test 6 from a specific cache superset, perform one of the following:

   ENTER; (Starting cache superset to be tested); ENTER.

   CHANGE FIELD; 3; ENTER; (Starting cache superset to be tested); **ENTER**.

   NOTE

   Test 6 starts from the cache superset entered and tests the remainder of the cache superset. If no failures are detected, Test 6 starts over from the beginning of the cache superset (0) and continuously tests the entire cache superset.

   Proceed to Step 5.

5. To start Test 6 after selecting the cache superset to be tested, depress **EXECUTE**.

6. The testing interval is determined by maintenance personnel performing the test (as long as no failures are detected), and is ended by depressing **STOP**.

7. While Test 6 is executing and no failures are detected, Field 3 is updated with the number of times the entire cached superset is tested and Field 8 displays a 0 (indicating no failures).

8. If a cache superset failure is detected, Test 6 is stopped automatically and the following is displayed:

   Field 1 - 6.

   Field 2 - Dashed.

   Field 3 - Cache superset failing.

   Fields 4 through 7 - Dashed.

   Field 8 - Failure code.

9. Depressing **EXECUTE** starts Test 6 from the failing cache superset displayed in Field 6.

   If the same cache superset fails again, Test 6 stops. Field 3 displays the failing cache superset and Field 8 displays the failure code associated with the failing cache superset.

10. If the same cache superset does not fail, Test 6 continues testing the entire cache superset until a failure is detected, or until Test 6 is halted by depressing **STOP**.

    Field 3 is updated with the number of times the entire cache superset is tested without a failure detected.

Repair Guide

When a memory read/memory match failure is indicated, **PROC 614** referenced from **PROC 600** as the cause for the **MEM** and/or **CACHE MEMORY** fault indicator(s) being lighted, perform the following steps in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and record the failure history generated by the on-line periodic maintenance software.
2. Execute Test 2.

   Test 2 runs a variable length of time depending on the switch memory configuration.
3. If Test 2 passes, perform Test 4 (continuous test) on each memory block and address displayed in Test 1 to ensure no intermittent failures exist.
4. If Test 2 fails, perform Test 3 on the area of memory where the failure occurred (i.e., patch, program, translation, other, or any combination of the four areas).
5. Record the failure code displayed in Field 8 for the failed memory block and location detected in Test 3.
6. Isolation and repair steps for the failure codes are detailed in:

   Failure Code 1.

   Failure Codes 2, 3, 6, 7, or 8.

   Failure Code 4.

   Failure Code 5 or 16.

   Failure Codes 10 through 15.

Failure Code 1 (Memory Mismatch).

The repair guide for failure code 1 is presented in two parts: the translation repair guide (memory area encodes 4 through 7 or 12 through 15) and the patch/program repair guide (memory area encodes 1 through 3 or 9 through 11).

Good Customer Service is Defined as Follows:

1. The most recent changes made to the switch are added and are working properly.
2. No trouble reports exist.
3. Attendant consoles are not malfunctioning.
4. An abnormal number of status memory audit peg counts do not exist (refer to **PROC 600**, Test 2 - Unit type 43 to investigate status memory audit peg counts).
5. There are no initialization problems (refer to **PROC 612** to determine the status of initialization problems).

Translation Repair Guide

1. Determine the status of customer service.

   If customer service is good, proceed to Step 2.

   If customer service is not good, proceed to Step 11.

2. Perform a run tape in the on-line processor and proceed to Step 3.

3. Load the off-line processor with the on-line tape by performing the following and proceed to Step 4.

   Remove the tape cartridge from the on-line minirecorder and install the tape cartridge into the off-line minirecorder.

   Set the off-line processor's **TEST SELECT** switch to 15, depress the off-line processor's **RESET, ENABLE**, and wait until the off-line processor completes reloading.

   Remove the tape cartridge from the off-line minirecorder, and install the tape cartridge into the on-line minirecorder.

4. Execute **PROC 614**, Test 2 and check for a memory mismatch.

   If the two processors match, proceed to Step 5.

   NOTE

   The **MEM** and/or **CACHE MEMORY** fault indicator goes off when the memories match and no other failures are detected in Test 2.

   If the two processors do not match, perform **PROC 610** (Tape Test) in both processors to correct the problem.

5. Perform a run tape on the off-line tape by performing the following and proceed to Step 6.

   Install the original off-line tape cartridge into the off-line minirecorder.

   Depress **RUN TAPE, EXECUTE** and proceed to Step 6.

6. Switch service to the off-line processor by performing a hard switch and proceed to Step 7.

   CAUTION

   A hard switch of common controls results in loss of service.

   A hard switch of common controls is accomplished by setting the on-line common control's **GO/HALT** switch to **HALT**.

7. Set the new off-line processor's **GO/HALT** switch to the **GO** position and proceed to Step 8.

8. Determine the status of customer service in the new on-line processor.

   If customer service is good, proceed to Step 9.

   If customer service is not good, proceed to Step 10.

9. Execute **PROC 614**, Test 2 and check for a memory mismatch.

   If the two processors match, repair is complete.

   NOTE

   The **MEM** and/or **CACHE MEMORY** fault indicator goes off when the memories match and no other failures are detected in Test 2.

   If the two processors do not match, perform **PROC 610** (Tape Test) in both processors to correct the problem.

10. Reload the new off-line processor by performing the following and proceed to Step 11.

    Set the off-line processor's **TEST SELECT** switch to 15, depress the off-line processor's **RESET, ENABLE**, and wait until the off-line processor completes reloading.

    CAUTION

    A hard switch of common controls results in loss of service.

11. Perform a hard switch of common controls by setting the on-line common control **GO/HALT** switch to **HALT**.

    Set the new off-line processor's **GO/HALT** switch to the **GO** position and proceed to Step 12.

12. Determine the status of customer service in the new on-line processor.

    If customer service is good, go to Step 2 above.

    If customer service is not good, proceed to Step 13.

13. At this point, both processors are reloaded independently without achieving good customer service.

    Start at Step 2 with backup tapes in an attempt to provide good customer service.

Patch and Program Repair Guide

Customer service must be good before proceeding with the patch and program repair guide. If customer service is not good, perform the translation repair guide first. If customer service is good or after performing the translation repair guide above and customer service is still not good, proceed with Step 1 below.

1. Find the total number of patches on both the on-line and off-line common control tapes by using **PROC 490**.

   If both tapes have the same number of patches, proceed to Step 5.

   If both tapes do not have the same number of patches, proceed to Step 2.

2. Add the missing patches to the appropriate tape using **PROC 490**.

3. Reload the appropriate common control by performing the following:

   Set the **TEST SELECT** switch to 15, depress **RESET, ENABLE**, and wait until the processor completes reloading.

4. Execute **PROC 614**, Test 2 and check for a memory mismatch.

   If a mismatch still exists, use **PROC 610** (Tape Test) to isolate the problem to the tape or minirecorder area.

   If there are no mismatches, repair is complete.

   The **MEM** and/or **CACHE MEMORY** fault indicator goes off when the memories match and no other failures are detected in Test 2.

5. If the problem is in the program memory area only (encode 1 displayed in Field 7), proceed to Step 6.

   If the problem is in the patch memory area only (encode 2 displayed in Field 7) or in the program and patch memory area (encode 3 displayed in Field 7), proceed to Step 14.

6. Acquire second level maintenance assistance to determine which processor is in error.

   Correct the failing processor using **PROC 999**.

7. Reload the appropriate common control by performing the following:

   Set the **TEST SELECT** switch to 15, depress **RESET, ENABLE**, and wait until the processor completes reloading.

8. Execute **PROC 614**, Test 2 and check for a memory mismatch.

   If there are no mismatches, proceed to Step 11.

   If a mismatch still exists, proceed to Step 9.

9. Reload the incorrect common control with the tape from the correct common control by performing the following:

   Remove the tape cartridge from the correct common control minirecorder, and install the tape cartridge into the incorrect common control minirecorder.

   Set the **TEST SELECT** switch to 15, depress **RESET, ENABLE**, and wait until the processor completes reloading.

   Remove the tape cartridge from the incorrect common control minirecorder, and install the tape cartridge into the correct common control minirecorder.

10. Execute **PROC 614**, Test 2 and check for a memory mismatch.

    If there are no mismatches, the tape in the incorrect common control is probably defective. Replace the tape and rerun the test from the beginning.

    If a mismatch still exists, use **PROC 610** (Tape Test) to isolate the problem to the tape or minirecorder area on the incorrect common control.

11. Execute **PROC 614**, Test 4 on the failed memory locations.

    If the two tapes match, the error was probably intermittent and repair is complete.

    If the two tapes mismatch, proceed to Step 12.

12. Replace the defective memory board.

    The memory block displayed in Field 2 indicates which memory board to replace; i.e., if Field 2 = 0, replace memory board in Slot 07 of the common control carrier.

    NOTE

    Block numbers and slot numbers are on a 4 to 1 basis when TN392 is installed in the common control carrier. Block numbers 0 through 3 displayed in Field 2 correspond to slot number 7; block numbers 4 through 7 displayed in Field 2 correspond to slot number 8; block numbers 10 through 13 (in octal) displayed in Field 2 correspond to slot number 9; block numbers 14 through 17 (in octal) displayed in Field 2 correspond to slot number 10; block numbers 20 through 23 (in octal) displayed in Field 2 correspond to slot number 11; block numbers 24 through 27 (in octal) displayed in Field 2 correspond to slot number 12; block numbers 30 through 33 (in octal) displayed in Field 2 correspond to slot number 13; and block numbers 34 through 37 (in octal) displayed in Field 2 correspond to slot number 14.

13. Reload the tape and execute **PROC 614** Test 2 to resolve the memory mismatch cause of the **MEM** and/or **CACHE MEMORY** fault indicator.
14. Execute **PROC 614**, Test 3 and determine which patch is missing from the defective tape by counting the number of failed locations.
15. Add the missing patch to the defective tape by using **PROC 490**.
16. Reload both tapes, and execute **PROC 614**, Test 2 to check for a memory mismatch.

    If both tapes match, repair is complete.

    The **MEM** and/or **CACHE MEMORY** fault indicator goes off when the memories match and no other failures are detected in Test 2.
17. If the two tapes still mismatch, execute **PROC 610** (Tape Test) on both common controls.

    Suspect a defective tape drive.

Failure Codes 2, 3, 6, 7, or 8 (Memory Failures).

1. Replace circuit pack TN392 associated with the memory block displayed in Field 2.

   Memory circuit packs in the common control carrier correspond to block numbers as listed in Step 2.
2. Block numbers and slot numbers are on a 4 to 1 basis when TN392 is installed in the common control carrier. Block numbers 0 through 3 displayed in Field 2 correspond to slot number 7; block numbers 4 through 7 displayed in Field 2 correspond to slot number 8; block numbers 10 through 13 (in octal) displayed in Field 2 correspond to slot number 9; block numbers 14 through 17 (in octal) displayed in Field 2 correspond to slot number 10; block numbers 20 through 23 (in octal) displayed in Field 2 correspond to slot number 11; block numbers 24 through 27 (in octal) displayed in Field 2 correspond to slot number 12; block numbers 30 through 33 (in octal) displayed in Field 2 correspond to slot number 13; and block numbers 34 through 37 (in octal) displayed in Field 2 correspond to slot number 14.
3. Repeat Test 3 on the memory block and location that failed with a failure code of 2, 3, 6, 7, or 8.
4. If Test 3 passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).
5. If Test 3 fails, check the wiring associated with the replaced circuit pack.

Failure Code 4 (Parity Error).

1. Record the memory block and location displayed in Fields 2 and 3.
2. Perform **PROC 613** (Duplicate Processor Control and Test) to determine the cause of the parity error.

Failure Code 5 or 16 (I/O Failures).

1. Perform **PROC 600** (Alarm Causes/Error Log), Test 2 and check for common control I/O failures (unit type 4).
2. Perform **PROC 611** (Common Control Tests), Test 2 on the circuits displayed in Test 1 or 2 of **PROC 600**.
3. Perform corrective action (as appropriate) on failing I/O circuits.
4. Enter **PROC 614**, Test 4 and continuously test the memory block and location that failed Test 3 with a failure code of 5 or 16.
5. If the memory block and location now passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).

   If the memory block and location fails, check the wiring between the memory or cache circuit and the common control interface.

Failure Codes 10 through 15 (Cache Failures).

1. Replace TN369 in slot 04 of the common control carrier.

   Repeat Test 3 on the memory block and location that failed with a failure code of 10 through 15.
2. If Test 3 passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).
3. If Test 3 fails, replace UN153 in slot 03 of the common control carrier.

   Repeat Test 3 on the memory block and location that failed with a failure code of 10 through 15.
4. If Test 3 passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).
5. If Test 3 fails, check the wiring associated with the replaced circuit packs.

PROC 615 - MAAP TEST

Purpose

PROC 615 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a transmission failure from or to the **MAAP**.

PROC 615 may also be used when a malfunction is suspected while using the **MAAP**.

Field Definitions and Codes

Each field of **PROC 615** flipchart and the possible displays for the fields during execution of the different tests are defined in Table Y, PROC 615 - Field Definitions and Codes.

There are no optional input fields for **PROC 615**.

Operation of Procedure

Overview

PROC 615 is used to test the **MAAP** or its interface.

To call in **PROC 615**, perform the following:

1. Depress **PROC NO; 615; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields (including the error code field) are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Five tests are available:

1. Test 1 - Tests **MAAP** digital readouts.
2. Test 2 - Tests **MAAP** control keys.

Table 5-26.

PROC 615 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	0-9	Digital display (Test 1).	8	0-9	Digital display (Test 1).
	1-5	Test number.			CLEAR DATA control key display (Test 2):
2	0-9	Digital display (Test 1).		1	Passed test.
3-25		For Tests 1 through 4: 0 (after key pressed) = default or test failure.			Dial key 6 display (Test 3):
		For Test 5: 0 = OTHER FAILS alarm not set. 1 = OTHER FAILS alarm set.		6	Passed test.
3	0-9	Digital display (Test 1).	9	0-9	Digital display (Test 1).
		Dial key 1 display (Test 3):			Dial key 7 display (Test 3):
	1	Passed test.		7	Passed test.
4	0-9	Digital display (Test 1).	10	0-9	Digital display (Test 1).
		Dial key 2 display (Test 3):			Dial key 8 display (Test 3):
	2	Passed test.		8	Passed test.
5	0-9	Digital display (Test 1).	11	0-9	Digital display (Test 1).
		Dial key 3 display (Test 3):			WORD NO control key display (Test 2):
	3	Passed test.		1	Passed test.
6	0-9	Digital display (Test 1).		9	Dial key 9 display (Test 3): Passed test.
		Dial key 4 display (Test 3):	12	0-9	Digital display (Test 1).
	4	Passed test.			Dial key CLEAR ENTRY display (Test 3):
7	0-9	Digital display (Test 1).		1	Passed test.
		STOP control key display (Test 2):	13	0-9	Digital display (Test 1).
	1	Passed test.			RLS BUSY out control key display (Test 2):
		Dial key 5 display (Test 3):		1	Passed test.
	5	Passed test.			

Table 5-26. (Contd)

PROC 615 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
13 (Contd)		Dial key 0 display (Test 3):	20	0-9	Digital display (Test 1).
	1	Passed test.			NEXT FAULT control key display (Test 2):
14	0-9	Digital Display (Test 1).		1	Passed test.
		BUSY OUT control key display (Test 2):	21	0-9	Digital display (Test 1).
	1	Passed test.			CHANGE control key display (Test 2):
		Dial key ENTER display (Test 3):		1	Passed test.
	1	Passed test.	22	0-9	Digital display (Test 1).
15	0-9	Digital display (Test 1).			DISPLAY control key display (Test 2):
		REMOVE control key display (Test 2):		1	Passed test.
	1	Passed test.	23	0-9	Digital display (Test 1).
16	0-9	Digital display (Test 1).			EXECUTE control key display (Test 2):
		ADD control key display (Test 2):		1	Passed test.
	1	Passed test.	24	0-9	Digital display (Test 1).
17	0-9	Digital display (Test 1).			NEXT DATA control key display (Test 2):
18	0-9	Digital display (Test 1).		1	Passed test.
		CHANGE FIELD control key display (Test 2):	25	0-9	Digital display (Test 1).
	1	Passed test.			NEXT CIRCUIT control key display (Test 2):
19	0-9	Digital display (Test 1).		1	Passed test.
		NEXT UNIT control key display (Test 2):			
	1	Passed test.			

3. Test 3 - Tests **MAAP** dial keys.
4. Test 4 - Tests **MAAP** indicators **BUSY OUT, WAIT, SEE NOTE**, and **IN USE**.
5. Test 5 - Tests for a transmission failure.

Test 1

Test 1 displays all digits in Fields 1 through 25, and two digits in the error code field.

1. Test 1 is the default test when entering **PROC 615** or is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. To start Test 1, depress **EXECUTE**.

   When **EXECUTE** is depressed, 0s are displayed in all **MAAP** fields including the error code field.

3. Depressing **NEXT DATA** increments the display to all 1s.

   Each depression of **NEXT DATA** increments the display from all 0s through all 9s.

4. Depressing **NEXT DATA** after all 9s are displayed causes Test 1 to be executed, starting the sequence over. Field 1 displays a 1 and all other fields (including the error code field) are dashed.

Test 2

Test 2 tests all control keys except **PROC NO, RESET**, and **NEXT TEST**.

CAUTION

Do not attempt to test RUN TAPE using this procedure.

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. To start Test 2, depress **EXECUTE**.

   Depressing **EXECUTE** displays a 1 in Field 23 to indicate proper operation of the **EXECUTE** key, and displays 0s in the other control key fields (Fields 7, 8, 11, 13 through 16, 18 through 22, 24 and 25).

3. Depress the other control keys in the following order and note the transition from 0 to 1, in the appropriate field, which indicates proper operation of the control keys.

NOTE

Special error code 06 is displayed in the error code field when keys other than control keys are depressed.

STOP - Field 7.

CLEAR DATA - Field 8.

WORD NO - Field 11.

RLS BUSY OUT - Field 13.

BUSY OUT - Field 14.

REMOVE - Field 15.

ADD - Field 16.

CHANGE FIELD - Field 18.

NEXT UNIT - Field 19.

NEXT FAULT - Field 20.

CHANGE - Field 21.

DISPLAY - Field 22.

NEXT DATA - Field 24.

NEXT CIRCUIT - Field 25.

Test 3

Test 3 tests all dial keys.

1. Test 3 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 3.

2. To start Test 3, depress **EXECUTE**.

   Zeros (0s) are displayed in Fields 3 through 14 after **EXECUTE** is depressed.

3. Depress each of the dial keys. If the dial key depressed operates properly, the correct number is displayed in the appropriate field as follows:

   Dial key 1 - Field 3 display = 1.

   Dial key 2 - Field 4 display = 2.

   Dial key 3 - Field 5 display = 3.

   Dial key 4 - Field 6 display = 4.

   Dial key 5 - Field 7 display = 5.

   Dial key 6 - Field 8 display = 6.

   Dial key 7 - Field 9 display = 7.

   Dial key 8 - Field 10 display = 8.

   Dial key 9 - Field 11 display = 9.

   Dial key **CLEAR ENTRY** - Field 12 display = 1.

   Dial key 0 - Field 13 display = 1.

   Dial key **ENTER** - Field 14 display = 1.

Test 4

Test 4 tests the **IN USE, SEE NOTE, BUSY OUT**, and **WAIT** indicators.

1. Test 4 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 4.

2. To start Test 4, depress **EXECUTE**.

   When **EXECUTE** is depressed, the **IN USE, SEE NOTE, BUSY OUT**, and **WAIT** indicators on the **MAAP** are lighted.

3. Depressing **NEXT DATA** alternately turns the **MAAP** indicators on and off.

4. When exiting Test 4, the indicators return to their original state.

Test 5

Test 5 displays the **MAAP** alarm status and can be used to turn off the **OTHER FAILS** fault indicator.

1. Test 5 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 5.

2. To start Test 5, depress **EXECUTE**.

3. When **EXECUTE** is depressed:

   Ones (1s) are displayed in all fields if the **OTHER FAILS** fault indicator is set because of a **MAAP** failure.

   Zeros (0s) are displayed in all fields if the **OTHER FAILS** fault indicator is not caused by a **MAAP** failure.

   NOTE

   The **OTHER FAILS** fault indicator can be lighted by other failures in the system.

4. To turn off the **OTHER FAILS** fault indicator when 1s are displayed in all fields (assuming no other sources are affecting the **OTHER FAILS** fault indicator) after Test 5 is executed at least once, perform the following:

   Depress **CLEAR DATA; EXECUTE**.

   NOTE

   The **MAAP** alarmed entries in PMIDS are marked as resolved.

Repair Guide

When a transmission failure is indicated **(PROC 615** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), perform the following steps in the order listed.

1. Replace TN403 (dual-speed data channel) associated with the **MAAP**.
2. Execute Tests 1 through 4 to verify correct operation of the **MAAP**.
3. Execute Test 5 to determine if the **OTHER FAILS** fault indicator is still lighted.
4. If a failure is still indicated, check the cabling and wiring between TN403 and the **MAAP** connector.

When a malfunction of the **MAAP** is suspected, perform the following steps in the order listed.

1. At the alarm panel, check the **MAAP** circuit breaker.

   If the circuit breaker is not tripped, proceed to Step 3.

   If the circuit breaker is tripped, proceed to Step 2.

2. Reset the **MAAP** circuit breaker.

   If the circuit breaker trips again, check the cabling and wiring between the **MAAP** connector and the circuit breaker.

3. Execute Tests 1 through 4 to verify the extent of the problem.

   If a limited number of failures is indicated, replace the **MAAP**.

   If complete failure is indicated, replace the TN403 associated with the **MAAP**. Repeat Tests 1 through 4. If a failure is still indicated, replace the **MAAP**.

4. Repeat Tests 1 through 5. If a failure is still indicated, check the cabling and wiring between TN403 and the **MAAP** connector.

PROC 616 - ALARM PANEL TEST

Purpose

PROC 616 is used when there is a suspected malfunction in one or more of the software controlled alarm panel indicators.

PROC 616 displays the test states of the alarms (major, minor, warning), and processor/memory, attendant console, environment, common control, network, applications processor, and other fault indicators.

Maintenance personnel **must** be at the customer's premises to determine if the indicators are actually lighted when this maintenance procedure is executed.

The Automatic Alarm Origination Feature (AAOF) and the diagnostic background tests are disabled when performing **PROC 616**.

Field Definitions and Codes

Each field of **PROC 616** flipchart and the possible displays for the fields during execution of the different tests are defined in Table Z, PROC 616 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 25 - Select indicator to be tested (Test 2 only).

NOTE

Field 17 is unused.

Operation of Procedure

Overview

PROC 616 is used to test the alarm panel indicators.

Table 5-27.

PROC 616 - FIELD DEFINITIONS AND CODES		
FIELD	**CODE**	**DEFINITION**
1	1, 2	Test number.
2-16 and 18-25	0	Indicator is off.
	1	Test 1: Indicator is on. Test 2: Indicator is flashing.
	dash	Alarm indicator is under on-line control.
17	dash	Unused

To call in **PROC 616**, perform the following:

1. Depress **PROC NO; 616; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Simultaneously tests all software controlled indicators.
2. Test 2 - Individually tests any or all of the software controlled indicators.

Test 1

Test 1 displays the status when testing all indicators simultaneously. The status is displayed in Fields 2 through 25.

1. Test 1 is the default test when entering **PROC 616** or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.

   A 1 is displayed in Fields 2 through 16, a dash in Field 17, a 1 in Fields 18 through 25 and the alarm panel indicators corresponding to the fields on the flipchart are turned on.

3. **MAAP** display fields are grouped by alarm panel areas as follows:

   Fields 2 through 4 = **ALARMS**.

   Fields 5 through 10 = **PROCESSOR/MEMORY**.

   Fields 11 and 12 = Attendant console.

   NOTE

   The **ACK** indicator is located on the attendant console and **not** on the alarm panel.

   Field 13 = **ENVIRONMENT**.

   Fields 14 through 16 = **COMMON CONTROL**.

   NOTE

   Field 17 is unused.

   Fields 18 through 20 = **NETWORK**.

   Fields 21 and 22 = **APPLICATIONS PROCESSOR**.

   Field 23 through 25 = **OTHER**.

4. Depressing **NEXT DATA** turns off all the alarm panel indicators and a 0 is displayed in Fields 2 through 16, and 18 through 25.

   NOTE

   When **NEXT DATA** is depressed a dash is displayed in Field 17 which is unused.

   Depressing **NEXT DATA** again turns on all the indicators and a 1 is displayed in Fields 2 through 16, and 18 through 25.

5. Depressing **NEXT DATA** repeatedly alternates between 0 and 1 in each field and turns the indicators off and on.

   NOTE

   While the indicators are off, **PROC 616** allows brief flashes of the normal indicator outputs from the on-line programs.

6. Test 1 is stopped by depressing **NEXT TEST** or **RESET**.
7. When Test 1 is exited, all indicator outputs are restored to their previous state and the AAOF and background tests are enabled.

Test 2

Test 2 tests a specific indicator. Testing status is displayed in Fields 2 through 25.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is selected, a flashing 1 is displayed in Field 2 indicating an optional entry field and all other fields contain 0s.

   NOTE

   Field 17 which is unused displays a dash.

3. Either the indicator associated with Field 2 can be tested or another indicator can be selected in one of three ways (Steps 4 through 6).

   To test the indicator displayed in Field 2, proceed to Step 7.

4. Using **NEXT DATA** to increment to the indicator to be tested.

   NOTE

   A 1 is placed in the next field and the previous field changes to a 0 each time **NEXT DATA** is depressed.

   Proceed to Step 7.

5. Depressing **ENTER** repeatedly to select the field corresponding to the indicator to be tested and entering a 1 as follows:

   1, ENTER.

   NOTE

   A 0 is placed in Field 1 when the indicator to be tested is selected by use of **ENTER**.

   Proceed to Step 7.

6. Using the change field sequence:

   CHANGE FIELD; (Field number of indicator to be tested); **ENTER; 1; ENTER**.

   NOTE

   A 0 is placed in Field 1 when the indicator to be tested is selected by use of the **CHANGE FIELD** sequence.

   Proceed to Step 7.

7. To start Test 2 after selecting the indicator to be tested, depress **EXECUTE**.

   The associated indicator on the alarm panel turns on and off at a 1/2-second on, 1/2-second off rate.

8. While the selected indicator is off, **PROC 616** allows brief flashes of the normal indicator outputs from the on-line programs.

9. Depressing **NEXT DATA** repeatedly, after **EXECUTE** is depressed, causes the alarm panel indicators to be tested in the sequence shown on the flipchart beginning with the indicator after the one that was selected initially for testing.

10. Depressing **NEXT DATA** after all indicators are cycled through using **NEXT DATA** dashes Fields 2 through 25.

    Depressing **NEXT DATA** again without depressing **EXECUTE** begins the sequence over with the indicator associated with Field 2.

11. To select another indicator to test using the change field sequence requires the **EXECUTE** key to be depressed again to initiate the test for the new indicator.

    NOTE

    The previous field selected for testing is changed to a 0.

12. Test 2 is stopped by depressing **NEXT TEST** or **RESET**.

13. When Test 2 is exited, all indicator outputs are restored to their previous state and the AAOF and background tests are enabled.

Repair Guide

When an alarm panel malfunction is suspected, the following steps should be performed in the order listed to isolate and repair the faulty component.

1. Execute Test 1 to determine whether all the indicators respond to on/off control.
2. If interaction between two or more indicators is suspected, execute Test 2 and observe their individual operation.
3. If failures are observed, replace TN490 and repeat the appropriate test(s).

CAUTION

Replacement of the alarm panel takes the entire switch down.

4. If a failure is still indicated, tag the appropriate indicator(s) and replace the alarm panel when traffic permits.

NOTE

Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the alarm panel.

5. When the alarm panel is replaced and failures still exist, check the wiring between TN490 and the alarm panel.

When Test 1 is executed, or the ack and external ack fault indicators are tested in Test 2, check the **ACK** indicator on the attendant console.

1. If the **ACK** indicator is not lighted, replace TN490 and repeat the appropriate test(s).
2. If a failure is still indicated, replace console component **lamp control and carrier**.

NOTE

Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of console components.

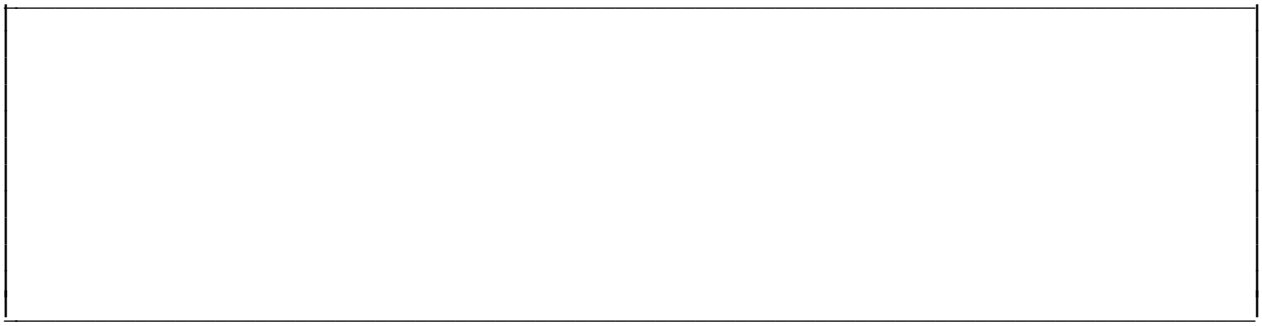
3. Repeat the appropriate test(s).

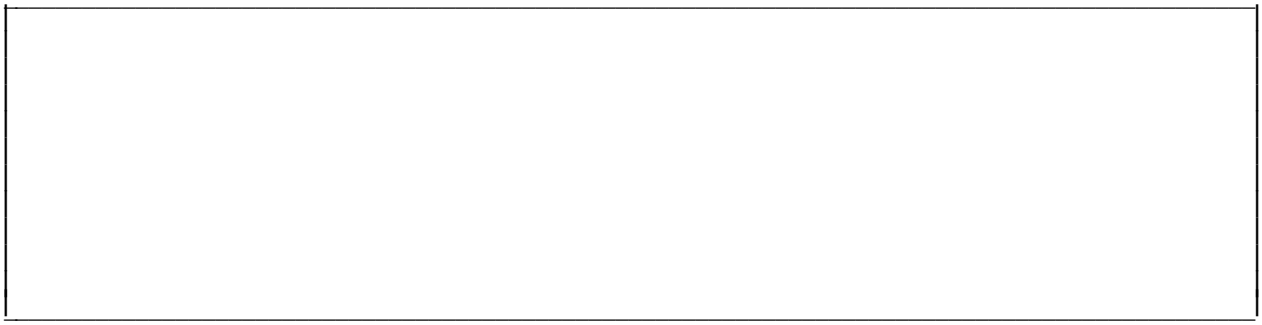
   If a failure is still indicated, replace the console.

4. Repeat the appropriate test(s).

   If a failure is still indicated, check the wiring between TN490 and the console.

PROC 618 - DIAGNOSTIC PROCESSOR/REMOTE INTERFACE/ALARM INTERFACE TEST





Purpose

PROC 618 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS, EXT PROC**, and **EXT EQPT** fault indicator resulting from a diagnostic processor complex failure.

PROC 618 reports the status and performs demand testing of the diagnostic processor complex. In addition, external alarms originated by the external processor, external equipment, and auxiliary equipment are also reported.

The diagnostic processor complex consists of:

1. The diagnostic processor.
2. The alarm interface.
3. The remote interface.
4. 1200 baud modem serving RMATS.
5. Maintenance bus.

Field Definitions and Codes

Each field of **PROC 618** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AA, PROC 618 - Field Definitions and Codes.

There are no optional input fields for **PROC 618**.

Operation of Procedure

Overview

PROC 618 is used to determine the cause of the **OTHER FAILS, EXT PROC**, and **EXT EQPT** fault indicator being lighted resulting from a diagnostic processor complex failure.

To call in **PROC 618**, perform the following:

1. Depress **PROC NO; 618; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Five tests are available:

1. Test 1 - Displays the failure history for unit type 60 (Diagnostic Processor/Remote Interface/Alarm Interface), unit type 63 (External Equipment), and unit type 64 (External Processor).
2. Test 2 - Executes a single test cycle on the diagnostic processor complex.
3. Test 3 - Executes a continuous test cycle on the diagnostic processor complex.
4. Test 4 - Makes a test call to RMATS and displays the current state of the test.
5. Test 5 - Displays the results of the last test call executed by Test 4.

NOTE

Test 5 allows RMATS to execute **PROC 618**, Test 4 remotely and then later call back to get the results of the test call.

There is reduced functionality if **PROC 618** is executed in the off-line side of a duplicated common control.

1. Test 1 executes the same way as it does in the on-line side of a duplicated common control.
2. The analog loop-around test capability for the modems is not performed in Tests 2 and 3.
3. Test 4 cannot be performed in the off-line side of the common control.

NOTE

If Test 4 is attempted in the off-line side of the common control, special error code 85 (test can not run in off-line processor) is displayed in the **MAAP** error code field.

4. Test 5 executes the same way as it does in the on-line side of a duplicated common control.

NOTE

Test 5 displays the results of the last test call executed by Test 4 when the off-line common control was on-line.

Table 5-28.

PROC 618 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-5	Test number.	4 (Contd)		Equipment location for unit type 63 (Contd).
2	60, 63 and 64	Unit type: Number designation of the functional unit of equipment which is being displayed.		4	Auxiliary cabinet circuit breaker.
				5	Auxiliary cabinet frequency generator.
	60	Diagnostic processor/ remote interface.		6	Auxiliary cabinet rectifier.
	63	External equipment.		7	Multiple external and/or auxiliary equipment failures.
	64	External processor.			
3-6		Equipment location for unit type 60 displayed in Field 2.		8	Type unknown (multiple errors).
3	0-30	Module number.	5-6	Dashed	Not applicable for unit type 63.
4	0-7	Cabinet number.	3-6		Equipment location for unit type 64 displayed in Field 2.
5	0-3	Carrier number.			
6	22, 31, or 32	Slot number.	3	1-32	Unit number of external processor.
3-6		Equipment location for unit type 63 displayed in Field 2.	4-6	Dashed	Not applicable for unit type 64.
3	1-32	Unit number of external equipment.	7	1-5	Alarm status of displayed failure.
4	1-8	External equipment encode.		1	Major.
				2	Minor.
	1	Auxiliary cabinet battery holdover.		3	Warning.
	2	Auxiliary cabinet temperature.		4	Errors recorded.
				5	Alarm resolved.
	3	Auxiliary cabinet fan.			

Table 5-28. (Contd)

PROC 618 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
8	0-99	Failure index.	9 (Contd)		Call state (Contd)
9	1-972	Specific fault code (Test 1, 2, and 3). See documentation.		12	Test call failed, modem 1 busy.
				13	Test call failed, modems 0 and 1 busy.
9	0-13	Call state (Test 4 and Test 5).	10	1-99	Number of times the displayed circuit failed (Test 1 only).
	0	Test call not run.			
	1	Dialing in progress.	10	1-99	Number of times the specific fault code displayed in Field 9 occurred (Test 3 only).
	2	Remote modem connected.			
	3	Test data received.	11	1-3	Stamp Index (Time Stamp Index).
	4	Test call passed, modem 0 idle, AAOF disabled.	12-14		Time Stamp: A time stamp showing the day of the month, hour, and minute when the error began, or of the most recent error; or when the error was alarmed or resolved (Test 1 only).
	5	Test call passed, modem 0 idle, AAOF enabled.			
	6	Test call failed, I/O to diagnostic processor failed.			
	7	Test call failed, calling out failed.	12	1-31	Day of the month.
	8	Test call failed, test data not received.	13	0-23	Hour of the day.
			14	0-59	Minute.
	9	Test data failed, test call not terminated.	13	1-99	Number of times the diagnostic processor complex was continuously tested (Test 3 only).
	10	Test call failed, test call aborted.			
	11	Test call failed, modem 0 busy.	14	1-99	Number of times the diagnostic processor complex failed Test 3.

Test 1

Test 1 displays the failure history for unit type 60 (Diagnostic Processor/Remote Interface/Alarm Interface), unit type 63 (External Equipment), and unit type 64 (External Processor).

Test 1 can also be used to manually turn off the **OTHER FAILS** fault indicator.

1. Test 1 is the default test when entering **PROC 618** or is selected by use of **NEXT TEST**.
2. To start Test 1, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted as the PMIDS failure history is sorted.
3. If the on-line program has not detected any unit type 60, unit type 63, or unit type 64 failures, a 0 is displayed in Field 8 (failure index).
4. If failures are recorded, the following summary is displayed:

   Field 1 - 1.

   Fields 2 through 7 - Dashed.

   Field 8 - Total number of failures.

   Fields 9 through 14 - Dashed.
5. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the first PMIDS entry with recorded errors.

   NEXT CIRCUIT is used to step through all individual circuit entries or all entries within a unit type.

   NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.
6. The first entry with recorded errors is displayed as follows:

   Field 1 - 1.

   Field 2 - Unit type.

   Field 3 - Unit number of external equipment/processor, or module number of displayed entry.

   Field 4 - Dashed, external equipment encode, or cabinet number of displayed entry.

   Field 5 - Dashed or carrier number of displayed entry.

   Field 6 - Dashed or slot number of displayed entry.

   Field 7 - Alarm status.

   Field 8 - Failure index.

   Field 9 - Specific fault code.

   Field 10 - Total number of times the displayed entry failed.

   Field 11 - 1 (indicating that Fields 12 through 14 display the time when the most recent error was recorded for the displayed entry).

   Fields 12 through 14 - Day, hour, and minute of the most recent error recorded for the displayed entry.
7. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time when the error began for the entry displayed in Fields 2 through 6.

8. If the displayed entry is an alarmed PMIDS entry (indicated by a 1, 2, or 3 displayed in Field 7), depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 3 indicating that the time displayed in Fields 12 through 14 is the time the entry was alarmed.

   If the displayed entry is not an alarmed PMIDS entry (or after displaying the time the entry was alarmed), depressing **NEXT DATA** cycles back to the initial display providing a stamp index of 1 in Field 11 and the time of the most recent error for the entry in Fields 12 through 14.

9. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures.

   Each time **NEXT CIRCUIT** is depressed, Field 8 is decremented by 1 to show the number of remaining entires to be displayed.

   When all failures are displayed, Fields 2 through 14 are dashed.

   Depressing **NEXT CIRCUIT** once more starts the sequence over displaying the failure summary.

10. Depressing **NEXT UNIT** when the summary is displayed or after displaying the first unit type displays the next unit type with failures (if any).

    Depressing **NEXT UNIT** when the summary is displayed decrements Field 8 corresponding to the number of entries within a unit type passed over (if any).

    NEXT CIRCUIT is used to display the failures within the unit type.

11. The **CLEAR DATA; EXECUTE** sequence can be used to resolve individual alarmed entries after **EXECUTE** is used to initiate Test 1.

12. To resolve individual alarmed entries (turn off its associated fault indicator - when no other alarmed entries affect the same fault indicator), perform the following:

    Use **NEXT UNIT** and/or **NEXT CIRCUIT** to display the alarmed entry (1, 2, or 3 displayed in Field 7) on the **MAAP**.

    > The alarmed entry cannot be resolved or the fault indicator turned off unless the alarmed entry is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

13. Field 7 (alarm status) displays a 5, indicating the alarmed entry in PMIDS is resolved.

    The **OTHER FAILS, EXT PROC**, or **EXT EQPT** fault indicator associated with the alarmed entry goes off if no other alarmed entries affecting the same fault indicator exist.

Test 2

Test 2 performs a single test cycle on the diagnostic processor complex.

When all tests for circuits of a given unit type pass, all alarmed entries in that unit type are resolved in PMIDS.

Test 2 performs the following tests:

1. An ID-chip test on the diagnostic processor (DP).

2. A parity checker test on the DP.
3. 501CC to DP interface RAM test.
4. An analog loop-around test on modem 0, the 1200 baud modem serving RMATS.
5. A retrieval of the error status bytes which reflect the results of the DP tests.
6. An ID-chip test on the remote interface (RI).
7. An ID-chip test on the alarm interface (AI).

If there is modem activity on either modem, the interface RAM testing, the error status bytes testing, and the analog loop-around testing are not performed.

NOTE

Special error code 80 (there is reduced testing functionality) is displayed in the **MAAP** error code field when these tests cannot be performed because of modem activity.

Test 2 automatically turns off the **OTHER FAILS** fault indicator when the diagnostic processor complex is tested successfully.

1. Test 2 is selected by use of **NEXT TEST**.
2. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

   NOTE

   If special error code 82 (modem 0 busy), special error code 83 (modem 1 busy), or special error code 84 (modems 0 and 1 busy) is displayed alternately on and off, or steadily on in the **MAAP** error code field while Test 2 is executing, the special error code indicates that all tests are not being performed because RMATS is using modem 0, modem 1, or both modems.

3. The failure information returned in Test 2 is stored in the Demand Information Data Structure (DMIDS).

   If DMIDS becomes full at any time during the test, special error code 81 (DMIDS overflow) is displayed in the **MAAP** error code field.

   Testing is **not** stopped when the DMIDS buffer becomes full.

   NOTE

   A maximum of 254 failure entries are frozen in DMIDS although Field 8 (failure index) may only indicate 99.

4. When Test 2 is completed, the **WAIT** indicator goes off and a summary is displayed.
5. If no failures occur, a 2 is displayed in Field 1 and a 0 is displayed in Field 8 (failure index).
6. If failures occurred, the following summary is displayed:

   Field 1 - 2.

   Fields 2 through 7 - Dashed.

   Field 8 - Total number of failures.

   Fields 9 through 14 - Dashed.

7. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the first failure.

   NEXT CIRCUIT is used to step through all individual circuit failures within a unit type.

   NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.

8. The first failure is displayed as follows:

   Field 1 - 2.

   Field 2 - Unit type.

   Field 3 - Unit number of external equipment/processor, or module number of displayed entry.

   Field 4 - Dashed, external equipment encode, or cabinet number of displayed entry.

   Field 5 - Dashed or carrier number of displayed entry.

   Field 6 - Dashed or slot number of displayed entry.

   Field 7 - Dashed.

   Field 8 - Failure index.

   Field 9 - Specific fault code.

   Fields 10 through 14 - Dashed.

   NOTE

   If there are failures for unit type 60 (diagnostic processor/remote interface), the **RED** LEDs on the indicted circuit packs are lighted. No circuit packs are indicted for unit type 63 (external equipment) and unit type 64 (external processor).

9. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures.

   Each time **NEXT CIRCUIT** is depressed, Field 8 is decremented by 1 to show the number of remaining entires to be displayed.

   When all failures are displayed, Fields 2 through 14 are dashed.

   Depressing **NEXT CIRCUIT** once more starts the sequence over displaying the failure summary.

10. Depressing **NEXT UNIT** when the summary is displayed or after displaying the first unit type displays the next unit type with failures (if any).

    Depressing **NEXT UNIT** when the summary is displayed decrements Field 8 corresponding to the number of entries within a unit type passed over (if any).

    NEXT CIRCUIT is used to display the failures within the unit type.

11. The **OTHER FAILS, EXT PROC**, and/or **EXT EQPT** fault indicator automatically goes off when Test 2 completes with no failures detected if no other alarmed entries affecting the same fault indicator exist.

Test 3

Test 3 performs a continuous test cycle on the diagnostic processor complex, performing the same tests as in Test 2.

If there is modem activity on either modem, the interface RAM testing, the error status bytes testing, and the analog loop-around testing are not performed.

NOTE

Special error code 80 (there is reduced testing functionality) is displayed in the **MAAP** error code field when these tests cannot be performed because of modem activity.

1. Test 3 is selected by use of **NEXT TEST**.
2. To start Test 3, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is **not** lighted.

   NOTE

   If special error code 82 (modem 0 busy), special error code 83 (modem 1 busy), or special error code 84 (modems 0 and 1 busy) is displayed alternately on and off, or steadily on in the **MAAP** error code field while Test 3 is executing, the special error code indicates that all tests are not being performed because RMATS is using modem 0, modem 1, or both modems.

3. While Test 3 is executing, a blinking 0 is displayed in Field 9 (specific fault code).

   Field 13 (times tested) and Field 14 (times failed) are updated as Test 3 is executing.
4. If a failure is detected, a blinking specific fault code is displayed in Field 9 as soon as the failure occurs and blinks until the end of the current test cycle.

   A blinking 0 is displayed in Field 9 at the start of the next test cycle.
5. The **GREEN** LEDs on the DP, RI, and AI circuit packs are lighted at the end of one Test 3 cycle if no circuit packs failed.
6. If there is a failure for unit type 60 (Diagnostic Processor/Remote Interface), the **RED** LED on the indicted circuit pack is lighted.

   RED LEDs are lighted at the time a failure is detected and stay on until an entire cycle of Test 3 executes failure free for that circuit pack.
7. The failure information returned in Test 3 is stored in the Demand Information Data Structure (DMIDS).

   If DMIDS becomes full at any time during the test, special error code 81 (DMIDS overflow) is displayed in the **MAAP** error code field.

   If DMIDS becomes full at any time during the test, **STOP** can be depressed and the results of the test can be examined.

   NOTE

   A maximum of 254 failure entries are frozen in DMIDS although Field 8 (failure index) may only indicate 99.

8. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.
9. If no failures occur, a 3 is displayed in Field 1 and a 0 is displayed in Field 14 (times failed).
10. If failures occurred, the following summary is displayed:

    Field 1 - 3.

    Fields 2 through 7 - Dashed.

    Field 8 - Total number of failures.

    Fields 9 through 12 - Dashed.

Field 13 - Total number of times the diagnostic processor complex was tested.

Field 14 - Total number of times the diagnostic processor complex failed Test 3.

11. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the first failure.

    NEXT CIRCUIT is used to step through all individual circuit failures within a unit type.

    NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.

12. The first failure is displayed as follows:

    Field 1 - 3.

    Field 2 - Unit type.

    Field 3 - Unit number of external equipment/processor, or module number of displayed entry.

    Field 4 - Dashed, external equipment encode, or cabinet number of displayed entry.

    Field 5 - Dashed or carrier number of displayed entry.

    Field 6 - Dashed or slot number of displayed entry.

    Field 7 - Dashed.

    Field 8 - Failure index.

    Field 9 - Specific fault code.

    Field 10 - Number of times the specific fault code displayed in Field 9 occurred.

    Fields 11 and 12 - Dashed.

    Field 13 - Total number of times the diagnostic processor complex was tested.

    Field 14 - Total number of times the diagnostic processor complex failed Test 3.

NOTE

If there are failures for unit type 60 (diagnostic processor/remote interface, the **RED** LEDs on the indicted circuit packs are lighted. No circuit packs are indicted for unit type 63 (external equipment) and unit type 64 (external processor).

13. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures.

    Each time **NEXT CIRCUIT** is depressed, Field 8 is decremented by 1 to show the number of remaining entires to be displayed. Fields 9 and 10 are updated as appropriate.

    When all failures are displayed, Fields 2 through 14 are dashed.

    Depressing **NEXT CIRCUIT** once more starts the sequence over displaying the failure summary.

14. Depressing **NEXT UNIT** when the summary is displayed or after displaying the first unit type displays the next unit type with failures (if any).

    Depressing **NEXT UNIT** when the summary is displayed decrements Field 8 corresponding to the number of entries within a unit type passed over (if any).

    NEXT CIRCUIT is used to display the failures within the unit type.

15. If **STOP** is depressed to halt Test 3, **EXECUTE** must be depressed to restart Test 3. Test 3 will start from the beginning of the diagnostic processor complex test after the **STOP; EXECUTE** sequence is used.

Test 4

Test 4 is used to make a test call to RMATS and display the current call state as the test progresses.

Test 4 performs the following tests:

1. Checks translation for the presence of a phone number indicating that AAOF is allowed.

   NOTE Error code 74 (equipment not part of system) is displayed in the **MAAP** error code field indicating that AAOF is not assigned if there is no phone number in translation.

2. Sends an order to the diagnostic processor to enable AAOF.
3. Extinguishes the **RED** and **GREEN** LEDs on the RI.

   NOTE The LEDs must be extinguished in order to discern RMATS' turning on and off the **GREEN** LED.

4. Waits for modem 0 to become idle.

   NOTE RMATS may be calling in on modem 0 or modem 1 and executing **PROC 618**. The wait for modem 0 to become idle allows RMATS time to hang up (regardless of which modem RMATS is using) to allow the test call to be executed as the test call goes out on modem 0. RMATS must hang up prior to the test call being executed. The AAOF automatically tries to call out on modem 0.

5. Sends a test call request to the DP. The DP then sends a test call to the RMATS center.
6. Monitors the RI **GREEN** LED when modem 0 becomes active.

   NOTE The RI **GREEN** LED turning on signifies that RMATS received the call and recognizes it as a test call.

7. After the RI **GREEN** LED becomes active, waits for it to be extinguished.
8. The RMATS center waits for one second and then extinguishes the RI **GREEN** LED.

   NOTE The extinguishing of the **GREEN** LED signifies the end of the test data.

9. After the RI **GREEN** LED is extinguished, Test 4 waits for modem 0 carrier to drop.

   NOTE When the modem 0 carrier drops, RMATS has terminated its response to the test call.

Test 4 is performed as follows.

1. Test 4 is selected by use of **NEXT TEST**.
2. To start Test 4, depress **EXECUTE**.

   NOTE

   Special error code 87 (procedure cannot be moved to pseudo port to allow test call) is displayed in the **MAAP** error code field when port contention will not allow the procedure access to call out.

3. While Test 4 is executing, the following is displayed:

   Field 1 - 4.

   Fields 2 through 8 - Dashed.

   Field 9 - Current call state of test.

   Fields 10 through 14 - Dashed.

   NOTE

   Special error code 85 (test can not run in off-line processor) is displayed in the **MAAP** error code field if Test 4 is executed in the off-line common control.

4. Test 4 is terminated when it reaches one of the final call states. The following is displayed:

   Field 1 - 4.

   Fields 2 through 8 - Dashed.

   Field 9 - Completion call state of Test 4.

   Fields 10 through 14 - Dashed.

   NOTE

   If special error code 88 (I/O to diagnostic processor failed) is displayed in the **MAAP** error code field, perform Test 2 or 3 of **PROC 618** to determine the status of the diagnostic processor complex.

5. Depressing **STOP** causes the test to abort and results in a final state indicating a failure.

   Call state 10 (test call failed, test call aborted) is displayed in Field 9.

Test 5

Test 5 displays the results of the last test call executed by Test 4 while on-line.

Test 5 allows RMATS or local maintenance personnel to execute **PROC 618**, Test 4 remotely (or locally) and then later call back to display the results of the test call executed by Test 4.

Test 5 returns the result of the last test call whether or not Test 4 is executed remotely. That is, Test 4 may be executed locally from the MAAP. RMATS or local maintenance personnel may call in at a later time and get the results of that test.

In order to remotely execute Test 4 from modem 0 or modem 1, RMATS must initiate the test and then hang up. Test 4 continues to execute the test and stores the final call state of Test 4 in memory.

After the test call is completed, RMATS or local maintenance personnel may invoke Test 5 of **PROC 618** to obtain the final call state of the previous test call.

1. Test 5 is selected by use of **NEXT TEST**.
2. To start Test 5, depress **EXECUTE**.
3. The following is displayed:

   Field 1 - 5.

   Fields 2 through 8 - Dashed.

   Field 9 - Final call state of last test call executed by Test 4.

   NOTE

   Refer to Table AA, PROC 618 - Field Definitions and Codes for definition of the call state displayed in Field 9.

   Fields 10 through 14 - Dashed.

Repair Guide

When unit type 60 (Diagnostic Processor), unit type 63 (External Equipment), or unit type 64 (External Processor) failure is indicated **(PROC 618** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), perform the following steps in the order listed to isolate and repair the faulty unit.

1. Execute Test 1, and manually record the unit type, equipment location, and specific fault code displayed in Fields 2 through 6.
2. Perform the steps listed under **Unit type 60 (Diagnostic Processor), Unit type 63 (External Equipment), or Unit type 64 (External Processor)** as appropriate for the unit type(s) with failures recorded in Step 1.

Unit Type 60 (Diagnostic Processor):

1. If the specific fault code displayed in Field 9 is **914, 916, 917**, or **972**, check the configuration settings on the 1200 baud modem associated with the TN492 circuit pack at the equipment location displayed in slot 32.
2. Execute Test 3 to verify that the problem is corrected.

   Determine if the same entry for unit type 60 is displayed.
3. If the same entry is not displayed, corrective action is complete.

   If the same entry is displayed, proceed to Step 4.
4. Replace the 1200 baud modem.
5. Execute Test 3 to verify that the problem is corrected.

   Determine if the same entry for unit type 60 is displayed.
6. If the same entry is not displayed, corrective action is complete.

   If the same entry is displayed, proceed to Step 7.
7. Replace the cabling to the 1200 baud modem.
8. Execute Test 3 to verify that the problem is corrected.

   Determine if the same entry for unit type 60 is displayed.
9. If the same entry is not displayed, corrective action is complete.

   If the same entry is displayed, proceed to Step 10.

10. Replace circuit pack TN492 at the equipment location displayed in slot 32.

NOTE

Prior to replacement of circuit pack TN492, ensure that the battery (comcode 844665836) is connected (or connect) to the back side of the circuit pack.

a. Mark the date of the next battery replacement (month and year) on the **Date Label** that is attached to the battery.

NOTE

The battery replacement date is established by adding 5 years to the date of installation of the TN492 circuit pack and associated battery. Example: TN492 circuit pack replaced July 1987; date to be written on the label is July 1992.

b. Affix the **Date Label** to the faceplate of the TN492 circuit pack.

NOTE

If the **YELLOW** LED is lighted, after the circuit pack is replaced, the battery is **not** connected or wired correctly.

11. Execute Test 3 to verify that the problem is corrected.

    Determine if the same entry for unit type 60 is displayed.

12. If the same entry is not displayed, corrective action is complete.

    If the same entry is displayed, proceed to Step 13.

13. Replace circuit pack TN491.

14. Execute Test 3 to verify that the problem is corrected.

    Determine if the same entry for unit type 60 is displayed.

15. If the same entry is not displayed, corrective action is complete.

    If the same entry is displayed, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

16. If the specific fault code is **not 914, 916, 917**, or **972,** replace the circuit pack at the equipment location displayed in Fields 3 through 6.

17. Execute Test 3 to verify that the problem is corrected.

    Determine if the same entry for unit type 60 is displayed.

18. If the same entry is not displayed, corrective action is complete.

    If the same entry is displayed, determine if slot 22, or 32 is displayed in Field 6.

19. If slot 22 or 32 is not displayed, proceed to Step 22.

    If slot 22 or 32 is displayed, replace TN491 in slot 31 at the equipment location displayed in Fields 3 through 6.

20. Execute Test 3 to verify that the problem is corrected.

    Determine if the same entry for unit type 60 is displayed.

21. If the same entry is not displayed, corrective action is complete.

22. If the same entry is displayed, check the UART cable E26 - E26 and the wiring associated with the circuit pack(s) replaced or perform microdiagnostic test 0 in the off-line side of a duplicated common control switch. If the switch is unduplicated, perform microdiagnostic testing only when traffic permits as microdiagnostic testing takes the switch down.
23. Repeat Steps 1 through 22 for each diagnostic processor entry (unit type 60) displayed in Test 1.

Unit Type 63 (External Equipment):

1. Record the unit number of the external equipment and the external equipment encode displayed in Fields 3 and 4 of each unit type 63 entry displayed in Test 1.
2. Determine from local records if you are at the customer's premises associated with the unit number displayed in Field 3.
3. If you are at the customer's premises, determine what corrective action to take depending on the external equipment encode displayed in Field 4.
4. External equipment encodes displayed in Field 4 are defined as follows:

   1 = The auxiliary cabinet battery holdover circuit alarm is active.

   2 = The auxiliary cabinet temperature limit sensor alarm is active.

   3 = The auxiliary cabinet fan power alarm is active.

   4 = The auxiliary cabinet circuit breaker/fuse alarm is active.

   5 = The auxiliary cabinet frequency generator alarm is active.

   6 = The auxiliary cabinet rectifier alarm is active.

   7 = Multiple external and/or auxiliary equipment failures.

   8 = Type of trouble is unknown, unit number(s) are known (multiple errors).

Isolation techniques for the encodes displayed in **PROC 618** are detailed in the following paragraphs.

Encode 1 - Battery Holdover Extended holdover or extended power reserve is provided by the DC filter.

If encode 1 is displayed in Field 4 of **PROC 618**, Test 1 replace the DC filter.

NOTE

Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC filter.

Encode 2 - Temperature Limit Sensor An overtemperature alarm cause signifies that a predetermined cabinet temperature is exceeded.

1. Determine if fans are provided in the auxiliary cabinet.

   If no fans are provided, proceed to Step 8.

   If fans are provided, proceed to Step 2.

2. Determine if the fans are running.

   If no fans are running, proceed to Step 4.

   If fans are running, proceed to Step 3.

3. Determine if all fans are operating properly.

   If all fans are operating properly, refer to isolation and repair step **Other Repair Steps**.

   Replace any defective fan, allow sufficient time for cabinet interior to cool and proceed to Step 9.

   NOTE

   Refer to AUXILIARY CABINET COMPONENT REPLACEMENT for steps on replacement of fans.

4. Check the fuse (F1 or F2) associated with the fans. (F1 controls the upper fan assembly and F2 controls the lower fan assembly.)

   If the fuse is blown, proceed to Step 5.

   If the fuse is not blown, it may be possible for excessive heat in the room to cause the temperature alarm. Proceed to Step 8.

5. Replace the blown fuse.

   If the fuse does not blow again, allow sufficient time for cabinet interior to cool and proceed to Step 9.

6. If the fuse blows again, replace the fan assembly associated with the blown fuse.

   NOTE

   Refer to AUXILIARY CABINET COMPONENT REPLACEMENT for steps on replacement of the fan assembly.

7. Replace the blown fuse, allow sufficient time for cabinet interior to cool and proceed to Step 9.

8. When no fans are provided, or excessive heat in the room is suspected, determine if environmental temperature is above maximum for the auxiliary cabinet.

   If the environmental temperature is above the maximum, leave the cabinet open to allow cooling, and refer the problem to local engineering.

   If the environmental temperature is not above the maximum, refer to isolation and repair step **Other Repair Steps**.

9. Enter **PROC 618**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

10. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

    Determine if the same entry for unit type 63 is displayed.

11. If the same entry is not displayed, corrective action is complete.

12. If the same entry is displayed, check the wiring associated with the fuse and fan assembly.

Encode 3 - Fan Power Encode 3 (fan power) indicates that a fan may be malfunctioning.

1. Determine if the fans are running.

   If no fans are running, proceed to Step 3.

   If fans are running, proceed to Step 2.

2. Determine if all fans are operating properly.

   If all fans are operating properly, refer to isolation and repair step **Other Repair Steps**.

   Replace any defective fan, allow sufficient time for cabinet interior to cool and proceed to Step 7.

   NOTE

   Refer to AUXILIARY CABINET COMPONENT REPLACEMENT for steps on replacement of fans.

3. Check the fuse (F1 or F2) associated with the fans. (F1 controls the upper fan assembly and F2 controls the lower fan assembly.)

   If the fuse is blown, proceed to Step 4.

   If the fuse is not blown, refer to isolation and repair step **Other Repair Steps**.

4. Replace the blown fuse.

   If the fuse does not blow again, allow sufficient time for cabinet interior to cool and proceed to Step 7.

5. If the fuse blows again, replace the fan assembly associated with the blown fuse.

   NOTE

   Refer to AUXILIARY CABINET COMPONENT REPLACEMENT for steps on replacement of the fan assembly.

6. Replace the blown fuse, allow sufficient time for cabinet interior to cool and proceed to Step 7.
7. Enter **PROC 618**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

8. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

   Determine if the same entry for unit type 63 is displayed.

9. If the same entry is not displayed, corrective action is complete.
10. If the same entry is displayed, check the wiring associated with the fan and circuit breaker.

Encode 4 - Circuit Breaker/Fuse Fuses and circuit breakers provide visual indications when they operate.

1. Determine if any fuses are blown or circuit breakers tripped.

   If no fuses are blown or circuit breakers tripped, refer to isolation and repair step **Other Repair Steps**.

   If any fuse is blown or circuit breaker tripped, proceed to Step 2.

2. Replace the blown fuse, or reset the circuit breaker.

   If the fuse does not blow again or circuit breaker does not trip, proceed to Step 4.

   If the fuse blows again or circuit breaker trips, proceed to Step 3.
3. The corrective action to be taken depends on the blown fuse or tripped circuit breaker.

   Replacement of components associated with the blown fuse or circuit breaker may be required.

   Wiring or cabling associated with the fuse or circuit breaker should be checked.
4. Enter **PROC 618**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.
5. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

   Determine if the same entry for unit type 63 is displayed.
6. If the same entry is not displayed, corrective action is complete.
7. If the same entry is displayed, check the wiring associated with the fuse or circuit breaker.

Encode 5 - Frequency Generator

1. Determine the type of frequency generator installed in the auxiliary cabinet.

   If the frequency generator is a 124B, proceed to Step 4.

   If the frequency generator is a 124B1 or 124B2, proceed to Step 2.
2. Check the reset button (1 amp) at the front of the frequency generator.

   If the reset button is flush (not popped out), proceed to Step 4.

   If the reset button has popped out, proceed to Step 3.
3. Push the reset button in.

   If the reset button pops out again, check the wiring to the output load(s) to determine the cause of the trouble.

   If the reset button does not pop out, proceed to Step 7.
4. Check the fuse (2 amp) on the fuse panel associated with the frequency generator.

   If the fuse is blown, proceed to Step 5.

   If the fuse is not blown, proceed to Step 6.
5. Replace the blown fuse.

   If the fuse does not blow, proceed to Step 7.

   If the fuse blows again, check the wiring between the fuse and the frequency generator.
6. Replace the frequency generator.

NOTE

Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacement of the frequency generator.

7. Enter **PROC 618**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

8. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

   Determine if the same entry for unit type 63 is displayed.

9. If the same entry is not displayed, corrective action is complete.

10. If the same entry is displayed, check the wiring associated with the frequency generator.

Encode 6 - Rectifier A **GREEN** pilot LED located on the front panel of the rectifier is lighted when the rectifier is producing -48 volts on its output.

The **GREEN** pilot LED does not indicate that the output voltage is within regulation limits.

Appropriate test points are available on the front panel of the rectifier for measuring the output voltage and determining the rectifier performance.

1. At the rectifier, determine if the **GREEN** pilot LED is lighted.

   If the **GREEN** pilot LED is not lighted, proceed to Step 2.

   If the **GREEN** pilot LED is lighted, proceed to Step 9.

2. Determine if the circuit breaker associated with the rectifier is tripped.

   If the circuit breaker is tripped, proceed to Step 3.

   If the circuit breaker is not tripped, proceed to Step 5.

3. Reset the circuit breaker.

   If the circuit breaker does not trip, proceed to Step 12.

   If the circuit breaker trips again, replace the rectifier.

   NOTE

   Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacing the rectifier.

4. If the circuit breaker does not trip again after replacing the rectifier, proceed to Step 12.

   If the circuit breaker trips again after replacing the rectifier, check the wiring associated with the rectifier.

5. Measure the rectifier output voltages at the test points using a digital multimeter.

   NOTE

   At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and -52.6 volts, respectively.

   If all voltages are within tolerance, refer to isolation and repair step **Other Repair Steps**.

   If the voltages are not within tolerance, proceed to Step 6.

6. Replace the rectifier.

NOTE

Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacing the rectifier.

7. Measure the output voltages.

NOTE

At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and -52.6 volts, respectively.

8. If all voltages are within tolerance, proceed to Step 12.

   If voltages are not within tolerance, check the wiring associated with the rectifier.

9. Determine if marginal or fluctuating voltages exist at the rectifier test points by measuring the output voltages using a digital multimeter.

NOTE

At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and -52.6 volts, respectively.

   If all voltages are within tolerance without fluctuation, refer to isolation and repair step **Other Repair Steps**.

   If the voltages are marginal or fluctuating, proceed to Step 10.

10. Replace the rectifier.

NOTE

Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacing the rectifier.

11. Measure the output voltages.

NOTE

At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and -52.6 volts, respectively.

    If all voltages are within tolerance and do not fluctuate, proceed to Step 12.

    If voltages are not within tolerance or fluctuate, check the wiring associated with the rectifier.

12. Enter **PROC 618**, Test 1 and clear the alarmed entry.

    Wait at least 5 to 10 minutes.

13. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

    Determine if the same entry for unit type 63 is displayed.

14. If the same entry is not displayed, corrective action is complete.

15. If the same entry is displayed, check the wiring associated with the rectifier.

Other Repair Steps

1. In the event an alarm encode is present but the equipment associated with the alarm encode is functioning properly (or unable to function because of a suspected sensor or detector malfunction), the sensor, detector or alarm board corresponding to the auxiliary cabinet encode is probably faulty.
2. Replace the auxiliary cabinet alarm unit.
3. Enter **PROC 618**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.
4. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

   Determine if the same entry for unit type 63 is displayed.
5. If the same entry is not displayed, corrective action is complete.
6. If the same entry is displayed, proceed to Step 7.
7. Check the sensor or detector and replace as appropriate.
8. Enter **PROC 618**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.
9. Enter **PROC 618**, Test 1 and depress **EXECUTE**.

   Determine if the same entry for unit type 63 is displayed.
10. If the same entry is not displayed, corrective action is complete.
11. If the same entry is displayed, proceed to Step 12.
12. If the sensor or detector is functioning correctly or after replacement of the sensor or detector the failure still exists, the wiring between the sensor or detector and the module control channel may be at fault.

Encode 7 (multiple external and/or auxiliary equipment failures) and encode 8 (type of trouble is unknown) requires investigation of the entire auxiliary cabinet to determine the location of the trouble.

Unit Type 64 (External Processor):

1. Record the unit number of the external processor displayed in Field 3 of each unit type 64 entry displayed in Test 1.
2. Determine from local records if you are at the customer's premises associated with the unit number displayed in Field 3.
3. If you are at the customer's premises, perform corrective action on the external processor or refer the problem to the appropriate personnel.

Specific Fault Codes

Further isolation of a failure may be accomplished by analyzing the specific fault codes recorded from Test 1 (PMIDS) and Test 3 (DMIDS).

Determine from Table AB, PROC 618 - Specific Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

Check the wiring and cabling associated with the circuit pack(s) or components replaced (point to point) depending upon the specific fault code(s) recorded.

Table 5-29.

PROC 618 - SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
821	**The diagnostic processor interface RAM output is always busy.**
823	**The diagnostic processor interface RAM test failed for test request command.**
824	**The diagnostic processor interface RAM complement test failed for the complement test request command.**
825	**The automatic alarm origination function cannot be enabled.**
870	**The diagnostic processor interface RAM input buffer is unavailable.**
871	**The command in the diagnostic processor interface RAM input buffer was not accepted by the DP.**
872	**The diagnostic processor interface RAM output buffer gives no response.**
873	**The diagnostic processor interface RAM output buffer contains improper command response.**
874	**The external processor minor alarm is active.**
875	**The external processor major alarm is active.**
876	**The external equipment minor alarm is active.**
877	**The external equipment major alarm is active.**
878	**The auxiliary cabinet battery holdover circuit alarm is active.**
879	**The auxiliary cabinet temperature limit sensor alarm is active.**
880	**The auxiliary cabinet fan power alarm is active.**
881	**The auxiliary cabinet circuit breaker/fuse alarm is active.**
882	**The auxiliary cabinet frequency generator alarm is active.**
883	**The auxiliary cabinet rectifier alarm is active.**
884	**At least one background test of the diagnostic processor's ROM CRC test or internal RAM test has failed.**
885	**One ID-chip test on the maintenance bus has failed.**
886	**More than one ID-chip test on the maintenance bus has failed.**
887	**At least one background test of the integrated modems has failed.**
888	**At least one background test of the alarm interface circuit has failed.**
889	**Validated and rewritten information RAM CRC check failure.**

Table 5-29. (Contd)

PROC 618 SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
890	Two or more invalid messages that the diagnostic processor detected on port 0 while in direct mode.
891	Two or more invalid messages that the diagnostic processor detected on port 1 while in direct mode.
892	The diagnostic processor originated a call to RMATS but was not successful in reporting the alarm.
893	There was an unsuccessful initial data exchange on a call into the CS500 remote interface circuit.
894	An attempt was made to run the ID-chip test on a board. The presence of the board could not be detected.
895	Only the external alarm unit number is discernible.
896	Only the external alarm error type is discernible.
897	An external alarm has occurred; however, the type and unit number are not discernible because several alarms exist at once.
913	The diagnostic processor interface RAM input buffer flag is not settable.
914	Modem 0 twice failed the analog loop-around test run by the diagnostic processor.
916	Modem 1 twice failed the analog loop-around test run by the diagnostic processor.
917	Analog loop-around test could not be run on modem 0.
972	Analog loop-around test could not be run on modem 1.

PROC 620 - NETWORK PROCEDURE

Purpose

PROC 620 is used when referenced from **PROC 600** (Alarm Causes/Error Log) or when the **NETWORK SWITCH** and/or **PORT** and **MAJOR**, and/or **MINOR** alarm indicators on the alarm panel are lighted.

The hardware tested by **PROC 620** includes all of the digital network below the 4-MHz data channel down to and including the ports and the TMS.

PROC 620 is used to:

1. Display failure history for any circuit in the digital network.
2. Provide the capability to manually turn off the fault indicator(s) activated because of digital network failures.

NOTE

Network alarmed circuit failures in PMIDS are marked as resolved.

3. Test one or more circuits once and display the test results.
4. Test one or more circuits in a continuous cycle and display the test results.
5. Start with a specific equipment location and diagnose a problem to determine the true location of the fault.

6. Perform a verification test on a specific equipment location and turn the circuit pack's RED or GREEN LED on to indicate whether or not the problem is corrected.
7. Automatically turn off the fault indicator(s) when all circuits that raised an alarm are tested as good.

NOTE

Network alarmed circuit failures in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 620** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AC, PROC 620 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Field 2 - Select unit type (number designation of the functional unit of equipment) to be tested or displayed.
3. Fields 3 through 7 - Select equipment location of a specific circuit, range of circuits, or all circuits in a unit type to be tested (Tests 2 through 5 only).

Operation of Procedure

Overview

PROC 620 is used to determine the cause of the **NETWORK SWITCH** and/or **PORT** and **MAJOR** or **MINOR** alarm indicators being lighted, resulting from a digital network failure.

To call in **PROC 620**, perform the following:

1. Depress **PROC NO; 620; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Five tests are available:

1. Test 1 - Displays failure history by severity of alarm, then within alarm level by unit type, and within unit type by circuit location.

   Test 1 is also used to manually resolve individual digital network alarmed failures or all digital network alarmed failures which turns off the associated fault indicator(s).
2. Test 2 - Tests one or more circuits, an individual unit type, or a range of circuits one time.
3. Test 3 - Tests one or more circuits, an individual unit type, or a range of circuits continuously.
4. Test 4 - Performs a diagnostic analysis and verification test on a specific equipment location.
5. Test 5 - Performs a verification test on a specific equipment location.

Table 5-30.

PROC 620 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-5	Test number.	2 (Contd)	27	General purpose port (GPP).
2	6-99	Unit Type: Number designation of the functional unit of equipment to be tested, or which is being displayed.		28	Multifunctional Electronic Telephone (MFET) port.
				29	Line circuit.
	6	TMS or module control channel.		31	Auxiliary tone plant.
				32	CO trunk (hardware).
	7	TMS or module processor (scanner).		33	DID trunk (hardware).
	8	Maintenance interface.		34	Tie trunk/data port (hardware).
	9	Module clock.		44	Attendant console interface.
	10	Time slot interchanger (TSI) - ALU.		45	Auxiliary trunk.
	11	Time slot interchanger (TSI) - PSTORE.		46	Attendant conference.
	12	I/O bus interface (IOBI).		50	TMS clock oscillator (TCO).
	13	Port data store (PDS).		51	Local clock termination (LCT).
	14	Port control interface (PCI).		52	System clock synchronizer (SCS).
	15	Port data interface (PDI).		53	Multiplexer (MPX).
	16	Tone plant.		54	Fan out (FO).
	23	TMS or network duplication channel.		55	Module interface (MI).
	24	Touch-tone dialing sender.		56	Intermodule data store (IDS).
	25	Touch-tone dialing receiver.		57	Light guide interface (LGI).
	26	Network I/O.			

Table 5-30. (Contd)

PROC 620 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
2 (Contd)	58	Fan in (FI).	8	0-2	Remote status:
	59	TMS maintenance interface (TMIF).		0	Local port or RCL.
	62	Analog/Digital Facility Test Circuit (ADFTC).		1	Remote port or RCC via T1 carrier.
	66	Tone detector 2.		2	Remote port or RCC via fiber.
	68	DS-1 trunk interface.	9	0-5	Alarm status of circuit being displayed.
	69	Multifunction analog terminal (MFAT).		0	No errors recorded.
	71	Remote module interface (RMI).		1	Major.
	72	EIA interface.		2	Minor.
	74	Remote carrier group (RCG).		3	Warning.
	96	TMS fabric (TMSF).		4	Errors recorded.
	99	Time slot interchanger (TSI).		5	Alarm resolved.
3-7		Equipment location of displayed circuit.	10	0-4	Circuit status of circuit being displayed.
3	0-30	Module number.		0	Idle.
4	0-7	Cabinet number.		1	On-line and in-use.
5	0-3	Carrier number.		2	Off-line.
6	0-27	Slot number.		3	Maintenance busy.
7	0-7	Circuit number (if any).		4	Not plugged in or unable to communicate.
			11		Fault code index:
				1	Specific fault code.

Table 5-30. (Contd)

PROC 620 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
12	0-2007	Specific fault code.	14	0-99	Number of circuits failed in a multicircuit test OR Number of times that an individual circuit has failed a test OR Fault list index for an individual circuit during continuous testing.
	9999	Failure detected on other than the tested circuit (Test 5).			
13	0-9999	Number of circuits tested or number of times single circuit has been tested.			

Test 1

Overview Test 1 provides a failure history of the digital network failures detected by on-line software.

Failures are displayed in alarm order severity. Alarmed failures are displayed in descending order with major alarmed failures displayed first, entries with minor alarms second, and failures with warning alarms last. Entries in the failure history with errors recorded are displayed after all alarmed failures.

1. Within each alarm category failures are displayed by unit type priority.

   NOTE

   Entries with errors recorded are also displayed by unit type priority.

2. Unit type priority is assigned according to the order of their importance to service to the customer (most important to least important functional area) and are **not** in numerical order.

Test 1 is also used to manually turn off the **NETWORK SWITCH** and/or **PORT** fault indicator(s).

Test 1 Execution

1. Test 1 is the default test when entering **PROC 620** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. The PMIDS error log is sorted and a summary of the failures and/or entries with errors recorded are displayed.
4. If no failures and/or entries with errors recorded exist, the following summary is displayed:

   Field 1 - 1.

   Field 13 - 0 (Indicating no failures and/or entries with errors recorded).
5. If any failures and/or entries with errors recorded exist, the summary displays a 1 in Field 1 and the total number of failures and/or entries with errors recorded in Field 13.
6. Depressing **NEXT CIRCUIT** displays the first failure or entry with errors recorded as follows:

   Field 1 - 1.

   Field 2 - Unit type of displayed circuit.

   Fields 3 through 7 - Equipment location of displayed circuit.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Alarm status of displayed circuit (1 = major, 2 = minor, 3 = warning, 4 = errors recorded).

   Fields 10 and 11 - Dashed.

   Field 12 - Specific fault code.

   Field 13 - Total number of failures and/or entries with errors recorded.

   Field 14 - Total number of times the circuit in Fields 2 through 7 failed or had errors recorded.

   NOTE

   Field 13 includes in its count the entry currently being displayed.
7. Failures for unit type 26 (Network I/O) are logged in PMIDS by ORing the current fault code with the one, if any, already logged for the specific location.

   Table AD, PROC 620 - Unit Type 26 (Network I/O) Specific Fault Code Definitions, defines the meaning of the current fault code, or the ORed fault code logged in PMIDS for unit type 26.

   NOTE

   The specific fault code displayed in Field 12 for unit type 26 (Network I/O) is **not** passed to Tests 2, 3, 4, or 5.
8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining digital network failures and/or entries with errors recorded in the PMIDS error log.

   Each time **NEXT CIRCUIT** is depressed, Field 13 is decremented by 1 to show the number of remaining failures and/or entries with errors recorded to be displayed.

   Field 13 includes in its count the failure and/or entry with errors recorded being displayed.

Table 5-31.

PROC 620 UNIT TYPE 26—NETWORK I/O SPECIFIC FAULT CODE DEFINITIONS (SFC)		
SFC	DEFINITION	
3	SCAN_TSK_ERR	Scan task error
129	CALL_PROC_ERR	Call Processing error
131	SCAN_TSK_ERR; CALL_PROC_ERR	Scan task error and call processing error
257	NACK_RESPONSE	Negative acknowledgment response
259	SCAN_TSK_ERR; NACK_RESPONSE	Scan task error and negative acknowledgment response
385	CALL_PROC_ERR; NACK_RESPONSE	Call processing error and negative acknowledgment response
387	SCAN_TSK_ERR; CALL_PROC_ERR; NACK_RESPONSE	Scan task error, call processing error, and negative acknowledgment response

9. Depressing **NEXT CIRCUIT** after all failures and/or entries with errors recorded are displayed dashes Fields 2 through 14.

   Depressing **NEXT CIRCUIT** again causes the display sequence to start over beginning with the summary.

10. The **CLEAR DATA; EXECUTE** sequence is used to manually resolve individual alarmed digital network failures or all alarmed digital network failures after **EXECUTE** is used to initiate Test 1.

NOTE

When alarmed failures are resolved the circuits' failure history is not deleted from the PMIDS error log. The failure history is updated to show that the alarm status now equals 5 (alarm resolved).

The digital network failures which are resolved are those failures with an alarm status of 1, 2, or 3 displayed in Field 9.

11. To resolve individual digital network failures with an alarm status of 1, 2, or 3, perform the following:

    Use **NEXT CIRCUIT** to display the alarmed failure on the **MAAP**.

    Individual digital network failures cannot be resolved unless the failing digital network circuit is displayed on the **MAAP**.

    Depress **CLEAR DATA; EXECUTE**.

12. Field 9 (alarm status) displays a 5, indicating that the failing digital network circuit in PMIDS is marked as resolved.

    The **NETWORK SWITCH** or **PORT** fault indicator associated with the failing digital network circuit goes off if no other sources affecting the same fault indicator exist.

13. All digital network failures with an alarm status of 1, 2, or 3 can be resolved when the summary is initially displayed, i.e., upon entry to **PROC 620**, Test 1 and after displaying and recording all alarmed digital network failures and then using **NEXT CIRCUIT** to display the summary.

    CAUTION

    The alarmed digital network failures should be displayed and recorded prior to resolving the alarmed failures and turning off their associated alarm and fault indicators in order that a record of the causes of the alarmed failures are available for maintenance personnel.

14. After entering Test 1 and depressing **EXECUTE**, the summary is displayed.

    Depress **CLEAR DATA; EXECUTE**.

15. Field 13 (total number of failures and/or entries with errors recorded) changes to indicate the number of digital network failures with an alarm status of 1, 2, or 3 which are resolved.

    Alarmed digital network failures are marked as resolved in PMIDS and the **NETWORK SWITCH** and/or **PORT** fault indicator(s) goes off.

16. After displaying and recording all digital network failures, depress **NEXT CIRCUIT** until the summary is displayed.

    Then, depress **CLEAR DATA; EXECUTE**.

17. Field 13 (total number of failures and/or entries with errors recorded) changes to indicate the number of digital network failures with an alarm status of 1, 2, or 3 which are resolved.

    Alarmed digital network failures are marked as resolved in PMIDS and the **NETWORK SWITCH** and/or **PORT** fault indicator(s) goes off.

18. The **MAJOR** and/or **MINOR** alarm indicator(s) also goes off when no other sources affecting the **MAJOR** and/or **MINOR** alarm indicator(s) is present.

Test 2

Overview Test 2 is used to test one or more circuits in the digital network once and display the results of the test.

Circuits can be selected for testing by unit type, a range of equipment locations, or on a single circuit basis.

Test 2 automatically turns off the **NETWORK SWITCH** and/or **PORT** fault indicator(s) when all circuits that raised an alarm pass Test 2. Network circuit alarmed failures in PMIDS are marked as resolved.

Test 2 Data Entry

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

   The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 9, 10, and 12.

   Field 2 (unit type) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Tests 1, or 3 through 5 of **PROC 620** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

   The default equipment location can also be passed from other maintenance procedures, i.e.: **PROC 621, PROC 622, PROC 625, PROC 646**, and **PROC 647** as long as the equipment location is a network digital circuit and is still displayed in **PROC 621, PROC 622, PROC 625, PROC 646**, or **PROC 647** when it is passed.

4. All digital network circuits, a range of circuits, all circuits within a unit type, a combination of unit type and range (i.e., all circuit locations of a unit type in the range specified), a specific digital network circuit, or the default equipment location can be tested.

5. When unit type 27 (GPP) is selected during range testing, all translated peripherals should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

   NOTE

   Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when peripherals are disconnected or do not have power on when required.

   Proceed to Step 11.

6. When attendant console interface circuits (unit type 44) is selected during range testing, the associated headset(s) or handset(s) **must** be unplugged or the circuits fail.

   Proceed to Step 11.

7. When unit type 45 (auxiliary trunks) is selected during range testing, one-way incoming and one-way outgoing auxiliary trunks **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

   Proceed to Step 11.

8. Unit type 68 (DS-1) and unit type 74 (RCG) can be selected for range testing in two ways.

   NOTE

   For Release 2, Version 3 **tape issue 1.1 or later**, any unit type 68 or unit type 74 circuit packs not busied out and **in use** can be tested in Test 2 without busying out the unit type 68 (DS-1) or unit type 74 (RCG) circuit packs as the test executed is **not** service affecting.

9. To range test unit type 68 (DS-1) and unit type 74 (RCG) without busying out the circuit packs to be tested, proceed to Step 11.

   NOTE

   Any unit type 68 or unit type 74 circuit packs not busied out and **in use** for Release 2, Version 3 **tape issue 1.0** are not tested until the entire circuit pack is **not in use**.

10. To range test unit type 68 (DS-1) and unit type 74 (RCG) by busying out all circuit packs to be tested, proceed to Step 45.

11. To select the entire switch to be tested, Fields 2 through 7 must be dashed.

    If no default equipment location is displayed, depress **ENTER**.

    If a default equipment location is displayed, depress **CHANGE FIELD; 2; ENTER; ENTER**.

    Test 2 starts with the first module, first cabinet and carrier and runs until all digital network circuits in the switch are tested.

    Proceed to Step 1 of Test 2 Execution.

12. In addition to testing all network circuits in the entire switch, a range of digital network circuits (all network circuits in a module, cabinet, carrier, or slot) can also be selected for testing.

13. Selection of a range of circuits to be tested depends on whether or not a default equipment location is displayed.

    If a default equipment location is displayed, the **CHANGE FIELD** sequence **must** be used.

    If no default equipment location is displayed, **ENTER** or the **CHANGE FIELD** sequence is performed to select the range of circuits to be tested.

14. To select all network circuits in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    ENTER; (Module number to be tested); ENTER.

    CHANGE FIELD; 2; ENTER; ENTER; **(Module number to be tested); ENTER**.

    Test 2 starts with the first network circuit in the module selected and runs until all digital network circuits in the module are tested.

    Proceed to Step 1 of Test 2 Execution.

15. To select all network circuits in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    ENTER; (Module number of cabinet to be tested); **ENTER; (Cabinet number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; ENTER; **(Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

    Test 2 starts with the first network circuit in the cabinet selected and runs until all digital network circuits in the cabinet are tested.

    Proceed to Step 1 of Test 2 Execution.

16. To select all network circuits in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    ENTER; (Module number of carrier to be tested); ENTER; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; ENTER; **(Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    Test 2 starts with the first network circuit in the carrier selected and runs until all digital network circuits in the carrier are tested.

    Proceed to Step 1 of Test 2 Execution.

17. To select all network circuits in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    ENTER; (Module number of slot to be tested); ENTER; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); **ENTER; (Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    NOTE

    When a slot is specified to be tested, either all circuits on the circuit pack are tested, or if the circuit pack has no circuits, then the circuit pack is tested.

    Test 2 starts with the first network circuit on the circuit pack selected and runs until all digital network circuits on the circuit pack are tested.

    Proceed to Step 1 of Test 2 Execution.

18. To select all circuits within a unit type to be tested, the appropriate unit type must be entered in Field 2.

    NOTE

    Refer to Table AE, PROC 620 - Unit Type to Circuit Pack Identification, to determine which circuit pack(s) is tested for a particular unit type.

19. A unit type can be selected in several ways, i.e.: by depressing **NEXT UNIT** until the correct unit type is displayed, or by entering the unit type and depressing **ENTER**.

20. When unit type 27 (GPP) is selected during range testing, all translated peripherals should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

    NOTE

    Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when peripherals are disconnected or do not have power on when required.

    Proceed to Step 26.

21. When unit type 44 (attendant console interface) is selected during range testing, the associated headset(s) or handset(s) **must** be unplugged or the circuits fail.

    Proceed to Step 26.

Table 5-32.

PROC 620 - UNIT TYPE TO CIRCUIT PACK IDENTIFICATION		
UNIT TYPE	DEFINITION	CIRCUIT PACK
6	TMS or module control channel (MCC)	TN401
7	TMS or module processor	TN381 or TN380
8	Maintenance interface (MIF)	TN444
9	Module clock	TN460
10	Time slot interchanger (TSI)—ALU	TN446
11	Time slot interchanger (TSI)—PSTORE	TN445
12	I/O bus interface (IOBI)	TN400
13	Port data store (PDS)	TN440
14	Port control interface (PCI)	TN452
15	Port data interface (PDI)	TN454
16	Tone plant	SN250
23	TMS or network duplication/update channel	TN530
24	Touch-tone dialing sender	SN252
25	Touch-tone dialing receiver	SN251
26	Network I/O	Not applicable
27	General purpose port (GPP) or off-premises purpose port (OPGPP)	SN270 or SN271
28	Multifunctional electronic telephone (MFET) port	SN224
29	Line circuit	SN228 or SN229
31	Auxiliary tone plant	SN253
32	CO trunk (hardware)	SN230
33	DID trunk (hardware)	SN232
34	TIE trunk/data port (hardware)	SN233 or SN243
44	Attendant console interface	SN233
45	Auxiliary trunk (hardware)	SN231
46	Attendant conference	SN254
50	TMS clock oscillator (TCO)	TN461
51	Local clock termination (LCT)	TN462
52	System clock synchronizer (SCS)	TN463
53	Multiplexer (MPX)	TN470
54	Fan out (FO)	TN473
55	Module interface	TN480
56	Intermodule data store	TN441
57	Light guide interface (LGI)	TN481
58	Fan in (FI)	UN150

Table 5-32. (Contd)

PROC 620 - UNIT TYPE TO CIRCUIT PACK IDENTIFICATION		
UNIT TYPE	DEFINITION	CIRCUIT PACK
59	TMS maintenance interface (TMIF)	TN482
62	Analog/digital facility test circuit (ADFTC)	SN261
66	Tone detector 2	SN255
68	DS-1	ANN11
69	Multifunction analog terminal (MFAT)	ANN17
71	Remote module interface (RMI)	TN456
72	EIA	SN238
74	Remote carrier group	ANN15/ANN16

22. When unit type 45 (auxiliary trunks) is selected during range testing, one-way incoming and one-way outgoing auxiliary trunks **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

    Proceed to Step 26.

23. Unit type 68 (DS-1) and unit type 74 (RCG) can be selected for range testing in two ways.

    NOTE

    For Release 2, Version 3 **tape issue 1.1 or later**, any unit type 68 or unit type 74 circuit packs not busied out and **in use** can be tested in Test 2 without busying out the unit type 68 (DS-1) or unit type 74 (RCG) circuit packs as the test executed is **not** service affecting.

24. To range test unit type 68 (DS-1) and unit type 74 (RCG) without busying out the circuit packs to be tested, proceed to Step 26.

    NOTE

    Any unit type 68 or unit type 74 circuit packs not busied out and **in use** for Release 2, Version 3 **tape issue 1.0** are not tested until the entire circuit pack is **not in use**.

25. To range test unit type 68 (DS-1) and unit type 74 (RCG) by busying out all circuit packs to be tested, proceed to Step 45.

26. If no default equipment location is displayed, enter the unit type to be tested in Field 2 and depress **ENTER** or use **NEXT UNIT** to step through the unit types in numerical sequence until the unit type to be tested is displayed in Field 2.

    If a default equipment location is displayed, enter the unit type to be tested in Field 2 and depress **ENTER**.

    Test 2 starts with the first module, first cabinet and carrier, and runs until all digital network circuits of the unit type selected are tested.

    Proceed to Step 1 of Test 2 Execution.

27. In addition to testing all network circuits in a specified unit type, a range of circuits for the unit type (all circuits for a unit type in a module, cabinet, carrier, or slot) can also be selected for testing.

28. To select all network circuits for a unit type in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Unit type to be tested); ENTER; **(Module number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Unit type to be tested); **ENTER; (Module number to be tested); ENTER**.

    Test 2 starts with the first network circuit of the unit type specified, in the module selected, and runs until all digital network circuits of the unit type in the module are tested.

    Proceed to Step 1 of Test 2 Execution.

29. To select all network circuits for a unit type in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Unit type to be tested); ENTER; **(Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; **(Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

    Test 2 starts with the first network circuit of the unit type specified, in the cabinet selected, and runs until all digital network circuits of the unit type in the cabinet are tested.

    Proceed to Step 1 of Test 2 Execution.

30. To select all network circuits for a unit type in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Unit type to be tested); ENTER; **(Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; **(Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    Test 2 starts with the first network circuit of the unit type specified, in the carrier selected, and runs until all digital network circuits of the unit type in the carrier are tested.

    Proceed to Step 1 of Test 2 Execution.

31. To select all network circuits for a unit type in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    NOTE

    When a slot is specified to be tested, either all circuits on the circuit pack are tested, or if the circuit pack has no circuits, then the circuit pack is tested.

    (Unit type to be tested); ENTER; **(Module number of slot to be tested); ENTER**; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; **(Module number of slot to be tested); ENTER**; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

Test 2 starts with the first network circuit of the unit type specified, in the slot selected, and runs until all digital network circuits of the unit type in the slot are tested.

Proceed to Step 1 of Test 2 Execution.

32. A specific network circuit can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

(Unit type of circuit to be tested); ENTER; **(Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

Proceed to Step 39.

33. When a specific circuit in unit type 27 (GPP) is selected for testing, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

NOTE

Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

Proceed to Step 39.

34. When a specific circuit in unit type 44 (attendant console interface) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails.

Proceed to Step 39.

35. When a specific circuit in unit type 45 (auxiliary trunks) is selected for testing, one-way incoming and one-way outgoing auxiliary trunks **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

Proceed to Step 39.

36. The unit type field is an optional input field to test a specific network circuit.

If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

37. A specific network circuit can also be selected for testing whether or not a default equipment location is displayed by use of **NEXT UNIT** and **NEXT CIRCUIT**.

Depress **NEXT UNIT** until the unit type of the circuit to be tested is displayed in Field 2.

Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 3 through 7.

Proceed to Step 39.

38. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 39.

39. When a specific network circuit, default equipment location, DS-1 or RCG circuit pack is to be tested, check the circuit status in Field 10.

NOTE

For Release 2, Version 3 **tape issue 1.1 or later**, individual DS-1 or RCG circuit packs do not have to be busied out as testing of DS-1 or RCG circuit packs is non-destructive in Test 2 (i.e., does not affect customer calls).

40. If Field 10 equals 1 (on-line and in-use) Test 2 cannot be performed for port circuits without busying them out. Wait until the circuit is not in-use or perform tests on other circuits.

NOTE

Port circuits that cannot be tested while in-use without being busied out are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 41.

If Field 10 does not equal 4, proceed to Step 42.

41. If Test 2 is being performed remotely, proceed to Step 42.

If Test 2 is being run locally (or with maintenance personnel on the customer's premises or at the remote carrier group), determine if the circuit pack being tested is plugged in.

If the circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 42.

If the circuit pack is firmly seated, proceed to Step 42.

42. Individual port circuits, DS-1 or RCG circuit packs can be placed in maintenance busy out status for testing by checking the circuit status in Field 10.

CAUTION

Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out a DS-1 or RCG circuit pack disrupts calls in progress on all 24 ports of the DS-1 or RCG circuit pack.

43. If Field 10 equals 1 individual port circuits should not be busied out as they are on-line and in-use. Busying out in-use port circuits and performing tests results in loss of calls or data.

NOTE

Port circuits that should not be busied out while in-use are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

44. If the circuit status = 3, proceed to Step 1 of Test 2 Execution.

If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 1 of Test 2 Execution.

NOTE

If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

45. When range testing of unit type 68 (DS-1) or unit type 74 (RCG) is being performed using the busy out method, perform Steps 46 through 70 as appropriate.

46. Enter unit type 68 or unit type 74 (as appropriate) in Field 2 and depress **ENTER**.

47. Depress **NEXT CIRCUIT**.

    The first DS-1 or RCG circuit pack (as appropriate) in the first module is displayed in Fields 3 through 6.

    NOTE

    Field 7 (circuit) is dashed for a DS-1 or RCG circuit pack.

48. Determine the type of range testing to be performed for unit type 68 (DS-1) or unit type 74 (RCG).

    If all DS-1 or RCG circuit packs are to be tested, proceed to Step 49.

    If all DS-1 or RCG circuit packs in a module are to be tested, proceed to Step 53.

    If all DS-or RCG circuit packs in a cabinet are to be tested, proceed to Step 58.

    If all DS-1 or RCG circuit packs in a carrier are to be tested, proceed to Step 63.

    If a DS-1 or RCG circuit pack in a particular slot is to be tested, proceed to Step 68.

49. If all DS-1 or RCG circuit packs are to be tested, perform Steps 39 through 44 above to busy out the DS-1 or RCG circuit pack displayed in Fields 3 through 6.

50. Depress **NEXT CIRCUIT** to display the next DS-1 or RCG circuit pack.

    NOTE

    When all DS-1 or RCG circuit packs are displayed, Fields 3 through 7 are dashed.

51. If Fields 3 through 7 are not dashed, repeat Steps 49 through 51.

    If Fields 3 through 7 are dashed, proceed to Step 52.

52. Depress **CHANGE FIELD; 3; ENTER**.

    Test 2 starts with the first module, first cabinet and carrier, and runs until all unit type 68 or unit type 74 circuit packs (as appropriate) are tested.

    Proceed to Step 1 of Test 2 execution.

53. Determine if the module displayed in Field 3 is the module to be tested.

    If the module displayed in Field 3 is to be tested, proceed to Step 54.

    If the module displayed in Field 3 is not to be tested, depress **NEXT CIRCUIT** until the module to be tested is displayed in Field 3, then proceed to Step 54.

54. Perform Steps 39 through 44 above to busy out the DS-1 or RCG circuit pack in the module to be tested.

55. Depress **NEXT CIRCUIT** to display the next DS-1 or RCG circuit pack.

NOTE

When all DS-1 or RCG circuit packs are displayed, Fields 3 through 7 are dashed.

56. Determine if the module being tested is still displayed in Field 3.

    If the same module is displayed, repeat Steps 54 through 56.

    If the same module is not displayed, proceed to Step 57.

57. Depress **CHANGE FIELD; 4; ENTER**.

    Test 2 starts with the first DS-1 or RCG circuit pack in the module selected and runs until all unit type 68 or unit type 74 circuit packs (as appropriate) in the module are tested.

    Proceed to Step 1 of Test 2 execution.

58. Determine if the module and cabinet displayed in Fields 3 and 4 is the module and cabinet to be tested.

    If the module and cabinet displayed in Fields 3 and 4 is to be tested, proceed to Step 59.

    If the module and cabinet displayed in Fields 3 and 4 is not to be tested, depress **NEXT CIRCUIT** until the module and cabinet to be tested is displayed in Fields 3 and 4, then proceed to Step 59.

59. Perform Steps 39 through 44 above to busy out the DS-1 or RCG circuit pack in the module and cabinet to be tested.

60. Depress **NEXT CIRCUIT** to display the next DS-1 or RCG circuit pack.

NOTE

When all DS-1 or RCG circuit packs are displayed, Fields 3 through 7 are dashed.

61. Determine if the module and cabinet being tested is still displayed in Fields 3 and 4.

    If the same module and cabinet is displayed, repeat Steps 59 through 61.

    If the same module and cabinet is not displayed, proceed to Step 62.

62. Depress **CHANGE FIELD; 5; ENTER**.

    Test 2 starts with the first DS-1 or RCG circuit pack in the cabinet selected and runs until all unit type 68 or unit type 74 circuit packs (as appropriate) in the cabinet are tested.

    Proceed to Step 1 of Test 2 execution.

63. Determine if the module, cabinet, and carrier displayed in Fields 3 through 5 is the module, cabinet, and carrier to be tested.

    If the module, cabinet, and carrier displayed in Fields 3 through 5 is to be tested, proceed to Step 64.

    If the module, cabinet, and carrier displayed in Fields 3 through 5 is not to be tested, depress **NEXT CIRCUIT** until the module, cabinet, and carrier to be tested is displayed in Fields 3 through 5, then proceed to Step 64.

64. Perform Steps 39 through 44 above to busy out the DS-1 or RCG circuit pack in the module, cabinet, and carrier to be tested.

65. Depress **NEXT CIRCUIT** to display the next DS-1 or RCG circuit pack.

NOTE

When all DS-1 or RCG circuit packs are displayed, Fields 3 through 7 are dashed.

66. Determine if the module, cabinet, and carrier being tested is still displayed in Fields 3 through 5.

    If the same module, cabinet, and carrier is displayed, repeat Steps 64 through 66.

    If the same module, cabinet and carrier is not displayed, proceed to Step 67.

67. Depress **CHANGE FIELD; 6; ENTER**.

    Test 2 starts with the first DS-1 or RCG circuit pack in the carrier selected and runs until all unit type 68 or unit type 74 circuit packs (as appropriate) in the carrier are tested.

    Proceed to Step 1 of Test 2 execution.

68. Determine if the module, cabinet, carrier, and slot displayed in Fields 3 through 6 is the module, cabinet, carrier, and slot to be tested.

    If the module, cabinet, carrier, and slot displayed in Fields 3 through 6 is to be tested, proceed to Step 69.

    If the module, cabinet, carrier, and slot displayed in Fields 3 through 6 is not to be tested, depress **NEXT CIRCUIT** until the module, cabinet, carrier, and slot to be tested is displayed in Fields 3 through 6, then proceed to Step 69.

69. Perform Steps 39 through 44 above to busy out the DS-1 or RCG circuit pack in the module, cabinet, carrier, and slot to be tested.

70. Depress **CHANGE FIELD; 7; ENTER**.

    Proceed to Step 1 of Test 2 execution.

Test 2 Execution

1. To start Test 2 after selecting the circuit(s) to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. Test 2 operation and display of test results is different when a specific network circuit, a default equipment location, a DS-1 or RCG circuit pack is tested and when the entire switch or a range of circuits are tested.

3. For test operation and display of test results for a default equipment location, a specific network circuit, a DS-1 or RCG circuit pack proceed to Step 1 of Test 2 Execution and Test Result Display for a Single Circuit.

4. For test operation and display of test results for the entire switch or a range of circuits, proceed to Step 1 of Test 2 Execution and Test Result Display for a Range of Circuits.

Test 2 Execution and Test Result Display for a Single Circuit

1. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific network digital circuit cannot be tested.
2. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 2. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.
3. When special error code 83 (switch resources not available) is displayed, repeat Test 2 until the test is executed or wait until switch resources become available before testing.
4. If special error code 81 or 83 is not displayed, proceed to Step 5.

Test 2 Execution

1. To start Test 2 after selecting the circuit(s) to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.
2. Test 2 operation and display of test results is different when a specific network circuit, a default equipment location, a DS-1 or RCG circuit pack is tested and when the entire switch or a range of circuits are tested.
3. For test operation and display of test results for a default equipment location, a specific network circuit, a DS-1 or RCG circuit pack proceed to Step 1 of Test 2 Execution and Test Result Display for a Single Circuit.
4. For test operation and display of test results for the entire switch or a range of circuits, proceed to Step 1 of Test 2 Execution and Test Result Display for a Range of Circuits.

Test 2 Execution and Test Result Display for a Single Circuit

1. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific network digital circuit cannot be tested.
2. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 2. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.
3. When special error code 83 (switch resources not available) is displayed, repeat Test 2 until the test is executed or wait until switch resources become available before testing.
4. If special error code 81 or 83 is not displayed, proceed to Step 5.

5. When the test is completed for a default equipment location, a specific circuit, a DS-1 or RCG circuit pack the **WAIT** indicator goes off and the following is displayed:

   Field 1 - 2.

   Fields 2 through 7 - Unit type and equipment location of circuit tested.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Alarm status of displayed circuit.

   Field 10 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Fields 11 and 12 - Dashed.

   Field 13 - 1 (Indicating one circuit tested).

   Field 14 - 0 (Indicating no failures were found for the circuit tested) or 1 (Indicating that the circuit failed the test).

6. When a specific circuit, a default equipment location, a DS-1 or RCG circuit pack fails Test 2 (indicated by a 1 in Field 14), depressing **NEXT CIRCUIT** displays the index and specific fault code recorded for the circuit tested in Fields 11 and 12.

7. When the default equipment location, specific circuit, DS-1 or RCG circuit pack previously tested was busied out and the test passed, or the problem was corrected, the circuit, or circuit pack should be released from busy using **RLS BUSY OUT**.

8. When another specific circuit is to be tested, the **CHANGE FIELD** sequence must be used to select the specific circuit:

   CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

9. **EXECUTE** must be depressed to test the specific circuit selected.

Test 2 Execution and Test Result Display for a Range of Circuits

1. When the entire switch or a range of circuits is being tested for digital network failures, the **WAIT** indicator is lighted and the following fields are incremented as a circuit is tested:

   Field 2 - Unit type of circuit being tested.

   Fields 3 through 7 - Equipment location of circuit being tested.

   NOTE

   When a range of circuits for a particular unit type is being tested and the unit type contains only one circuit pack, the display in Fields 2 through 7 may not be changing.

   Field 11 - Index (if any).

   Field 12 - Specific fault code (if any).

   Field 13 - Number of circuits tested.

   Field 14 - Number of circuits failed (if any).

2. The failure information returned in Test 2 is stored in the Demand Maintenance Information Data Structure (DMIDS).

   If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator goes off.

   The last equipment location tested is displayed in Fields 2 through 7, and special error code 84 (DMIDS overflow) is displayed in the **MAAP** error code field.

3. Results of the test can be examined at this time (See Steps 14 through 21 below) and Test 2 can be continued from where it was stopped, i.e., from the equipment location displayed in Fields 3 through 7.

CAUTION

If Test 2 is continued from where it was stopped by a DMIDS overflow, any test results gathered to that point are lost and only new failure data is retained.

NOTE

Before depressing **EXECUTE** to continue Test 2 from where it was stopped because of a DMIDS overflow, the failure data should be examined and recorded.

4. If the test is halted because of a DMIDS overflow, a new range of circuits to be tested can be entered instead of continuing Test 2 from where it was stopped.

   The **CHANGE FIELD** sequence must be used to enter the new range of circuits to be tested.

   Refer to Steps 5 through 17 of Test 2 Data Entry above to select a range of digital network circuits to be tested in a module, cabinet, carrier, or slot.

   Refer to Steps 20 through 31 of Test 2 Data Entry above to select a range of digital network circuits within a unit type to be tested in a module, cabinet, carrier, or slot.

   Refer to Steps 45 through 70 (as appropriate) of Test 2 Data Entry above to select a range of unit type 68 (DS-1) or unit type 74 (RCG) circuit packs to be tested in a module, cabinet, carrier, or slot using the busy out method for Release 2, Version 3 **tape issue 1.0**.

5. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits entered or from where Test 2 was stopped.

6. When more than one circuit is being tested and the test of the circuit cannot be completed because switch resources are not available, special error code 83 (switch resources not available) is displayed in the **MAAP** error code field.

   A fault code indicating resources were not available is stored in DMIDS and the next circuit is tested.

7. When a range of circuits is being tested and a circuit is encountered which is being used by call processing, the **IN USE** indicator on the **MAAP** is lighted momentarily when the display is updated and the in-use circuit is stored for a later retry.

NOTE

The **IN USE** indicator on the **MAAP** is also lighted momentarily when a DS-1 or RCG circuit pack is being tested and one of the circuits is in-use.

8. When the range of circuits specified is tested once, the stored in-use circuit locations are tried again following the same testing sequence as the first pass through the range of circuits.

The in-use list may be reduced to a few circuits or circuit packs which remain in-use by call processing. This condition can be recognized by the **IN USE** indicator on the **MAAP** remaining lighted and the display fields not changing or changing very slowly.

The test of in-use circuits or circuit packs continues until all circuits or circuit packs in the range specified are tested or until maintenance personnel halt Test 2 by depressing **STOP**.

9. When Test 2 is halted by depressing **STOP** and in-use circuits still exist, the list of in-use circuits or circuit packs are merged into the failed circuits list and the circuits or circuit packs are marked with a specific fault code of 13 indicating they were in-use.

   The **WAIT** indicator goes off and the results of the test can be examined at this time. (See Steps 14 through 21 below.)

10. **STOP** can be depressed when the entire switch or a range of circuits is being tested.

    If Test 2 is stopped before one complete testing pass through the range of circuits specified is made, the total number of circuits tested and the total number of circuits failed are displayed in Fields 13 and 14.

    The last equipment location tested is displayed in Fields 3 through 7 and special error code 82 (test of range not completed) is displayed in the **MAAP** error code field.

11. When Test 2 is halted by depressing **STOP** before the range of circuits is tested at least once, the in-use circuit list (if any) is merged into the failure list.

    When Test 2 is continued, the in-use circuit list is added to as necessary and the circuits are retried as described in Step 8.

12. Test result information can be stepped through (as described in Steps 14 through 21 below) when Test 2 is halted using **STOP** even though the entire range is not tested.

13. To restart the test when Test 2 is halted by use of **STOP** before the range of circuits is tested at least once, **EXECUTE** is depressed and Test 2 starts at the equipment location following the last equipment location tested.

    Test results gathered after restarting Test 2 are added to the test results previously stored in DMIDS.

14. When the entire switch or a range of circuits is tested, the **WAIT** indicator goes off and a summary is displayed.

15. If no digital network circuits failed, the following summary is displayed.

    Field 1 - 2.

    Fields 2 through 6 - Equipment location of the range of circuits tested.

    Field 13 - Number of circuits tested.

    Field 14 - 0 (Indicating no failures).

16. If any digital network circuits failed, the summary displays a 2 in Field 1, the equipment location of the range of circuits tested in Fields 2 through 6, the total number of circuits tested in Field 13, and the total number of failures in Field 14.

17. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

    Field 1 - 2.

    Field 2 - Unit type of failed circuit.

Fields 3 through 7 - Equipment location of failed circuit.

Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

Field 9 - Alarm status of failed circuit.

Field 10 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 11 - Index (1).

Field 12 - Specific fault code.

Field 13 - Number of circuits tested.

Field 14 - Number of circuits failed.

18. When one-way incoming and one-way outgoing auxiliary trunks (unit type 45) are tested during range testing they **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

19. When individual circuits, DS-1 or RCG circuit packs are tested without being busied out and they are in-use at the time the test is attempted, they will fail with a specific fault code of 13 indicating they were in-use at the time of the test and were not tested.

20. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing digital network circuits.

    When more than one unit type is tested, depressing **NEXT UNIT** causes the first circuit of the next unit type with failures to be displayed.

    Field 14 decrements, corresponding to the number of failures passed over (if any), when stepping from unit to unit.

    NEXT CIRCUIT is used to step through the failures of the displayed unit type.

21. When all failing circuits are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 14.

    Depressing **NEXT CIRCUIT** or **NEXT UNIT** once more causes the summary to be displayed, and the failing circuits can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

22. When DS-1 or RCG circuit packs previously tested were busied out and the test passed, or the problem was corrected, the DS-1 or RCG circuit packs should be released from busy using **RLS BUSY OUT**.

23. To select another range of digital network circuits to test, the **CHANGE FIELD** sequence must be used.

    Refer to Steps 5 through 17 of Test 2 Data Entry above to select a range of digital network circuits to be tested in a module, cabinet, carrier, or slot.

    Refer to Steps 20 through 31 of Test 2 Data Entry above to select a range of digital network circuits within a unit type to be tested in a module, cabinet, carrier, or slot.

    Refer to Steps 45 through 70 (as appropriate) of Test 2 Data Entry above to select a range of unit type 68 (DS-1) or unit type 74 (RCG) circuit packs to be tested in a module, cabinet, carrier, or slot using the busy out method for Release 2, Version 3 **tape issue 1.0**.

24. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits selected.

25. The **NETWORK SWITCH** and/or **PORT** fault indicator(s) automatically goes off when Test 2 completes with no failures detected for all network digital circuits that raised an alarm.

    NOTE

    Network circuit alarmed entries in PMIDS are marked as resolved.

26. The **MAJOR** and/or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Test 3

Overview Test 3 is used to test one or more circuits in the digital network in a continuous cycle.

Test 3 is mainly used when an intermittent fault is suspected, when using test equipment to further isolate a problem, or to trace wiring problems.

Circuits can be selected for testing by unit type, a range of equipment locations, or on a single circuit basis.

Test 3 Data Entry

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. When Test 3 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

   The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 9, 10, and 12.

   Field 2 (unit type) is blinking, indicating an optional entry field.

3. Normally, a specific digital network circuit or the default equipment location is tested in Test 3. However, circuit selection for testing in Test 3 is identical to Test 2.

   All digital network circuits, a range of circuits, all circuits within a unit type, a combination of unit type and range (i.e., all circuit locations of a unit type in the range specified), a specific digital network circuit, or the default equipment location can be tested continuously in Test 3.

4. When unit type 27 (GPP) is selected during range testing, all translated peripherals should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

   NOTE

   Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when peripherals are disconnected or do not have power on when required.

   Proceed to Step 10.

5. When attendant console interface circuits (unit type 44) are selected during range testing, the associated headset(s) or handset(s) **must** be unplugged or the circuits fail.

   Proceed to Step 10.

6. When unit type 45 (auxiliary trunks) is selected during range testing, one-way incoming and one-way outgoing auxiliary trunks **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

   Proceed to Step 10.

7. Unit type 68 (DS-1) and unit type 74 (RCG) can be selected for range testing in two ways.

   NOTE

   For Release 2, Version 3 **tape issue 1.1 or later**, any unit type 68 or unit type 74 circuit packs not busied out and **in use** can be tested in Test 3 without busying out the unit type 68 (DS-1) or unit type 74 (RCG) circuit packs as the test executed is **not** service affecting.

8. To range test unit type 68 (DS-1) and unit type 74 (RCG) without busying out the circuit packs to be tested, proceed to Step 10.

   NOTE

   Any unit type 68 or unit type 74 circuit packs not busied out and **in use** for Release 2, Version 3 **tape issue 1.0** are not tested until the entire circuit pack is **not in use**.

9. To range test unit type 68 (DS-1) and unit type 74 (RCG) by busying out all circuit packs to be tested, refer to Test 2 Data Entry, Step 45.

10. When all circuits in the switch are to be tested continuously, refer to Test 2 Data Entry, Step 11 for circuit selection.

    To select all circuits in a specific module to be tested continuously, refer to Test 2 Data Entry, Step 14.

    To select all circuits in a specific cabinet to be tested continuously, refer to Test 2 Data Entry, Step 15.

    To select all circuits in a specific carrier to be tested continuously, refer to Test 2 Data Entry, Step 16.

    To select all circuits in a specific slot to be tested continuously, refer to Test 2 Data Entry, Step 17.

    Proceed to Step 1 of Test 3 Execution.

11. When all circuits in a unit type are to be tested continuously, refer to Test 2 Data Entry, Steps 18 through 26 for unit type selection.

    To select all circuits of a unit type in a specific module to be tested continuously, refer to Test 2 Data Entry, Step 28.

    To select all circuits of a unit type in a specific cabinet to be tested continuously, refer to Test 2 Data Entry, Step 29.

    To select all circuits of a unit type in a specific carrier to be tested continuously, refer to Test 2 Data Entry, Step 30.

To select all circuits of a unit type in a a specific slot to be tested continuously, refer to Test 2 Data Entry, Step 31.

To select all circuit packs of unit type 68 (DS-1) or unit type 74 (RCG) to be tested continuously in a module, cabinet, carrier, or slot for Release 2, Version 3 **tape issue 1.0** using the busy out method, refer to Test 2 Data Entry, Steps 45 through 70 as appropriate.

Proceed to Step 1 of Test 3 Execution.

12. A specific network circuit can be selected for testing by entering the unit type (optional) and equipment location in Fields 2 through 7 whether or not a default equipment location is displayed:

    (Unit type of circuit to be tested); ENTER; **(Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

    Proceed to Step 19.

13. When a specific circuit in unit type 27 (GPP) is selected for testing, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

    NOTE

    Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

    Proceed to Step 19.

14. When a specific circuit in unit type 44 (attendant console interface) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails. ohm termination reflection possibly caused by an open transmission option switch).

    Proceed to Step 19.

15. When a specific circuit in unit type 45 (auxiliary trunks) is selected for testing, one-way incoming and one-way outgoing auxiliary trunks **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

    Proceed to Step 19.

16. The unit type field is an optional input field to test a specific network circuit.

    If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

17. A specific network circuit can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

    Depress **NEXT UNIT** until the unit type of the circuit to be tested is displayed in Field 2.

    Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 3 through 7.

    Proceed to Step 19.

18. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 19.

19. When a specific network circuit, default equipment location, DS-1 or RCG circuit pack is to be tested, check the circuit status in Field 10.

NOTE

For Release 2, Version 3 **tape issue 1.1 or later**, individual DS-1 or RCG circuit packs do not have to be busied out as testing of DS-1 or RCG circuit packs is non-destructive in Test 3 (i.e., does not affect customer calls).

20. If Field 10 equals 1 (on-line and in-use) Test 3 cannot be performed for port circuits without busying them out. Wait until the circuit is not in-use or perform tests on other circuits.

NOTE

Port circuits that cannot be tested while in-use without being busied out are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 21.

IF Field 10 does not equal 4, proceed to Step 22.

21. If Test 3 is being performed remotely, proceed to Step 22.

If Test 3 is being run locally (or with maintenance personnel on the customer's premises or at the remote carrier group), determine if the circuit pack being tested is plugged in.

If the circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 22.

If the circuit pack is firmly seated, proceed to Step 22.

22. Individual port circuits, DS-1 or RCG circuit packs can be placed in maintenance busy out status for testing by checking the circuit status in Field 10.

CAUTION

Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out a DS-1 or RCG circuit pack disrupts calls in progress on all 24 ports of the DS-1 or RCG circuit pack.

23. If Field 10 equals 1 individual port circuits should not be busied out as they are on-line and in-use. Busying out in-use port circuits and performing tests results in loss of calls or data.

NOTE

Port circuits that should not be busied out while in-use are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

24. If the circuit status = 3, proceed to Step 1 of Test 3 Execution.

If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 1 of Test 3 Execution.

NOTE

If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

Test 3 Execution

1. To start Test 3 after selecting the circuit(s) to be tested, depress **EXECUTE**.

   The **WAIT** indicator is not lighted during Test 3 execution.

2. When an in-use circuit or circuit pack is encountered during Test 3 execution (for a range of circuits, a circuit pack, or for a single circuit) the **IN USE** indicator is lighted on the **MAAP** momentarily and the circuit or circuit pack is passed over for that iteration of the test.

   The in-use circuit or circuit pack is not stored for a later retry as Test 3 is executed continuously, testing all circuits or circuit packs specified in physical order.

   Circuits or circuit packs that are in-use are not merged into the failed circuits list when Test 3 is stopped.

3. When no switch resources are available to test a circuit during execution of Test 3, special error code 83 (switch resources not available) is displayed in the **MAAP** error code field.

   If a single circuit is being tested, a fault code indicating no resources were available is stored in DMIDS and the single circuit is tested again.

   If more than one circuit is being tested, a fault code indicating no resources were available is stored in DMIDS and the next circuit is tested.

4. If the DMIDS storage buffer becomes full either during testing of a range of circuits or a single circuit, special error code 84 (DMIDS overflow) is displayed in the **MAAP** error code field.

   NOTE

   Testing is not stopped when the DMIDS buffer becomes full.

5. When multiple circuits are being tested new errors found are discarded. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed. (See Steps 1 through 9 of Test 3 Result Display for a Range of Circuits below).

6. When testing a single circuit new errors found are added to the failure list and the oldest errors are deleted. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed. (See Steps 5 through 11 of Test 3 Result Display for a Single Circuit below.)

   NOTE

   Only 40 errors are displayed when the DMIDS buffer becomes full. When multiple circuits are being tested the 40 errors are the oldest errors recorded. When a single circuit is tested the 40 errors are the newest errors recorded.

7. When a default equipment location, a specific circuit, a DS-1 or RCG circuit pack is being tested continuously in Test 3, Field 12 is dashed for 3 seconds and blanked for 3 seconds.

8. When the entire switch or a range of circuits is being tested continuously in Test 3, the following fields are incremented as a circuit is tested:

   Field 2 - Unit type of circuit being tested.

   Fields 3 through 7 - Equipment location of circuit being tested.

   NOTE

   When a range of circuits for a particular unit type is being tested and the unit type contains only one circuit pack, the display in Fields 2 through 7 may not be changing.

   Field 11 - Index (if any).

   Field 12 - Specific fault code (if any) for circuit displayed.

   NOTE

   While testing of a circuit displayed in Fields 2 through 7 is being conducted, Field 12 will be dashed for 3 seconds and blanked for 3 seconds.

9. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.
10. Display of test results is different when a specific network circuit, a default equipment location, a DS-1 or RCG circuit pack is tested and when the entire switch or a range of circuits are tested.
11. For display of test results when testing a default equipment location, a specific network circuit, a DS-1 or RCG circuit pack proceed to Step 1 of Test 3 Result Display for a Single Circuit.
12. For display of test results when testing the entire switch or a range of circuits, proceed to Step 1 of Test 3 Result Display for a Range of Circuits.

Test 3 Result Display for a Single Circuit

1. Special error codes 81 or 83 may be displayed in the **MAAP** error code field when the default equipment location or the specific network digital circuit cannot be tested.
2. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 3. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.
3. When special error code 83 (switch resources not available) is displayed, repeat Test 3 until the test is executed or wait until switch resources become available before testing.
4. If special error code 81 or 83 is not displayed, proceed to Step 5.

5. When Test 3 is stopped while testing a default equipment location, a specific circuit, a DS-1 or RCG circuit pack the following is displayed:

   Field 1 - 3.

   Field 2 - Unit type of displayed circuit.

   Fields 3 through 7 - Equipment location of circuit tested.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Alarm status of displayed circuit.

   Field 10 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Fields 11 and 12 - Dashed.

   Field 13 - Number of times the circuit was tested.

   Field 14 - 0 (Indicating no failures were found for the circuit tested) or number of fault information lists for the failing circuit.

6. When a specific circuit, a default equipment location, a DS-1 or RCG circuit pack failed Test 3 (indicated by Field 14), depressing **NEXT CIRCUIT** displays the index and the specific fault code for the circuit tested in Fields 11 and 12.

7. When more than one fault information list is recorded for a single circuit location that is tested, indicated by Field 14 displaying more than 1 (which is an index to fault information lists when testing single circuits), **NEXT FAULT** is depressed to step to the next fault information list.

   NOTE

   When **NEXT FAULT** is depressed, Fields 2 through 14 may be dashed. This indicates that all remaining fault information lists contained the same type of data.

   Dashing of Fields 2 through 14 can happen at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 14 before **NEXT FAULT** was depressed.

8. Depressing **NEXT FAULT** may display a different specific fault code in Field 12 when a new fault information list exists.

9. **NEXT FAULT** is depressed once more to determine if other fault information lists exist for the circuit tested.

   When no new fault information lists exist, Fields 2 through 14 are dashed when **NEXT FAULT** is depressed.

10. Depressing **NEXT FAULT** again displays the summary (Fields 11 and 12 are dashed).

11. When the default equipment location, specific circuit, DS-1 or RCG circuit pack previously tested was busied out and the test passed, or the problem was corrected, the circuit or circuit pack should be released from busy using **RLS BUSY OUT**.

12. When another specific circuit is to be continuously tested, the **CHANGE FIELD** sequence must be used to select the specific circuit:

    CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

13. **EXECUTE** must be depressed to test the specific circuit selected.

Test 3 Result Display for a Range of Circuits

1. When Test 3 is stopped while testing the entire switch or a range of circuits, a summary is displayed.
2. If no digital network circuits failed, the following summary is displayed:

   Field 1 - 3.

   Fields 2 through 6 - Equipment location of the range of circuits tested.

   Field 13 - Number of circuits tested.

   Field 14 - 0 (Indicating no failures).

3. If any digital network circuits failed, the summary displays a 3 in Field 1, the equipment location of the range of circuits tested in Fields 2 through 6, the total number of circuits tested in Field 13, and the total number of circuits failed in Field 14.

Test 3 Result Display for a Range of Circuits

1. When Test 3 is stopped while testing the entire switch or a range of circuits, a summary is displayed.
2. If no digital network circuits failed, the following summary is displayed:

   Field 1 - 3.

   Fields 2 through 6 - Equipment location of the range of circuits tested.

   Field 13 - Number of circuits tested.

   Field 14 - 0 (Indicating no failures).

3. If any digital network circuits failed, the summary displays a 3 in Field 1, the equipment location of the range of circuits tested in Fields 2 through 6, the total number of circuits tested in Field 13, and the total number of circuits failed in Field 14.

4. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

   Field 1 - 3.

   Field 2 - Unit type of failed circuit.

   Fields 3 through 7 - Equipment location of failed circuit.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Alarm status of failed circuit.

   Field 10 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Field 11 - Index (1).

   Field 12 - Specific fault code.

   Field 13 - Number of circuits tested.

   Field 14 - Number of circuits failed.

   NOTE

   Only one fault information list exists for each failing circuit when multiple circuits are tested.

5. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing digital network circuits.
6. When more than one unit type is tested, depressing **NEXT UNIT** causes the first circuit of the next unit type with failures to be displayed.
7. When **NEXT UNIT** is used to step from unit to unit, without examining the circuits within the unit, Field 14 is decremented by the number of failures passed over (if any).

   NEXT CIRCUIT is used to step through the failures of the displayed unit type.
8. When all failing circuits are displayed, depressing **NEXT CIRCUIT** dashes Fields 2 through 14.

   Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing circuits can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.
9. When DS-1 or RCG circuit packs previously tested were busied out and the test passed, or the problem was corrected, the DS-1 or RCG circuit packs should be released from busy using **RLS BUSY OUT**.
10. Test 3 can be restarted without changing the equipment location originally entered for testing by depressing **EXECUTE**.

    The same equipment location or range of circuits is used as the basis for the new execution of Test 3.

    Any data gathered in the last execution of Test 3 is lost when **EXECUTE** is depressed.
11. To select another range of digital network circuits to be continuously tested, the **CHANGE FIELD** sequence must be used.

    Refer to Steps 5 through 17 of Test 2 Data Entry to select a range of digital network circuits to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 20 through 31 of Test 2 Data Entry to select a range of digital network circuits within a unit type to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 45 through 70 (as appropriate) of Test 2 Data Entry to select a range of unit type 68 (DS-1) or unit type 74 (RCG) circuit packs to be tested in a module, cabinet, carrier, or slot using the busy out method for Release 2, Version 3 **tape issue 1.0**.

12. **EXECUTE** must be depressed to begin Test 3 from the new range of circuits selected.

Test 4

Overview Test 4 provides a diagnostic analysis on a single circuit or circuit pack, beginning with the specific equipment location of the circuit or circuit pack, to determine where a fault actually is located in the digital network.

Test 4 automatically runs a verification test on any circuit pack that is reseated or replaced (without any **MAAP** operations by maintenance personnel) to ensure that the problem is corrected.

Verification tests are destructive tests in that they automatically busy out all circuits on a port circuit pack (except DS-1 or RCG port circuit packs). After the port circuit pack is tested, all circuits on the port circuit pack are released from busy by the verification test whether or not the circuits had been previously busied out by other software routines.

Test 4 provides alternate circuit pack replacements (if any) when the first circuit pack replaced does not correct the problem.

When alternate circuit packs are replaced, Test 4 runs a verification test on the alternate circuit pack. If the alternate circuit pack passes the test, the first circuit pack replaced is also verified to be sure that it now passes, and the original failing test is executed to ensure that the problem is corrected.

Test 4 provides visual feedback to maintenance personnel on whether a problem is corrected by the use of **RED** and **GREEN** LEDs on the faceplate of the circuit pack that was reseated or replaced.

Test 4 Data Entry

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

   The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 9, 10, and 12.

   Field 2 (unit type) is blinking, indicating an optional entry field.

3. Either the default equipment location can be tested, or another digital network circuit can be selected for testing.

   CAUTION

   Diagnosis of specific fault codes 607, 612, 630, or 638 displayed in Field 12 against unit type 57 (light guide interface) may affect service for approximately the last 6 seconds of Test 4 when unit type 57 is tested.

   NOTE

   A normal passing test for unit type 57 lasts approximately 2 to 3 minutes.

4. A specific digital network circuit can be selected for testing by entering the equipment location and unit type (optional) in Fields 2 through 7 whether or not a default equipment location is displayed:

   (Unit type of circuit to be tested); ENTER; **(Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

   NOTE

   No entry is required for the circuit number field if there are no circuits on the circuit pack.

   Proceed to Step 8.

5. The unit type field is an optional input field to test a specific network circuit.

   If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

6. A specific network circuit can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

   Depress **NEXT UNIT** until the unit type of the circuit to be tested is displayed in Field 2.

   Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 3 through 7.

   Proceed to Step 8.

7. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 8.

8. When a specific circuit in unit type 27 (GPP) is selected for testing, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

   NOTE

   Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

   Proceed to Step 13.

9. When an attendant console interface circuit (unit type 44) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails the diagnostic test.

   Proceed to Step 13.

10. When a 1-way incoming or 1-way outgoing auxiliary trunk circuit (unit type 45) is selected for testing the option settings **must** be set for 2-way transmission or the circuit fails the diagnostic test.

11. To test an auxiliary trunk circuit, perform the following:

    Remove the auxiliary trunk circuit pack (SN231) and check the option settings on the circuit to be tested.

    If the auxiliary trunk circuit is 2-way transmission (option Q - switches 2 and 3 in the up position), proceed to Step 13.

    If the auxiliary trunk circuit is a 1-way incoming (option S - switch 2 up and switch 3 down) or a 1-way outgoing (option R - switch 2 down and switch 3 up) record the switch settings and set both switches (2 and 3) to the up position, then proceed to Step 13.

    NOTE

    After the test has passed (corrective action taken if necessary), ensure the switch settings are correctly positioned (recorded above) for the type of transmission required (1-way incoming or 1-way outgoing) on the auxiliary trunk circuit tested.

12. A specific circuit in unit type 68 (DS-1) and unit type 74 (RCG) can be selected for testing in two ways.

    To test unit type 68 (DS-1) and unit type 74 (RCG) circuits without manually busying out the circuit pack to be tested, proceed to Step 1 of Test 4 Execution. Test 4 automatically busies out circuits on unit type 68 (DS-1) and unit type 74 (RCG) circuit packs if the circuits are not in use.

    NOTE

    Any unit type 68 or unit type 74 circuit pack not busied out and **in use** is not tested. Test 4 returns specific fault code 13 (circuit in use) for any unit type 68 or unit type 74 circuit that is not busied out and in use when the test is attempted.

    To test unit type 68 (DS-1) and unit type 74 (RCG) circuits by busying out the circuit pack to be tested, proceed to Step 13.

13. When a specific network circuit, default equipment location, DS-1 or RCG circuit pack is to be tested, check the circuit status in Field 10.

14. If Field 10 equals 1 (on-line and in-use) Test 4 cannot be performed for port circuits without busying them out. Wait until the circuit is not in-use or perform tests on other circuits.

    NOTE

    Port circuits that cannot be tested while in-use without being busied out are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

15. If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 16.

    If Field 10 does not equal 4, proceed to Step 17.

16. If Test 4 is being performed remotely, proceed to Step 17.

    If Test 4 is being run locally (or with maintenance personnel on the customer's premises or at the remote carrier group), determine if the circuit pack being tested is plugged in.

    If the circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 17.

    If the circuit pack is firmly seated, proceed to Step 17.

17. Individual port circuits, DS-1 or RCG circuit packs can be placed in maintenance busy out status for testing by checking the circuit status in Field 10.

CAUTION

Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out a DS-1 or RCG circuit pack disrupts calls in progress on all 24 ports of the DS-1 or RCG circuit pack.

18. If Field 10 equals 1 individual port circuits should not be busied out as they are on-line and in-use. Busying out in-use port circuits and performing tests results in loss of calls or data.

NOTE

Port circuits that should not be busied out while in-use are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

19. If the circuit status = 3, proceed to Step 1 of Test 4 Execution.

    If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 1 of Test 4 Execution.

NOTE

If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

Test 4 Execution

1. To start Test 4 after selecting the circuit to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific network digital circuit cannot be tested.

3. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.

4. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.

5. If special error code 81 or 83 is not displayed, proceed to Step 6.

6. During execution of Test 4, Fields 2 through 7 display the unit type and equipment location of the circuit being tested. Field 1 displays a 4, and all other fields are dashed.

7. If **STOP** is depressed while Test 4 is executing, the test is returned to its configuration just before **EXECUTE** was depressed, i.e.: circuit selected for testing is displayed in Fields 2 through 7.

   Any data gathered during testing prior to **STOP** being depressed is lost.

Test 4 Result Display

1. When Test 4 is completed for a default equipment location, a specific circuit, a DS-1 or RCG circuit pack the **WAIT** indicator goes off.

2. When the specific circuit, default equipment, DS-1 or RCG circuit pack passes Test 4, the following is displayed:

   Field 1 - 4.

   Field 2 - Unit type of circuit tested.

   Fields 3 through 7 - Equipment location of circuit tested.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Alarm status of circuit tested.

   Field 10 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Fields 11 through 14 - Dashed.

   NOTE

   The **GREEN** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack passed Test 4.

3. When the specific circuit, default equipment location, DS-1 or RCG circuit pack fails Test 4, the following is displayed:

   Field 1 - 4.

   Field 2 - Unit type of failing circuit pack.

   Fields 3 through 7 - Equipment location of failing circuit pack.

   NOTE

   The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. The diagnostic analysis may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Alarm status of failing circuit.

   Field 10 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Field 11 - Index (1).

   Field 12 - Specific fault code.

   Fields 13 and 14 - Dashed.

   NOTE

   The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 4.

4. When Test 4 is performing the diagnostic test upon depressing **EXECUTE** only one fault information list is recorded.

   NOTE

   Depressing **NEXT FAULT** displays special error code 00 (key not allowed at this time) in the **MAAP** error code field.

5. When a circuit pack is reseated or replaced an automatic verification test is performed.
6. If the DMIDS storage buffer becomes full during the verification test, special error code 84, (DMIDS overflow) is displayed in the **MAAP** error code field.

   NOTE

   Testing is not stopped when the DMIDS buffer becomes full.

   New errors found are added to the failure list, and the oldest errors are deleted.

   NOTE

   Only 40 errors are displayed when the DMIDS buffer becomes full.

7. During the verification test more than one fault information list may be recorded (if the circuit pack fails the verification test) for the circuit pack being tested (indicated by Field 14 displaying more than 1).

   NOTE

   The circuit (displayed in Field 7) on the circuit pack being tested may **not** be the circuit failing the verification test.

8. Depressing **NEXT FAULT** steps to the next fault information list.

   NOTE

   When **NEXT FAULT** is depressed, Fields 2 through 14 may be dashed. This indicates that all remaining fault information lists contained the same type of data.

9. Dashing of Fields 2 through 14 can happen at any time when **NEXT FAULT** is depressed no matter what number was displayed in Field 14 before **NEXT FAULT** was depressed.
10. Depressing **NEXT FAULT** may display a different specific fault code in Field 12 when a new fault information list exists.

    NEXT FAULT is depressed once more to determine if other fault information lists exist for the circuit tested.

    When no new fault information lists exist, Fields 2 through 14 are dashed when **NEXT FAULT** is depressed.

    Depressing **NEXT FAULT** again displays the original fault information list.

11. Depressing **NEXT CIRCUIT** displays an alternate circuit pack (if any) to be replaced.

    The **RED** LED on the original circuit pack goes off and the **RED** LED on the displayed circuit pack in Fields 2 through 6 is lighted.

12. Depressing **NEXT CIRCUIT** again displays the last alternate circuit pack (if any) to be replaced.

    The **RED** LED on the first alternate circuit pack goes off and the **RED** LED on the displayed circuit pack in Fields 2 through 6 is lighted.

13. When all alternate circuit packs are displayed, depressing **NEXT CIRCUIT** once more dashes Fields 2 through 14.

    Depressing **NEXT CIRCUIT** again displays the first circuit pack in the replacement sequence.

14. When the default equipment location, specific circuit, DS-1 or RCG circuit pack previously tested was busied out and the test passed, or the problem was corrected, and the circuit status in Field 10 = 3 the circuit should be released from busy using **RLS BUSY OUT**.

15. When another specific circuit is to be tested, the **CHANGE FIELD** sequence must be used to select the specific circuit:

    CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

    NOTE

    No entry is required for the circuit number field if there are no circuits on the circuit pack.

16. **EXECUTE** must be depressed to test the circuit selected.

17. The **NETWORK SWITCH** and/or **PORT** fault indicator goes off when Test 4 completes with no failures detected for all network digital circuits that raised an alarm.

    NOTE

    Network circuit alarmed entries in PMIDS are marked as resolved.

18. Test 4 must be repeated for each network digital circuit alarmed entry in **PROC 600** Test 1 or **PROC 620** Test 1 before the fault indicator can be turned off.

19. The **MAJOR** and/or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Test 5

Overview Test 5 runs a verification test sequence on a circuit pack, testing all circuits (if any). The verification sequence indicates the status of the circuit pack, i.e., the circuit pack passed, the circuit pack is good but that another circuit pack is faulty, or the circuit pack failed.

Verification tests are destructive tests in that they automatically busy out all circuits on a port circuit pack (except DS-1 and RCG port circuit packs). After the port circuit pack is tested, all circuits on the port circuit pack are released from busy by the verification test whether or not the circuits had been previously busied out by other software routines.

Test 5 provides visual feedback to maintenance personnel on whether a problem is corrected by the use of **RED** and **GREEN** LEDs on the faceplate of the circuit pack that is reseated or replaced.

Test 5 Data Entry

1. Test 5 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 5; ENTER.

2. When Test 5 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

3. The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 9, 10, and 12.

   Field 2 (unit type) is blinking, indicating an optional entry field.

4. Either the default equipment location can be tested, or another digital network circuit pack can be selected for testing.

5. A specific digital network circuit pack can be selected for testing by entering the equipment location and unit type (optional) in Fields 2 through 6 whether or not a default equipment location is displayed:

   (Unit type of circuit pack to be tested); ENTER; **(Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**.

   NOTE

   All circuits (if any) on a circuit pack are tested in Test 5.

   Proceed to Step 9.

6. The unit type field is an optional input field to test a specific network circuit pack.

   If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

7. A specific network circuit pack can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

   Depress **NEXT UNIT** until the unit type of the circuit pack to be tested is displayed in Field 2.

   Depress **NEXT CIRCUIT** until the circuit pack to be tested is displayed in Fields 3 through 6.

   NOTE

   All circuits (if any) on a circuit pack are tested in Test 5.

   Proceed to Step 9.

8. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 9.

9. When a specific circuit in unit type 27 (GPP) is selected for testing, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

   NOTE

   Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

   Proceed to Step 1 of Test 5 Execution.

10. When a specific circuit in unit type 44 (attendant console interface) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails.

    Proceed to Step 1 of Test 5 Execution.

11. When a specific auxiliary trunk circuit pack (unit type 45) is selected for testing the option settings **must** be set for 2-way transmission on **all** circuits or the circuit pack fails.

12. To test an auxiliary circuit pack, perform the following:

    Remove the auxiliary trunk circuit pack (SN231) and check the option settings on all four circuits.

    If the auxiliary trunk circuits are 2-way transmissions (option Q - switches 2 and 3 in the up position) proceed to Step 1 of Test 5 Execution.

    If any of the auxiliary trunk circuits are 1-way incoming (option S - switch 2 up and switch 3 down) or 1-way outgoing (option R - switch 2 down and switch 3 up) record the switch settings for each circuit and set the switches (2 and 3) to the up position for each circuit as required, then proceed to Step 1 of Test 5 Execution.

    NOTE

    After the test has passed (corrective action taken if necessary), ensure the switch settings for each circuit are correctly positioned (recorded above) for the type of transmission required (1-way incoming or 1-way outgoing) on the auxiliary trunk circuit pack tested.

    Proceed to Step 1 of Test 5 Execution.

13. When a DS-1 or RCG circuit pack is to be tested, check the circuit status in Field 10.

    If Field 10 equals 1 (on-line and in-use) Test 5 cannot be performed for DS-1 or RCG circuit packs without busying them out and **disrupting calls in progress on all 24 ports of the DS-1 or RCG circuit pack**. Wait unit the circuit pack is not in-use or perform tests on other circuit packs.

    If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 14.

    If Field 10 does not equal 4, proceed to Step 15.

14. If Test 5 is being performed remotely, proceed to Step 15.

    If Test 5 is being run locally (or with maintenance personnel on the customer's premises or at the remote carrier group), determine if the DS-1 or RCG circuit pack being tested is plugged in.

    If the DS-1 or RCG circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 15.

    If the DS-1 or RCG circuit pack is firmly seated, proceed to Step 15.

15. Individual DS-1 or RCG circuit packs can be placed in maintenance busy out status for testing by checking the circuit status in Field 10.

    CAUTION

    Busying out a DS-1 or RCG circuit pack disrupts calls in progress on all 24 ports of the DS-1 or RCG circuit pack.

16. If the circuit status = 3, proceed to Step 1 of Test 5 Execution.

    If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 1 of Test 5 Execution.

    NOTE

    If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

Test 5 Execution

CAUTION

All port circuits are automatically busied out when verification tests are performed. Established calls and data transmission for all port circuits on the port circuit pack being tested are aborted.

1. To start Test 5 after selecting the circuit pack to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific network digital circuit pack cannot be tested.

3. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 5. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.

4. When special error code 83 (switch resources not available) is displayed, repeat Test 5 until the test is executed or wait until switch resources become available before testing.

5. If special error code 81 or 83 is not displayed, proceed to Step 6.
6. During execution of Test 5, Field 12 (specific fault code) is updated with the latest value received from the test.
7. If **STOP** is depressed while Test 5 is executing, the test is returned to its configuration just before **EXECUTE** was depressed, i.e.: circuit or circuit pack selected for testing is displayed in Fields 2 through 7.

   Any data gathered during testing prior to **STOP** being depressed is lost.
8. If the DMIDS storage buffer becomes full, special error code 84 (DMIDS overflow), is displayed in the **MAAP** error code field.

NOTE

Testing is not stopped when the DMIDS buffer becomes full.

New errors found are added to the failure list, and the oldest errors are deleted.

NOTE

Only 40 errors can be displayed when the DMIDS buffer becomes full.

Test 5 Result Display

1. When Test 5 is completed for a default equipment location, a specific circuit pack, a DS-1 or RCG circuit pack the **WAIT** indicator goes off.
2. When the specific circuit pack, default equipment location, DS-1 or RCG circuit pack passes Test 5, the following is displayed:

   Field 1 - 5.

   Field 2 - Unit type of circuit pack tested.

   Fields 3 through 7 - Equipment location of circuit pack tested.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Dashed or alarm status of circuit tested.

   Field 10 - Dashed or current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Field 11 - Dashed.

   Field 12 - 0 (circuit pack passed the test) or 9999 (failure is detected on other than tested circuit pack).

   Fields 13 and 14 - Dashed.

NOTE

The **GREEN** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack passed Test 5.

3. When 9999 is displayed in Field 12 the circuit pack tested passed Test 5 and the **GREEN** LED is lighted on the circuit pack. However, a failure has been detected on another circuit pack that interfaces with the circuit pack tested.

   NOTE

   Test 4 should be executed on the circuit pack displaying 9999 to find the failing circuit pack that interfaces with the circuit pack tested.

   Field 11 (index) and Field 14 (fault list index) display dashes.

   Depressing **NEXT FAULT** displays a 1 in Field 11, the specific fault code in Field 12, and the number of fault information lists that are recorded in Field 14.

   Proceed to Step 5.

4. When the specific circuit pack, default equipment location, DS-1 or RCG circuit pack fails Test 5, the following is displayed:

   Field 1 - 5.

   Field 2 - Unit type of circuit pack tested.

   Fields 3 through 7 - Equipment location of circuit pack tested.

   NOTE

   The circuit (displayed in Field 7) on the circuit pack being tested may **not** be the circuit failing the verification test.

   Field 8 - Remote status of displayed circuit (dashed if non-port circuit; 0, 1, or 2 if port circuit).

   Field 9 - Dashed or alarm status of circuit tested.

   Field 10 - Dashed or current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

   Field 11 - Index (1).

   Field 12 - Specific fault code.

   Field 13 - Dashed.

   Field 14 - Index to the fault information lists recorded.

   NOTE

   The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 5.

5. When more than one fault information list is recorded, indicated by Field 14 displaying more than 1 (which is an index to fault information lists), **NEXT FAULT** is depressed to step to the next fault information list.

   NOTE

   When **NEXT FAULT** is depressed, Fields 2 through 14 may be dashed. This indicates that all remaining fault information lists contained the same type of data.

   Dashing of Fields 2 through 14 can happen at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 14 before **NEXT FAULT** was depressed.

6. Depressing **NEXT FAULT** may display a different specific fault code in Field 12 when a new fault information list exists.

   NEXT FAULT is depressed once more to determine if other fault information lists exist for the circuit tested.

   When no new fault information lists exist, Fields 2 through 14 are dashed when **NEXT FAULT** is depressed.

   Depressing **NEXT FAULT** again displays the original fault information list (last list recorded).

7. When a DS-1 or RCG circuit pack previously tested was busied out and the test passed, or the problem was corrected, the DS-1 or RCG circuit pack should be released from busy using **RLS BUSY OUT**.

8. When another specific circuit pack is to be tested, the **CHANGE FIELD** sequence must be used to select the specific circuit pack:

   CHANGE FIELD; 2; ENTER; (Unit type of circuit pack to be tested); ENTER; (Module number); ENTER; (Cabinet number); **ENTER; (Carrier number); ENTER; (Slot number); ENTER**.

9. **EXECUTE** must be depressed to test the circuit pack selected.

10. Test 5 must be repeated for each network digital circuit pack alarmed entry in **PROC 600** Test 1 or **PROC 620** Test 1 before the fault indicator can be turned off.

    All alarmed entries for a circuit pack do not have to be tested in Test 5 if the circuit pack passes Test 5. All alarmed entries for the circuit pack are resolved when the circuit pack passes Test 5.

11. The **NETWORK SWITCH** and/or **PORT** fault indicator goes off when Test 5 completes with no failures detected for all network digital circuits that raised an alarm.

    NOTE

    Network circuit alarmed entries in PMIDS are marked as resolved.

12. The **MAJOR** and/or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Repair Guide

Overview

When the **NETWORK SWITCH** and/or **PORT** and **MAJOR** and/or **MINOR** alarm indicators on the alarm panel are lighted (indicating a digital network failure) or when **PROC 620** is referenced from **PROC 600** (Alarm Causes/Error Log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

The starting point for isolation and repair of digital network circuit failures is Test 1 of **PROC 620**.

To isolate a digital network failure displayed in Test 1 of **PROC 620**, Test 4 of **PROC 620** is executed to determine where a fault actually is located in the digital network.

Test 4 of **PROC 620** performs a diagnostic analysis on the failing digital network circuit beginning at the specified circuit location.

If the circuit fails, other tests may be executed on the circuit pack and the paths leading into the circuit pack (i.e., data, I/O, maintenance interface, etc.) to determine if a fault lies inside the circuit pack or along one of the interface paths.

If the fault lies outside of the circuit pack, Test 4 continues testing until the fault is isolated. If the failure is found to be on another circuit pack than the one originally specified, this circuit pack is indicated as the failure.

Test 4 of **PROC 620** also provides alternate circuit pack replacements (if any).

The alternate circuit packs are replaced in order of decreasing probability until the possibilities (maximum of three - 2 alternate circuit packs) are replaced or the failure is corrected.

Isolation of Failure

1. Execute Test 1 of **PROC 620** to determine which digital network circuits are alarmed, indicated by a 1, 2, or 3 (major, minor, or warning) displayed in Field 9; the severity of the alarms; and the order in which the digital network unit types (functional areas) are displayed.

   Record the unit types, equipment locations, and the remote status of the failing digital network circuits displayed in Fields 2 through 8 of **PROC 620**, Test 1.

2. Determine from the failing digital network circuits recorded if a pattern exists that would assist in determining the type of corrective action required.

3. Isolation and repair steps for digital network circuit failures are detailed in:

   One digital network circuit failure.

   Digital network circuit failures in different unit types.

   Multiple digital network circuit failures in the same unit type.

Multi-module switch alarms with more than one unit type 13 (port data store) with specific fault code 70 and more than one unit type 53 (multiplexer) with specific fault code 611 failure caused by network test flag faults.

DS-1 (unit type 68) failures.

Remote carrier group (unit type 74) failures.

Remote module interface (unit type 71) failures.

Time Slot Interchanger (TSI) demand test (if applicable).

Special error code 88.

Special error code 90.

Specific fault codes.

One Digital Network Circuit Failure

Overview Assumption: Test 1 of **PROC 620** displays only one alarmed digital network circuit failure.

Fault Isolation

1. Display the failing circuit in Test 1 of **PROC 620**.
2. If the failing circuit is a DS-1 circuit pack (unit type 68) refer to isolation and repair step **DS-1 (unit type 68) Failures** for further diagnosis of the trouble.
3. If the failing circuit is a remote module interface (unit type 71), refer to isolation and repair step **Remote Module Interface (unit type 71) Failures** for further diagnosis of the trouble.
4. If the failing circuit is a RCG circuit pack (unit type 74), refer to isolation and repair step **Remote Carrier Group (unit type 74) Failures** for further diagnosis of the trouble.
5. If the failing circuit is not a unit type 68, unit type 71, or unit type 74 trouble, proceed to Step 6.
6. Enter **PROC 620**, Test 4.

NOTE

The alarmed circuit that was displayed in Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

7. Record the specific fault code displayed in Field 12 which was detected by on-line periodic software tests and logged in PMIDS.

CAUTION

Diagnosis of specific fault codes 607, 612, 630, or 638 displayed in Field 12 against unit type 57 (light guide interface) may affect service for approximately the last 6 seconds of Test 4 when unit type 57 is tested in an unduplicated TMS/network module complex.

NOTE

A normal passing test for unit type 57 lasts approximately 2 to 3 minutes.

8. If a unit type 27 (GPP), unit type 29 (line circuit), unit type 69 (MFAT), or unit type 72 (EIA) circuit is displayed in Fields 2 through 7, determine the remote status of the circuit displayed in Field 8.

   If the remote status displayed in Field 8 = 0 (local), proceed to Step 9.

   If the remote status displayed in Field 8 = 1 (remote T1) or 2 (remote fiber), refer to isolation and repair step **Remote Carrier Group (unit type 74) Failures** for further diagnosis of the trouble.

9. When a GPP circuit (unit type 27) is the failing circuit, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

   NOTE

   Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

   Proceed to Step 13.

10. When an attendant console interface circuit (unit type 44) is the failing circuit, the associated headset or handset **must** be unplugged or the circuit fails the diagnostic test.

    Proceed to Step 13.

11. When a 1-way incoming or 1-way outgoing auxiliary trunk circuit (unit type 45) is the failing circuit, the option settings **must** be set for 2-way transmission or the circuit fails the diagnostic test.

12. To test an auxiliary trunk circuit, perform the following:

    Remove the auxiliary trunk circuit pack (SN231) and check the option settings on the circuit to be tested.

    If the auxiliary trunk circuit is a 2-way transmission (option Q - switches 2 and 3 in the up position), proceed to Step 13.

    If the auxiliary trunk circuit is a 1-way incoming (option S - switch 2 up and switch 3 down) or a 1-way outgoing (option R - switch 2 down and switch 3 up), record the switch settings and set both switches (2 and 3) to the up position, then proceed to Step 13.

    NOTE

    After the test passes (corrective action taken if necessary), ensure the switch settings are correctly positioned (recorded above) for the type of transmission required (1-way incoming or 1-way outgoing) on the auxiliary trunk circuit tested.

13. Check the circuit status displayed in Field 10.

    If Field 10 equals 1 (on-line and in-use), Test 4 cannot be performed for port circuits without busying them out. Wait until the circuit is not in-use or perform tests on other circuits.

    NOTE

    Port circuits that cannot be tested while in-use without being busied out are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 69, 71, and 72.

If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 14.

NOTE

A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 10 before Test 4 is executed.

If Field 10 does not equal 4, proceed to Step 15.

14. If Test 4 is being run remotely, proceed to Step 15.

    If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

    If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 15.

    If the circuit pack is firmly seated, proceed to Step 15.

15. Individual port circuits can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 10.

CAUTION

Busying out a port circuit results in loss of customer calls when the port circuit is in use.

16. If Field 10 equals 1, individual port circuits should not be busied out as they are on-line and in-use. Busying out in-use port circuits and performing tests results in loss of calls or data.

NOTE

Port circuits that should not be busied out while in-use are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 69, 71, and 72.

17. If the circuit status equals 3, proceed to Step 18.

    If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 18.

NOTE

If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

18. Depress **EXECUTE**.

19. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the network digital circuit cannot be tested.

    If special error code 81 or 83 is not displayed, proceed to Step 22.

20. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

    If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

    If TN380 or TN381 fails, perform Steps 31 through 50 below (as appropriate).

    If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

21. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.

22. If special error code 88 (see documentation for replacement of circuit packs) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 88** for further diagnosis of the trouble.

23. If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

24. If unit type 6 (module control channel) is being tested, check the specific fault code displayed in Field 12.

    If specific fault code 23 is displayed in Field 12, proceed to Step 25.

    If specific fault code 23 is not displayed in Field 12, proceed to Step 28.

25. Check the translation for TN530 (duplication/update channel).

    If TN530 is not translated, either remove TN530 or translate the circuit and repeat Test 4.

    If TN530 is translated, proceed to Step 28.

26. If unit type 27 (GPP) is being tested, check the specific fault code displayed in Field 12.

    If specific fault code 351 is displayed in Field 12, it is probably the result of a disconnected or powered down peripheral. Proceed to Step 27.

    If specific fault code 350, 352, 354, or 356 is displayed in Field 12, it may be the result of excessive backplane noise or noise coupled into the conductors to the peripheral. Proceed to Step 27.

    If specific fault code 350, 351, 352, 354, or 356 is not displayed in Field 12, proceed to Step 28.

27. Verify that the peripheral is connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

    If the peripheral is not connected and/or powered up when required, connect or turn on the peripheral and repeat the test from Step 18.

    If the peripheral is connected and has power on when required, proceed to Step 28.

28. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

    NOTE

    The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

29. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Check the circuit status displayed in Field 10. If the circuit status = 4 (unable to communicate or not plugged in) a faulty ID chip on the circuit pack is the problem. Proceed to Step 65.

NOTE

When the circuit was alarmed in Test 1 of **PROC 620** and passes the diagnostic analysis test in Test 4 of **PROC 620**, further analysis of the problem should be performed by running a continuous test of the circuit in Test 3 of **PROC 620** to ensure that the failure is not intermittent.

If the circuit status does not equal 4, proceed to Step 56.

30. If the circuit fails, indicated by a specific fault code displayed in Field 12 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

CAUTION

Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

31. At the equipment location displayed in Fields 3 through 6, reseat the circuit pack.

NOTE

When a circuit in unit type 33 - Direct Inward Dialing (DID) trunk - is being tested, check the dip switch settings on SN232 prior to reseating the circuit pack. Each pair of switches for each circuit **must** be positioned one up and one down or the test fails.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

32. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

NOTE

A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

33. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

NOTE

If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

34. Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a faulty ID chip on the circuit pack is the problem. Proceed to Step 65.

    If the circuit status does not equal 4, proceed to Step 66.

35. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    At the equipment location displayed in Fields 2 through 6, replace the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

36. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    NOTE

    If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

    Proceed to Step 66.

37. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no alternate circuit pack is available for replacement.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

38. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the original circuit pack goes off, and the **RED** LED on the alternate circuit pack is lighted.

39. At the equipment location displayed in Fields 3 through 6, reseat the alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

40. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    NOTE

    If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

    Proceed to Step 66.

41. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    At the equipment location displayed in Fields 3 through 6, replace the alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

42. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    NOTE

    If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

    Proceed to Step 66.

43. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no other alternate circuit pack is available for replacement.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

44. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the first alternate circuit pack goes off, and the **RED** LED on the second alternate circuit pack is lighted.

45. At the equipment location displayed in Fields 3 through 6, reseat the second alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

46. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    NOTE

    If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

    Proceed to Step 66.

47. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

    At the equipment location displayed in Fields 3 through 6, replace the second alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

48. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    NOTE

    If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 90** for further diagnosis of the trouble.

    Proceed to Step 66.

49. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

50. Determine if unit type 53 (multiplexer) is being tested.

    If unit type 53 is being tested **and** specific fault code 636 is displayed in Field 12, proceed to Step 51.

    If unit type 53 is not being tested, or specific fault code 636 is **not** displayed in Field 12 for unit type 53, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

51. Use **NEXT TEST** to step to Test 3 of **PROC 620**.

    NOTE

    The multiplexer circuit that was displayed in Test 4 is the default equipment location displayed in Test 3.

    At Slot 23 of the TMS carrier, reseat TN530.

52. Depress **EXECUTE**.

    Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 12) and depress **STOP**.

    If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

    If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 14), replace TN530 in Slot 23 of the TMS carrier.

53. Depress **EXECUTE**.

    Allow Test 3 to execute for the same period of time (or longer) and depress **STOP**.

    If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

    If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 14), reseat TN462 at Slot 11 of the TMS carrier.

54. Depress **EXECUTE**.

    Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 12) and depress **STOP**.

    If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

    If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 14), replace TN462 in Slot 11 of the TMS carrier.

55. Depress **EXECUTE**.

    Allow Test 3 to execute for the same period of time (or longer) and depress **STOP**.

    If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

    If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 14), refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

56. Use **NEXT TEST** to step to Test 3 of **PROC 620**.

NOTE

The circuit that was displayed in Test 4 is the default equipment location displayed in Test 3.

57. Depress **EXECUTE**.

    Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 12) and depress **STOP**.

    If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

58. If the circuit fails Test 3, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

59. Depress **EXECUTE**.

    Allow Test 3 to execute for the same period of time (or longer) and depress **STOP**.

60. If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

61. If the circuit fails Test 3, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

62. At the equipment location displayed in Fields 3 through 6, replace the circuit pack.

63. Depress **EXECUTE**.

    Allow Test 3 to execute for the same period of time (or longer) and depress **STOP**.

64. If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

    If the circuit fails Test 3, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

65. When a circuit status of 4 indicates a faulty ID chip, perform the following:

    At the equipment location displayed in Fields 2 through 6, replace the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

    Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack. Proceed to Step 66.

    If the circuit pack fails, the **RED** LED is lighted on the faceplate of the circuit pack. Check the wiring associated with the circuit pack replaced.

66. When any circuit packs for the following unit types are replaced, isolation and repair step **TSI Demand Test** should be run before leaving the customer's premises.

    Unit type 8 - Maintenance Interface (MIF).

    Unit type 9 - Module clock.

    Unit type 10 - TSI ALU.

    Unit type 11 - TSI PSTORE.

    Unit type 13 - PDS.

    Unit type 15 - PDI.

67. The **NETWORK SWITCH** or **PORT** fault indicator goes off when the circuit passes Test 4.

    The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Digital Network Circuit Failures in Different Unit Types

Overview Assumption: Test 1 of **PROC 620** displays network circuit failures in different unit types.

In Test 1 of **PROC 620** alarmed failures are displayed in order of severity; i.e., major alarm failures first, followed by minor alarm failures, with warning alarm failures displayed last.

Within each alarm category, (i.e., major, minor, or warning), alarmed failures are displayed by unit types (functional areas) corresponding to the most important functional area to the least important functional area of the switch.

Fault Isolation

1. Record all alarmed failures in Test 1 of **PROC 620**.
2. Display the first failing circuit in Test 1 of **PROC 620**.

NOTE

The first failing circuit is the highest alarmed failure (i.e., major, minor, or warning) recorded in the most important functional area (unit type).

3. If the failing circuit is a DS-1 circuit pack (unit type 68) refer to isolation and repair step **DS-1 (unit type 68) Failures** for further diagnosis of the trouble.
4. If the failing circuit is a remote module interface (unit type 71), refer to isolation and repair step **Remote Module Interface (unit type 71) Failures** for further diagnosis of the trouble.
5. If the failing circuit is a RCG circuit pack (unit type 74), refer to isolation and repair step **Remote Carrier Group (unit type 74) Failures** for further diagnosis of the trouble.
6. If the failing circuit is not a unit type 68, unit type 71, or unit type 74 trouble, proceed to Step 7.
7. When a GPP circuit (unit type 27) is selected for testing, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

NOTE

Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

8. When an attendant console interface circuit (unit type 44) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails the diagnostic test.
9. When a 1-way incoming or 1-way outgoing auxiliary trunk circuit (unit type 45) is selected for testing, the option settings **must** be set for 2-way transmission or the circuit fails the diagnostic test.
10. To test an auxiliary trunk circuit, perform the following:

    Remove the auxiliary trunk circuit pack (SN231) and check the option settings on the circuit to be tested.

Record the positions of switches 2 and 3.

Set both switches (2 and 3) to the up position (2-way transmission) to test the auxiliary trunk circuit.

NOTE

After the test passes (corrective action taken if necessary), ensure the switch settings on the auxiliary trunk circuit tested are correctly positioned as recorded above.

11. Perform Steps 6 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** for the first failure displayed in Test 1 of **PROC 620**.
12. When the first failure displayed is repaired and/or passes, analyze the remaining alarmed failures to determine if the first failure could have affected the remaining failures.

    Example: A failure in a PCI or PDI can have some bearing on port failures.

    Perform one of the following steps (13 through 15) depending on what is determined by the analysis.
13. Enter Test 1 of **PROC 620** and display the next alarmed failure in order of severity, then step to Test 4 of **PROC 620** and perform Steps 2 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure**.
14. Enter the next recorded failure (in alarm severity order) in Fields 2 through 7 of Test 4 using the **CHANGE FIELD** sequence and perform Steps 2 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure**.
15. Perform Test 2 of **PROC 620** for each alarmed failure recorded in Test 1 of **PROC 620** to test the alarmed circuit or to turn off the fault indicator.
16. When Test 2 of **PROC 620** indicates a failure for the circuit entered (indicated by a 1 displayed in Field 13), Steps 2 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** must be performed to correct the problem.
17. When all alarmed circuits displayed in Test 1 of **PROC 620** are repaired and/or pass, the **NETWORK SWITCH** and/or **PORT** fault indicator goes off.

    The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Multiple Digital Network Circuit Failures In Same Unit Type

Overview Assumption: Test 1 of **PROC 620** displays multiple alarmed digital network circuit failures within the same unit type and that no other failures in other unit types are alarmed.

Fault Isolation

1. When Test 1 of **PROC 620** displays more than one digital network circuit of the same unit type with failures, execute Test 2 of **PROC 600** for the same unit type to determine if other digital network circuits within the same unit type have errors recorded against them.

   Record the unit type and digital network circuits with errors recorded against them displayed in Test 1 of **PROC 620** and Test 2 of **PROC 600**.

2. Analyze the failures recorded in Test 1 of **PROC 620** and Test 2 of **PROC 600** to determine if the failures could have been caused by a common interface.

   Example: A failure in an Input/Output Bus Interface (IOBI) circuit pack can affect several PCIs, a failure in a Port Data Store (PDS) can affect several PDIs, etc.

   Depending upon what is determined from the analysis of the circuits recorded in Test 1 of **PROC 620** and Test 2 of **PROC 600**, perform Step 3 or 4.

3. When the analysis does not indicate a common interface, perform Steps 1 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** starting with the first failing circuit displayed in Test 1 of **PROC 620**.

   After the first failing circuit is repaired and/or passes, repeat Steps 1 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** for each alarmed failure recorded in Test 1 of **PROC 620**.

   When all alarmed failures recorded in Test 1 of **PROC 620** pass Test 4 of **PROC 620**, the **NETWORK** or **PORT** fault indicator goes off.

   The **MAJOR** and/or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

4. When the analysis indicates a common interface as the potential problem, enter the common interface equipment location in Fields 2 through 7 of **PROC 620**, Test 4 using the **CHANGE FIELD** sequence.

   Perform Steps 6 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure**.

5. When the common interface circuit is repaired and/or passes, perform Test 2 of **PROC 620** for the unit type recorded in Test 1 of **PROC 620** with alarmed failures in order to turn off the fault indicator and resolve the alarmed entries.

6. When Test 2 of **PROC 620** indicates a failure for the unit type tested, Steps 2 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure must** be performed for each failure displayed in Test 2 of **PROC 620**.

7. When all alarmed failures recorded in Test 1 of **PROC 620** pass Test 2 or 4 of **PROC 620**, the **NETWORK** or **PORT** fault indicator goes off.

   The **MAJOR** and/or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Multimodule Switch Alarms With More Than One Unit Type 13 (Port Data Store) With Specific Fault Code 70 and More Than One Unit Type 53 (Multiplexer) With Specific Fault Code 611 Failures Caused by Network Test Flag Faults

Overview Assumption: Test 1 of **PROC 620** displays more than one unit type 13 (Port Data Store) alarmed failure with specific fault code 70 **and** more than one unit type 53 (Multiplexer) alarmed failure with specific fault code 611.

If either of these conditions is not true, the failures should be analyzed using other isolation and repair steps.

Under some failure conditions, these alarmed failures only appear while the switch is running traffic. The switch runs alarm free and passes all demand tests out of hours.

NOTE

This is a strong indication that the fault is in a port carrier.

Fault Isolation If both conditions are true (more than one unit type 13 alarmed failure with specific fault code 70 and more than one unit type 53 alarmed failure with specific fault code 611), perform the following steps to determine the module that is the true source of the alarms.

1. Use Test 2 of **PROC 620** to test all unit type 57 (LGI) circuits in the switch.
2. Expect many unit type 57 circuits to fail with specific fault code 611.

   Unit type 57 (LGI) circuits that fail with a fault code other than 611 indicate the source of the network test flags.
3. Display a unit type 57 circuit (LGI) with a fault code other than 611 in Test 2.

   Step to Test 4 of **PROC 620**.

   NOTE

   The circuit displayed in Test 2 is now displayed in Test 4 of **PROC 620**.
4. Depress **EXECUTE**.
5. If a unit type 54 (fan out) TN473 circuit pack, unit type 55 (module interface) TN480 circuit pack, unit type 58 (fan in) UN150 circuit pack, or the unit type 57 (light guide interface) TN481 circuit pack is displayed in Fields 2 through 7, it is the failing circuit pack.

   Perform Steps 31 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** to correct the problem.
6. If a unit type 54, unit type 55, unit type 58, or the unit type 57 circuit pack is **not** indicted, the failure is coming from within the same module as the LGI being tested.
7. Failures in a module control are generally diagnosed correctly and there should be few alarms in the failing module. If there are many alarms in the failing module, the fault is probably in a port carrier.

   Port carrier failures cause alarms no matter which module control is on-line. Failures in the port carrier often require the presence of traffic to raise alarms. Demand tests on port carriers executed out of hours often pass.

   Refer the problem to appropriate third tier maintenance personnel.

DS-1 (Unit Type 68) Failures

Overview System level fault isolation for DS-1 (unit type 68) alarmed failures is defined as the isolation of faults among the various subsystems.

a. System 85 DS-1 circuit packs.

b. Channel Division Multiplexer (CDM).

c. Channel Expansion Multiplexer (CEM).

d. Network Channel Terminating Equipment (NCTE).

e. Other associated equipment (i.e., on-site wiring, facility, and any special service equipment).

In isolating DS-1 alarmed failures, maintenance personnel should start by checking the current health and status of the circuit pack in question by using Test 1 of **PROC 625**.

If the health code is four or higher, maintenance personnel should attempt a call across the facility. If the call completes and is of acceptable quality, then additional maintenance (clearing of the alarmed failure) should be deferred until after hours.

However, if the facility is out of service, then **PROC 620** should be used to isolate the faulty hardware.

NOTE

PROC 620, Test 4 and Test 5 should not be used to check the status of the circuit pack. Tests 4 and 5 are destructive tests (service affecting to all 24 channels on the circuit pack) and should only be used when the facility is unavailable or out-of-hours.

When using **PROC 620** to test an DS-1 alarmed failure, the following should be understood.

1. **PROC 620**, Tests 2 and 3 for **tape issue 1.1 or later** are non-destructive and provide the same testing capability as scheduled tasks.
2. **PROC 620**, Tests 4 and 5 are destructive tests which start by checking the presence of any transmission facility faults.

   If found, they are stored until the interface has been checked.
3. Facility faults are only displayed when no other failure is found on the circuit pack (Test 4).

For a more detailed explanation of how DS-1 applies to System 85, refer to document 555-025-101 Issue 2, July 1987 entitled ‘‘AT&T System 75 and System 85 DS1/DMI Interface’’.

When DS-1 circuit packs fail, specific fault codes can be logged against the interface or facility. Interface specific fault codes are logged against the circuit pack and facility specific fault codes are logged against the network (link). The specific fault code has to be analyzed when the DS-1 circuit pack fails in order to determine the type of fault isolation to be performed in correcting alarmed failures for DS-1 circuit packs. **PROC 620**, Test 2 should be performed for the alarmed DS-1 failure to determine (if any) the type of specific fault code logged.

Fault isolation for DS-1 alarmed failures consist of:

a. Fault isolation when the alarmed DS-1 failure is caused by an associated alarmed CEM failure.

b. Fault isolation for DS-1 alarmed failures when the failure is not caused by an associated CEM alarmed failure.

c. Fault isolation techniques for CEM, CDM, and NCTE type equipment.

Fault Isolation for Associated Alarmed CEM Failure

1. Enter **PROC 618**, Test 1 and examine unit type 63 (external equipment) to determine if a CEM alarm associated with the DS-1 failure exists.

   NOTE

   Local records must be used to determine the external equipment encode for CEMs and the associated DS-1 equipment location.

2. Enter **PROC 620**, Test 1 and display the original DS-1 failure.
3. If a CEM alarm does not exist for the associated DS-1 interface failure, proceed to isolation and repair step **Fault Isolation for DS-1 Alarmed Failures Not Caused by Associated CEM Alarmed Failures** for further diagnosis of the trouble.
4. If a CEM alarm is present, there is a problem in the CEM.

   On-site repair actions on the CEM must be taken.

   The CEM maintenance procedures are specified in AT&T Practice 365-287-100.

   In general, the CEM circuit pack with the RED LED lighted is the first choice.

   If none are lighted, power should be checked at the test points on the power unit.

   Following the repair the CEM reset button must be depressed to clear the alarm condition.
5. Enter **PROC 620**, Test 2 and test the original DS-1 failure.
6. If Test 2 passes, the DS-1 facility is presently operational and no destructive testing of the DS-1 will be performed using **PROC 620**, Tests 4 or 5.
7. If Test 2 fails, indicating that the DS-1 facility is not healthy or **if you desire to verify that the DS-1 facility is functioning**, use one of the following test calls **prior** to testing the DS-1 using **PROC 620** Test 4 or Test 5.

   Make an ATMS supervision call using **PROC 647**, Test 3 on the DS-1.

   Make a TVS call using the DS-1.

   Make a terminal-to-trunk test call using **PROC 642** on the DS-1.

   CAUTION

   The DS-1 tests executed by PROC 620, Tests 4 and 5 are service affecting and should only be executed during periods of low traffic, during out-of-hours, or after a service outage has already occurred and is verified using one of the above tests. PROC 620, Test 2 or PROC 625, Test 1 should always be used when the current health of a DS-1 digital service is in question.

8. After repair of the CEM, the DS-1 circuit pack must be tested to clear the alarmed entry in PMIDS.

   CAUTION

   Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

9. Busy out the DS-1 circuit by depressing **BUSY OUT** in **PROC 620**, Test 4. One circuit cannot be busied out by **PROC 620**. If all 24 circuits on the DS-1 circuit pack are busied out in any busy out procedure, testing can be performed.

NOTE

If the DS-1 circuit pack is not busied out, the test **will** fail with a specific fault code of 13 (DS-1 in-use) if any channel on the DS-1 is in-use when the test is performed.

10. Perform Steps 1 through 67 (as required) of isolation and repair step **One Digital Network Circuit Failure** to retire the alarm cause.

Fault Isolation for DS-1 Alarmed Failures Not Caused by Associated CEM Alarmed Failures

The DS-1 alarms represent conditions that could result from either on or off-site faults.

A **RED** alarm (specific fault code 1862) is initiated by a digital switch or digital transmission equipment when the incoming DS-1 transmission bit stream on a particular facility is lost or framing for the incoming bit stream is lost. Upon initiation of a **RED** alarm, the switch or digital transmission equipment sends a **YELLOW** alarm code on the outgoing DS-1 transmission bit stream for that particular facility.

A **YELLOW** alarm (specific fault code 1858) is transmitted to an ''other end'' switch or digital transmission equipment to indicate that the DS-1 transmission bit stream incoming from the ''other end'' has been lost or framing on the incoming bit stream from the ''other end'' is lost. The **YELLOW** alarm code employed is dependent on the type of framing (D4 or Fe) and signaling (Rob Bit or 24th Channel) employed. For D4 framing with Rob Bit signaling, the **YELLOW** alarm code is recognized as a zero for bit 2 in each time slot (channel) for at least two full frames (48 consecutive time slots).

A **BLUE** alarm (specific fault code 1865) is transmitted to an ''other end'' switch or digital transmission equipment to indicate that testing is being done locally which interrupts communication with the ''other end''. One example is running a maintenance **PROC** on System 85 which executes a looparound test on the DS-1 circuit pack itself. While this test is being performed, the **BLUE** alarm code is sent to the ''other end''. The **BLUE** alarm is recognized as a continuous stream of ones with no provisions for framing or signaling.

1. Check the specific fault code displayed in Field 12 of **PROC 620**, Test 1 for the original DS-1 alarmed failure.

   If specific fault code 729, 730, 734, 762, 773, 1601, 1602, 1853, 1855 through 1858, or 1860 through 1865 is displayed in Field 12, you have a facility problem. Proceed to Step 5.

   If any other specific fault code is displayed in Field 12, proceed to Step 2.

   CAUTION

   If this DS-1 is a primary or secondary reference, then busying out the DS-1 circuit pack and testing it may be service affecting to other digital facilities because the capability to communicate at a digital rate would be lost for the duration of the test.

2. Busy out the DS-1 circuit by depressing **BUSY OUT** in **PROC 620**, Test 4. One circuit cannot be busied out. The entire DS-1 circuit pack is busied out by depressing **BUSY OUT**.

   CAUTION

   Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

NOTE

If the DS-1 circuit pack is not busied out the test **will** fail with a specific fault code of 13 (DS-1 in-use) if any channel on the DS-1 is in-use when the test is performed.

3. Perform Steps 1 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** for the failing DS-1 circuit pack.
4. Enter **PROC 620**, Test 2 and test the original DS-1 failure.
5. If Test 2 passes, the DS-1 facility is presently operational and no destructive testing of the DS-1 will be performed using **PROC 620**, Tests 4 or 5.
6. If Test 2 fails, indicating that the DS-1 facility is not healthy or **if you desire to verify that the DS-1 facility is functioning**, use one of the following test calls **prior** to testing the DS-1 using **PROC 620** Test 4 or Test 5.

   Make an ATMS supervision call using **PROC 647**, Test 3 on the DS-1.

   Make a TVS call using the DS-1.

   Make a terminal-to-trunk test call using **PROC 642** on the DS-1.

CAUTION

The DS-1 tests executed by PROC 620, Tests 4 and 5 are service affecting and should only be executed during periods of low traffic, during out-of-hours, or after a service outage has already occurred and is verified using one of the above tests. PROC 620, Test 2 or PROC 625, Test 1 should always be used when the current health of a DS-1 digital service is in question.

7. Specific fault codes 729, 730, 734, 762, 773, 1601, 1602, 1853, 1855 through 1858, or 1860 through 1865 displayed in Field 12 indicate a **RED, BLUE**, or **YELLOW** alarm indicting the facility.

   The DS-1 port, the CEMs and CDMs, the on-site wiring, the NCTE, or the facility could be the problem.
8. To isolate problems with the CEMs, CDMs, NCTE, the DS-1 port, refer to one of the following isolation and repair steps:

   Fault Isolation Techniques for CEM, CDM, and NCTE.

   Step 9 for DS-1 port test.
9. Enter **PROC 620**, Test 1 and display the original DS-1 failure.
10. Enter **PROC 620**, Test 4.

NOTE

The alarmed circuit that was displayed in Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

11. Record the specific fault code displayed in Field 12 which was detected by on-line periodic software tests and logged in PMIDS.
12. Check the circuit status displayed in Field 10.

    If Field 10 equals 1 (on-line and in-use), Test 4 cannot be performed for the DS-1 port circuit. Wait until the circuit is not in use or perform tests on other circuits.

If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 13.

NOTE

A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 10 before Test 4 is executed.

If Field 10 does not equal 4, proceed to Step 14.

13. If Test 4 is being run remotely, proceed to Step 14.

    If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

    If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 14.

    If the circuit pack is firmly seated, proceed to Step 14.

CAUTION

Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

14. Busy out the DS-1 circuit by depressing **BUSY OUT**. One circuit cannot be busied out by **PROC 620**. If all 24 circuits on the DS-1 circuit pack are busied out in any busy out procedure, testing can be performed.

NOTE

If the DS-1 circuit pack is not busied out, the test **will** fail with a specific fault code of 13 (DS-1 in-use) if any channel on the DS-1 is in-use when the test is performed.

15. Depress **EXECUTE**.

16. Special error codes 81 or 83 may be displayed in the **MAAP** error code field, and the test is terminated when the network digital circuit cannot be tested.

    If special error code 81 or 83 is not displayed, proceed to Step 19.

17. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

    If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

    If TN380 or TN381 fails, perform Steps 22 through 41 below (as required).

    If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

18. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.

19. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

NOTE

The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

20. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.
21. If the DS-1 circuit passes, facility vendor tests or on-site action is required to isolate the problem. Refer to isolation and repair step **Fault Isolation Techniques for CEM, CDM, and NCTE** for recommended procedures.
22. If the circuit fails, indicated by a specific fault code displayed in Field 12 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

CAUTION

If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

23. At the equipment location displayed in Fields 3 through 6, reseat the circuit pack.

CAUTION

Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

24. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

NOTE

A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

25. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 42.

26. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

CAUTION

If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

At the equipment location displayed in Fields 3 through 6, replace the circuit pack.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

27. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 42.

28. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    CAUTION

    If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

    Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no alternate circuit pack is available for replacement.

    Refer to DS-1 circuit pack LEDs described in Step 43 and isolation and repair step **Specific Fault Codes** for further isolation techniques.

29. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the original circuit pack goes off, and the **RED** LED on the alternate circuit pack is lighted.

30. At the equipment location displayed in Fields 3 through 6, reseat the alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

31. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 42.

32. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    CAUTION

    If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

    At the equipment location displayed in Fields 3 through 6, replace the alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

33. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 42.

34. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    CAUTION

    If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

    Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no other alternate circuit pack is available for replacement.

    Refer to DS-1 circuit pack LEDs described in Step 43 and isolation and repair step **Specific Fault Codes** for further isolation techniques.

35. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the first alternate circuit pack goes off, and the **RED** LED on the second alternate circuit pack is lighted.

36. At the equipment location displayed in Fields 3 through 6, reseat the second alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

37. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    Proceed to Step 42.

38. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

    CAUTION

    If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

    At the equipment location displayed in Fields 3 through 6, replace the second alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

39. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    Proceed to Step 42.

40. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

CAUTION

If the DS-1 circuit pack code is ANN11B, RED and YELLOW alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds, rerun Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN11C.)

Refer to DS-1 circuit pack LEDs described in Step 43 and isolation and repair step **Specific Fault Codes** for further isolation techniques.

41. When the DS-1 circuit pack previously tested was busied out and the test passed, or the problem was corrected, and the circuit status in Field 10 = 3, the circuit should be released from busy by depressing **RLS BUSY OUT**.

42. The **NETWORK SWITCH** or **PORT** fault indicator goes off when the circuit passes Test 4.

NOTE

The far end DS-1 will be in a **RED** alarm state following the termination of Test 4. Fifteen seconds must elapse before this alarm state clears and the DS-1 circuit packs resume normal operation. (With one exception, this alarm state is indicated by the **GREEN** LED in position 8 being off. The exception is when the circuit is optioned for D4 framing and 24th channel signaling.)

The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

43. The LEDS on the DS-1 circuit pack may assist in isolating problems with DS-1 alarms.

44. Examine the LEDs on the DS-1 circuit pack.

Under normal conditions, the two **GREEN** LEDs in positions 7 and 8 are lighted. This indicates the DS-1 link is up and framing is accomplished.

If the **GREEN** LED in position 7 is off **(not lighted)**, a **RED** alarm is indicated. This implies that the incoming DS-1 bit stream is lost or that framing is lost on the incoming bit stream. Under these conditions, the **GREEN** LED in position 8 is a don't care state and may be on or off. On rare occasions, the position 7 LED flutters. This indicates that the ANN11 circuit pack is not able to frame on the incoming signal. The problem could be either the signal coming from the facility, the ANN11 circuit pack, or System 85 circuitry distributing control signals to the ANN11.

If the **GREEN** LED in position 7 is lighted and the **GREEN** LED in position 8 is off **(not lighted)**, a **YELLOW** alarm has been received from the other end. This indicates that the ''other end'' has lost incoming framing or transmission and is in a **RED** alarm state. A **YELLOW** alarm condition may exist even though the **GREEN** LED is lighted. Use **PROC 600** to determine if a network alarm exists.

The **YELLOW** LED in position 9 is on **(lighted)** during initialization of the DS-1 circuit pack. It will turn off **(not lighted)** after approximately 4 seconds indicating initialization is complete. Thereafter, the **YELLOW** LED will be on **(lighted)** when at least one trunk channel on the DS-1 link is in use and serves as a busy indicator.

Fault Isolation Techniques for CEM, CDM and NCTE

1. On-site isolation among the units that are provided between the DS-1 port and the span line interface is performed by activating built-in tests on individual units and by using patch cords to provide external looparound and to bypass equipment external to the DS-1 port.
2. On-site tests for the specific unit should be run as needed in accordance with the maintenance documentation (or other vendor documentation) provided for the specific unit.
3. External looparound should be performed by changing Field 12 of **PROC 260** to a 1 and executing **PROC 620**, Test 2 on the DS-1 circuit pack.

   Test 2 performs external looparound on the DS-1 circuit pack to the first looparound on the DS-1 link outside the switch.
4. When CEMs are provided, a preferred looparound is on a patch field such as the ED-2C780 Jack Panel (X IN to X OUT or Y IN to Y OUT).

   NOTE

   The CEM switches looparound data back to the CEM on all three DS-1s. The switches do not loop data back towards the switch.
5. If a CDM is also provided, the CDM should be bypassed by manually forcing it into looparound.
6. If Test 2 fails, the DS-1 circuit pack should be replaced and the tests repeated.

   If Test 2 still fails, check the wiring between the DS-1 circuit pack and the associated units.
7. If Test 2 passes, activate the CEM loop switches and observe that no equipment alarm exists on the CEM.

   If no alarms are observed, loop the data at the NCTE (X IN to X OUT patch cord) and remove the line Z loop on the CEM via the loop control switch.
8. Observe that the CEM runs alarm free after reset is depressed.

   If the CEM displays alarms, trouble with the NCTE and the wiring to the NCTE probably exist.

   If the CEM does not display alarms, trouble with the facility probably exists.

Additional DS-1 Troubleshooting Techniques In some cases where extraordinary measures are needed for troubleshooting DS-1 failures, such as for infrequently occurring problems or during facility transmission setting alignment and verification, it may be desirable to connect stand-alone test equipment to the facility.

The following list of documents describe equipment that may be applicable depending upon circumstances encountered.

1. The AT&T 365 series of Practices includes general information about DS-1 facilities and specific guidance on use of some of the test equipment.
2. AT&T Practice 103-245-100 - J1C140A Digital Access Time Slot Selector is a unit that allows access to two of the voice channels multiplexed on the facility.
3. AT&T Practice 103-488-105 - J68435AH equipment to measure errored seconds.
4. AT&T Practices 103-493-xxx through 103-494-xxx - a number of units including outside suppliers equipment with various capabilities.

In addition to the equipment included in the above list, other equipment with varying capabilities are available in the industry. TEKELEC model TE-820A and VENATOR model VENCAT-24 are two examples of these.

Remote Carrier Group (Unit Type 74) Failures

Overview System level fault isolation for remote carrier group (unit type 74) failures is defined as the isolation of faults among the various subsystems:

a. System 85 remote carrier local (RCL) ANN15 circuit packs.

b. Remote carrier controller (RCC) ANN16 circuit packs located in the remote carrier group.

c. Port circuits located in the remote carrier group.

d. Remote carrier group environmental failures.

Determine the type of remote carrier group failure.

1. If the failing circuit is a RCG circuit pack (unit type 74), determine the remote status displayed in Field 8.

   If the remote status displayed in Field 8 equals 0 (local), proceed to isolation and repair step **Fault Isolation for RCL failures** for further diagnosis of the trouble.

2. If the remote status displayed in Field 8 equals 1 (remote T1) or 2 (remote fiber), check the specific fault code displayed in Field 12.

3. If the specific fault code displayed in Field 12 is 1625 (one or more environmental errors have been detected), proceed to isolation and repair step **Fault Isolation for RCG Environmental Failures** for further diagnosis of the trouble.

   If the specific fault code displayed in Field 12 is **not** 1625, proceed to isolation and repair step **Fault Isolation for RCC and Remoted Port failures** for further diagnosis of the trouble.

4. If **Remote Carrier Group (unit type 74) failures** was referenced for a remoted unit type 27 (GPP), unit type 29 (line circuit), unit type 69 (MFAT), or unit type 72 (EIA) circuit, proceed to isolation and repair step **Fault Isolation for RCC and Remoted Port Failures** for further diagnosis of the trouble.

Fault Isolation for RCL Failures

1. Enter **PROC 620**, Test 1 and display the original RCG failure.

2. Enter **PROC 620**, Test 4.

   NOTE

   The alarmed circuit that was displayed in Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

3. Record the specific fault code displayed in Field 12 which was detected by on-line periodic software tests and logged in PMIDS.

4. Check the circuit status displayed in Field 10.

   If Field 10 equals 1 (on-line and in-use), Test 4 cannot be performed for port circuits without busying them out. Wait until the circuit is not in-use or perform tests on other circuits.

   NOTE

   Port circuits that cannot be tested while in use without being busied out are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

5. If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 6.

   NOTE

   A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 10 before Test 4 is executed.

   If Field 10 does not equal 4, proceed to Step 7.

6. If Test 4 is being run remotely, proceed to Step 7.

   If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

   If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 7.

   If the circuit pack is firmly seated, proceed to Step 7.

7. Individual port circuits can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 10.

   CAUTION

   Busying out an RCG circuit pack disrupts calls in progress on all 24 ports of the RCG circuit pack.

8. If Field 10 equals 1, individual port circuits should not be busied out as they are on-line and in-use. Busying out in-use port circuits and performing tests results in loss of calls or data.

   NOTE

   Port circuits that should not be busied out while in-use are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

9. If the circuit status equals 3, proceed to Step 10.

   If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 10.

   NOTE

   If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

10. Depress **EXECUTE**.

11. Special error code 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the network digital circuit cannot be tested.

    If special error code 81 or 83 is not displayed, proceed to Step 14.

12. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

    If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

    If TN380 or TN381 fails, perform Steps 17 through 35 below (as appropriate).

    If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

13. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.

14. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

NOTE

The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

15. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a faulty ID chip on the circuit pack is the problem. Proceed to Step 45.

NOTE

When the circuit was alarmed in Test 1 of **PROC 620** and passes the diagnostic analysis test in Test 4 of **PROC 620**, further analysis of the problem should be performed by running a continuous test of the circuit in Test 3 of **PROC 620** to ensure that the failure is not intermittent.

    If the circuit status does not equal 4, proceed to Step 36.

16. If the circuit fails, indicated by a specific fault code displayed in Field 12 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

CAUTION

Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

17. At the equipment location displayed in Fields 3 through 6, reseat the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

18. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

NOTE

A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

19. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

20. Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a faulty ID chip on the circuit pack is the problem. Proceed to Step 45.

    If the circuit status does not equal 4, proceed to Step 46.

21. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    At the equipment location displayed in Fields 2 through 6, replace the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

22. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 46.

23. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no alternate circuit pack is available for replacement.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

24. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the original circuit pack goes off, and the **RED** LED on the alternate circuit pack is lighted.

25. At the equipment location displayed in Fields 3 through 6, reseat the alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

26. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 46.

27. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    At the equipment location displayed in Fields 3 through 6, replace the alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

28. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 46.

29. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no other alternate circuit pack is available for replacement.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

30. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the first alternate circuit pack goes off, and the **RED** LED on the second alternate circuit pack is lighted.

31. At the equipment location displayed in Fields 3 through 6, reseat the second alternate circuit pack.

CAUTION

Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

32. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 46.

33. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

At the equipment location displayed in Fields 3 through 6, replace the second alternate circuit pack.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

34. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 46.

35. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

36. Use **NEXT TEST** to step to Test 3 of **PROC 620**.

NOTE

The circuit that was displayed in Test 4 is the default equipment location displayed in Test 3.

37. Depress **EXECUTE**.

Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 12) and depress **STOP**.

If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

38. If the circuit fails Test 3, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

39. Depress **EXECUTE**.

Allow Test 3 to execute for the same period of time (or longer) and depress **STOP**.

40. If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

41. If the circuit fails Test 3, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.
42. At the equipment location displayed in Fields 3 through 6, replace the circuit pack.
43. Depress **EXECUTE**.

    Allow Test 3 to execute for the same period of time (or longer) and depress **STOP**.
44. If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

    If the circuit fails Test 3, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.
45. When a circuit status of 4 indicates a faulty ID chip, perform the following:

    At the equipment location displayed in Fields 2 through 6, replace the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

    Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack. Proceed to Step 46.

    If the circuit pack fails, the **RED** LED is lighted on the faceplate of the circuit pack. Check the wiring associated with the circuit pack replaced.
46. The **NETWORK SWITCH** or **PORT** fault indicator goes off when the circuit passes Test 4.

    The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Fault Isolation for RCC and Remoted Port Failures Fault isolation for RCC and remoted port failures is divided into two parts.

1. Part one is performed at the customer's premises using the **MAAP** to verify the existence of a failure and to determine the alternate circuit packs (if any) required to correct the trouble.
2. Part two is performed at the remote carrier group using the remote carrier group circuit pack insertion test by reseating or replacing circuit packs in the remote carrier group to correct the trouble.

Part One - Verifying Failure

1. Display the failing unit type 74 (RCG), unit type 27 (GPP), unit type 29 (line circuit), unit type 69 (MFAT), or unit type 72 (EIA) circuit with a remote status of 1 (remote T1) or 2 (remote fiber) displayed in Field 8 in Test 1 of **PROC 620**.
2. Enter **PROC 620**, Test 4.

NOTE

The alarmed circuit that was displayed in Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

3. Record the specific fault code displayed in Field 12 which was detected by on-line periodic software tests and logged in PMIDS.
4. When a GPP circuit (unit type 27) is the failing circuit, the translated peripheral should be connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

NOTE

Tests may fail with a specific fault code other than the expected specific fault code 351 (GPP DTL idle bit set) failure when the peripheral is disconnected or does not have power on when required.

5. Individual port circuits can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 10.
6. If Field 10 equals 1, individual port circuits should not be busied out as they are on-line and in-use. Busying out in-use port circuits and performing tests results in loss of calls or data.

NOTE

Port circuits that should not be busied out while in-use are unit types 16, 24, 25, 27 through 29, 31 through 34, 44 through 46, 62, 66, 68, 69, 71, 72, and 74.

CAUTION

Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out an RCG circuit pack disrupts calls in progress on all 24 ports of the RCG circuit pack.

7. If the circuit status equals 3, proceed to Step 8.

   If the circuit status does not equal 3 and you wish to test the circuit, depress **BUSY OUT** and proceed to Step 8.

NOTE

If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

8. Depress **EXECUTE**.
9. Special error code 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the network digital circuit cannot be tested.

   If special error code 81 or 83 is not displayed, proceed to Step 12.

10. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

    If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

    If TN380 or TN381 fails, perform Steps 31 through 50 of **One Digital Network Circuit Failure** fault isolation (as appropriate).

    If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

11. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.

12. If unit type 27 (GPP) is being tested, check the specific fault code displayed in Field 12.

    If specific fault code 351 is displayed in Field 12, it is probably the result of a disconnected or powered down peripheral. Proceed to Step 13.

    If specific fault code 350, 352, 354, or 356 is displayed in Field 12, it may be the result of excessive backplane noise or noise coupled into the conductors to the peripheral. Proceed to Step 13.

    If specific fault code 350, 351, 352, 354, or 356 is **not** displayed in Field 12, proceed to Step 14.

13. Verify that the peripheral is connected. When the terminal is powered by external sources (i.e., commercial power), the power to the terminal **must** be turned on.

    If the peripheral is not connected and/or powered up when required, connect or turn on the peripheral and repeat the test from Step 8.

    If the peripheral is connected and has power on when required, proceed to Step 14.

14. Determine the status of the circuit by checking the specific fault code in Field 12.

    NOTE

    The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

15. If the circuit passes, a specific fault code of 0 is displayed in Field 12.

    NOTE

    When the circuit was alarmed in Test 1 of **PROC 620** and passes the diagnostic analysis test in Test 4 of **PROC 620**, further analysis of the problem should be performed by running a continuous test of the circuit in Test 3 of **PROC 620** to ensure that the failure is not intermittent.

    Proceed to Step 22.

16. If the circuit fails, indicated by a specific fault code other than 0 displayed in Field 12, record the specific fault code which is detected by the demand diagnostic test and logged in DMIDS.

    Record the unit type and equipment location of the failing circuit displayed in Fields 2 through 7.

17. If specific fault code 1625 is displayed in Field 12 for unit type 74 (RCG), proceed to isolation and repair step **Fault Isolation for RCG Environmental Failures** for further diagnosis of the trouble.

18. Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no alternate circuit pack is available for replacement.

    Proceed to Step 25.

19. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    Record the unit type and equipment location of the alternate circuit pack displayed in Fields 2 through 6.

20. Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no other alternate circuit pack is available for replacement.

    Proceed to Step 25.

21. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    Record the unit type and equipment location of the second alternate circuit pack displayed in Fields 2 through 6.

    Proceed to Step 25.

22. Use **NEXT TEST** to step to Test 3 of **PROC 620**.

    NOTE

    The circuit that was displayed in Test 4 is the default equipment location displayed in Test 3.

23. Depress **EXECUTE**.

    Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 12) and depress **STOP**.

    If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

24. If the circuit fails Test 3, repeat the test from Step 1.

25. Dispatch maintenance personnel to the remote carrier group with the required circuit packs and the equipment location of the failing circuit pack(s) displayed in Fields 2 through 7.

Part Two - Remote Carrier Group Circuit Pack Replacement

Circuit pack replacement in the remote carrier group is dependent upon observation of the **RED** and **GREEN** LEDs on the circuit pack being reseated or replaced. There is **no MAAP** display to determine whether the circuit pack passes or fails the test.

The remote carrier group circuit pack insertion test consists of a hardware test and a software test. In order to perform the software test, the maintenance mode in the **MODE** display procedure **must not** be active.

Indications on the progress and results of the hardware and software tests are given by lighting LEDs on the circuit pack inserted.

The remote carrier group circuit pack insertion test LED indications depend on which circuit pack is inserted; i.e., Remote Carrier Controller (RCC) ANN16 circuit pack or a remote port circuit pack.

1. Each circuit pack and alternate circuit pack (as required) recorded in part one for the failing circuit should be reseated prior to being replaced. The circuit pack should be replaced if the test fails when the circuit pack is reseated.

2. The order of reseating and replacing circuit packs recorded as failing in part one is as follows:

   Reseat the failing circuit pack.

   Replace as required the failing circuit pack.

   Reseat the first alternate circuit pack (if any).

   Replace as required the first alternate circuit pack.

   Reseat the second alternate circuit pack (if any).

   Replace as required the second alternate circuit pack.

   If all of the above steps (as appropriate) fail, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

3. The equipment location(s) recorded in part one for the failing circuit is not the true physical location in the remote carrier group of the circuit pack to be reseated or replaced.

   The remote carrier group contains a label (refer to Figure 11) which shows the relationship of the **MAAP** display to the remote carrier group slot number to be replaced for the failing circuit pack.

4. When replacing unit type 74 (RCG) ANN16 circuit pack, refer to **RCC (ANN16) Circuit Pack Insertion** below for the results of the test.

5. When replacing unit type 27 (GPP), unit type 29 (line circuit), unit type 69 (MFAT), or unit type 72 (EIA) port circuits, refer to **Port Circuit Pack Insertion** below for the results of the test.

NOTE

When a unit type 27 (GPP) circuit pack is unseated or replaced in the remote carrier group, wait **at least 30 seconds** before reseating the SN270B or SN271 circuit pack. The auto reset may not take effect because of the circuit pack being horizontally mounted unless the circuit pack is unseated for at least 30 seconds.

RCC (ANN16) Circuit Pack Insertion

When the ANN16 (RCC) circuit pack is inserted in the remote carrier group, the following occurs.

NOTE

When a GPP circuit pack is tested, all translated peripherals should be connected. When the terminal(s) are powered by external sources (i.e., commercial power), the power to the terminal(s) **must** be turned on.

1. The hardware test on the RCC (ANN16) is performed.

   The **RED** LED on the RCC circuit pack is lighted, then goes off.

   The **GREEN** LED on the RCC circuit pack is lighted, then goes off.

2. If the RCC hardware test passes, both LEDs remain off.

   If the RCC hardware test fails, the **RED** LED is lighted on the RCC circuit pack.

NOTE

The RCC circuit pack's **GREEN heartbeat** LED indicates a fast heartbeat after the firmware test is performed.

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Figure 5-11. Remote Group Carrier Housing Unit Labels

3. Then the hardware test on all port boards is performed.

   NOTE

   The hardware test on the port boards is only performed if the hardware test on the RCC passed.

   The **RED** LEDs are lighted on all port boards.

   Then the **GREEN** LEDs are lighted on all port boards.

4. If the port board hardware test passes, both LEDs remain off.

   If the port board hardware test fails, the **RED** LED is lighted on the failing port circuit pack(s).

5. After the hardware test on the RCC and all port boards is completed, communications with the switch is attempted.

   NOTE

   The hardware test on the RCC has to pass before communications with the switch is attempted.

The RCC circuit pack's **GREEN heartbeat** LED indicates a slow heartbeat and the RCC circuit pack's **YELLOW** LED is lighted indicating communication with the switch is established.

6. If the hardware test on the RCC passes, the software test is executed on the RCC circuit pack.

NOTE

No software test is executed for any port circuit packs.

7. The **GREEN** LED on the RCC circuit pack being tested is lighted during the software test.
8. If the **GREEN** LED is not lighted on the RCC circuit pack within five minutes after the hardware test is completed, the maintenance mode bit is probably activated by another facility.

   Contact the local or remote maintenance facility and ask them to release the maintenance mode bit in the **MODE** display procedure.
9. When the RCC circuit pack being tested passes the software test, both LEDs are turned off.

   The **RED** LED is lighted if the RCC circuit pack fails the software test.
10. If any of the circuit packs fail the hardware test or the RCC circuit pack fails the software test indicated by a **RED** LED being lighted, replace the circuit pack and repeat the circuit pack insertion test.

NOTE

If more than one of the circuit packs fail and one of the circuit packs is the RCC (ANN16), replace the RCC circuit pack first.

Port Circuit Pack Insertion

When a port circuit pack is inserted in the remote carrier group, the following occurs.

NOTE

When a GPP circuit pack is tested, all translated peripherals should be connected. When the terminal(s) are powered by external sources (i.e., commercial power), the power to the terminal(s) **must** be turned on.

1. The hardware test on the port circuit pack is performed.

   The **RED** LED on the port circuit pack is lighted, then goes off.

   The **GREEN** LED on the port circuit pack is lighted, then goes off.
2. If the port circuit pack hardware test passes, both LEDs remain off.

   If the port circuit hardware test fails, the **RED** LED is lighted on the port circuit pack.
3. If the port circuit pack fails the hardware test indicated by a **RED** LED being lighted, replace the circuit pack and repeat the circuit pack insertion test.

Fault Isolation for RCG Environmental Failures When specific fault code 1625 is displayed in Field 12 for unit type 74 (RCG), it indicates that the remote carrier group or the cabinet housing the remote carrier group has one or more environmental troubles.

1. Depress **NEXT DATA**.

   Field 11 equals 2 and Field 12 displays a decimal value.

   Record the decimal value displayed in Field 12.

2. Depress **NEXT DATA**.

   Field 11 equals 3 and Field 12 displays a decimal value.

   Record the decimal value displayed in Field 12.

3. Depressing **NEXT DATA** again dashes Fields 11 and 12.

   Depressing **NEXT DATA** once more displays the original values in Fields 11 and 12. Field 11 equals 3; Field 12 equals 1625.

4. Refer to Table AF, PROC 620 - Remote Carrier Group Environmental Definitions, to determine the type of environmental failure requiring corrective action.

   NOTE

   When Field 11 display equals 3, there are 7 possible alarm conditions. When multiple alarm conditions exist, they are independent of each other. Table AF indicates in a note the priority of repair for multiple alarm conditions.

5. When the remote carrier group is **not** mounted in an auxiliary cabinet, some of the environmental encodes will not be displayed in Field 12. Only those environmental encodes applicable to the remote carrier group are displayed when the RCG is a stand-alone unit (not mounted in an auxiliary cabinet).

6. Dispatch maintenance personnel to the remote carrier group location to perform one or more (if required) of the following paragraphs listed below depending upon the type of environmental failure displayed in Field 12 and listed in Table AF, PROC 620 - Remote Carrier Group Environmental Definitions.

Table 5-33.

PROC 620
REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS
(See Note)

FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
2	0	No environmental failures.
2	1	RCC power failure.
2	2	RCG converter alarm.
2	4	RCG low 48-volt alarm.
2	6	RCG converter alarm and RCG low 48-volt alarm.
3	0	No environmental failures.
3	1	Cabinet AC rectifier alarm.
3	2	Cabinet battery holdover alarm.

Table 5-33. (Contd)

PROC 620 REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS (See Note)		
FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	3	Cabinet AC rectifier alarm and Cabinet battery holdover alarm.
3	4	RCG fan alarm.
3	5	Cabinet AC rectifier alarm and RCG fan alarm.
3	6	Cabinet battery holdover alarm and RCG fan alarm.
3	7	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, and RCG fan alarm.
3	8	RCG over temp alarm.
3	9	Cabinet AC rectifier alarm and RCG over temp alarm.
3	10	Cabinet battery holdover alarm and RCG over temp alarm.
3	11	Cabinet AC rectifier alarm, Cabinet battery holdover alarm and RCG over temp alarm.
3	12	RCG fan alarm and RCG over temp alarm.
3	13	Cabinet AC rectifier alarm, RCG fan alarm, and RCG over temp alarm.
3	14	Cabinet battery holdover alarm, RCG fan alarm, and RCG over temp alarm.
3	15	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, and RCG over temp alarm.
3	16	RCG analog ringing generator alarm.
3	17	Cabinet AC rectifier alarm and RCG analog ringing generator alarm.
3	18	Cabinet battery holdover alarm and RCG analog ringing generator alarm.
3	19	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, and RCG analog ringing generator.
3	20	RCG fan alarm and RCG analog ringing generator alarm.
3	21	Cabinet AC rectifier alarm, RCG fan alarm, and RCG analog ringing generator alarm.
3	22	Cabinet battery holdover alarm, RCG fan alarm, and RCG analog ringing generator alarm.
3	23	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, and RCG analog ringing generator alarm.
3	24	RCG over temp alarm and RCG analog ringing generator alarm.

Table 5-33. (Contd)

PROC 620 REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS (See Note)		
FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	25	Cabinet AC rectifier alarm, RCG over temp alarm, and RCG analog ringing generator alarm
3	26	Cabinet battery holdover alarm, RCG over temp alarm, and RCG analog ringing generator alarm.
3	27	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, and RCG analog ringing generator alarm.
3	28	RCG fan alarm, RCG over temp alarm, and RCG analog ringing generator alarm.
3	29	Cabinet AC rectifier alarm, RCG ran alarm, RCG over temp alarm, and RCG analog ringing generator alarm.
3	30	Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, and RCG analog ringing generator alarm.
3	31	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, and RCG analog ringing generator alarm.
3	32	CDM alarm.
3	33	Cabinet AC rectifier alarm and CDM alarm.
3	34	Cabinet battery holdover alarm and CDM alarm.
3	35	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, and CDM alarm.
3	36	RCG fan alarm and CDM alarm.
3	37	Cabinet AC rectifier alarm, RCG fan alarm, and CDM alarm.
3	38	Cabinet battery holdover alarm, RCG fan alarm, and CDM alarm
3	39	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, and CDM alarm.
3	40	RCG over temp alarm and CDM alarm.
3	41	Cabinet AC rectifier alarm, RCG over temp alarm, and CDM alarm.
3	42	Cabinet battery holdover alarm, RCG over temp alarm, and CDM alarm.
3	43	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, and CDM alarm.
3	44	RCG fan alarm, RCG over temp alarm, and CDM alarm.
3	45	Cabinet AC rectifier alarm, RCG fan alarm, RCG over temp alarm, and CDM alarm.

Table 5-33. (Contd)

PROC 620 REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS (See Note)		
FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	46	Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, and CDM alarm.
3	47	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, and CDM alarm.
3	48	RCG analog ringing generator alarm and CDM alarm.
3	49	Cabinet AC rectifier alarm, RCG analog ringing generator alarm, and CDM alarm.
3	50	Cabinet battery holdover alarm, RCG analog ringing generator alarm, and CDM alarm.
3	51	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG analog ringing generator alarm, and CDM alarm.
3	52	RCG fan alarm, RCG analog ringing generator alarm, and CDM alarm.
3	53	Cabinet AC rectifier alarm, RCG fan alarm, RCG analog ringing generator alarm, and CDM alarm.
3	54	Cabinet battery holdover alarm, RCG fan alarm, RCG analog ringing generator alarm, and CDM alarm.
3	55	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG analog ringing generator alarm, and CDM alarm.
3	56	RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	57	Cabinet AC rectifier alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	58	Cabinet battery holdover alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	59	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	60	RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	61	Cabinet AC rectifier alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	62	Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.

Table 5-33. (Contd)

PROC 620 REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS (See Note)		
FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	63	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CDM alarm.
3	64	CEM alarm.
3	65	Cabinet AC rectifier alarm and CEM alarm.
3	66	Cabinet battery holdover alarm and CEM alarm.
3	67	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, and CEM alarm.
3	68	RCG fan alarm and CEM alarm
3	69	Cabinet AC rectifier alarm, RCG fan alarm, and CEM alarm.
3	70	Cabinet battery holdover alarm, RCG fan alarm, and CEM alarm.
3	71	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, and CEM alarm.
3	72	RCG over temp alarm and CEM alarm.
3	73	Cabinet AC rectifier alarm, RCG over temp alarm, and CEM alarm.
3	74	Cabinet battery holdover alarm, RCG over temp alarm, and CEM alarm.
3	75	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, and CEM alarm.
3	76	RCG fan alarm, RCG over temp alarm, and CEM alarm.
3	77	Cabinet AC rectifier alarm, RCG fan alarm, RCG over temp alarm, and CEM alarm.
3	78	Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, and CEM alarm.
3	79	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, and CEM alarm.
3	80	RCG analog ringing generator alarm and CEM alarm.
3	81	Cabinet AC rectifier alarm, RCG analog ringing generator alarm, and CEM alarm.
3	82	Cabinet battery holdover alarm, RCG analog ringing generator alarm, and CEM alarm.
3	83	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG analog ringing generator alarm, and CEM alarm.

Table 5-33. (Contd)

PROC 620 REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS (See Note)		
FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	84	RCG fan alarm, RCG analog ringing generator alarm, and CEM alarm.
3	85	Cabinet AC rectifier alarm, RCG fan alarm, RCG analog ringing generator alarm, and CEM alarm.
3	86	Cabinet battery holdover alarm, RCG fan alarm, RCG analog ringing generator alarm, and CEM alarm.
3	87	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG analog ringing generator alarm, and CEM alarm.
3	88	RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	89	Cabinet AC rectifier alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	90	Cabinet battery holdover alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	91	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	92	RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	93	Cabinet AC rectifier alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	94	Cabinet battery holdover alarm, RCG fan alarm, RCG over term alarm, RCG analog ringing generator alarm, and CEM alarm.
3	95	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, and CEM alarm.
3	96	CDM alarm and CEM alarm.
3	97	Cabinet AC rectifier alarm, CDM alarm, and CEM alarm.
3	98	Cabinet battery holdover alarm, CDM alarm, and CEM alarm.
3	99	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, CDM alarm, and CEM alarm.
3	100	RCG fan alarm, CDM alarm, and CEM alarm.
3	101	Cabinet AC rectifier alarm, RCG fan alarm, CDM alarm, and CEM alarm.

Table 5-33. (Contd)

PROC 620 REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS (See Note)		
FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	102	Cabinet battery holdover alarm, RCG fan alarm, CDM alarm, and CEM alarm.
3	103	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, CDM alarm, and CEM alarm.
3	104	RCG over temp alarm, CDM alarm, and CEM alarm.
3	105	Cabinet AC rectifier alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	106	Cabinet battery holdover alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	107	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	108	RCG fan alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	109	Cabinet AC rectifier alarm, RCG fan alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	110	Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	111	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, CDM alarm, and CEM alarm.
3	112	RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	113	Cabinet AC rectifier alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	114	Cabinet battery holdover alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	115	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	116	RCG fan alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	117	Cabinet AC rectifier alarm, RCG fan alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	118	Cabinet battery holdover alarm, RCG fan alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.

Table 5-33. (Contd)

PROC 620
REMOTE CARRIER GROUP ENVIRONMENTAL DEFINITIONS
(See Note)

FIELD 11 =	FIELD 12 =	ENVIRONMENTAL DEFINITION
3	119	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	120	RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	121	Cabinet AC rectifier alarm, RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	122	Cabinet battery holdover alarm, RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	123	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	124	RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	125	Cabinet AC rectifier alarm, RCG fan alarm, RCG over temp alarm, RCG analog generator alarm, CDM alarm, and CEM alarm.
3	126	Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.
3	127	Cabinet AC rectifier alarm, Cabinet battery holdover alarm, RCG fan alarm, RCG over temp alarm, RCG analog ringing generator alarm, CDM alarm, and CEM alarm.

Note: When Field 11 display equals 3, there are 7 possible alarm conditions. When multiple alarm conditions exist, they are independent of each other. Each alarm condition has to be corrected separately. When multiple alarms exist, the priority of repair is:

1 = Cabinet AC rectifier.
2 = CDM.
3 = CEM.
4 = RCG analog ringing generator.
5 = RCG over temp.
6 = RCG fan.
7 = Cabinet battery holdover.

RCC Power Failure Environmental Alarm

The RCC power failure alarm normally indicates that a circuit breaker is tripped, an AC cord is disconnected, or commercial power is not available.

1. At the remote carrier group location, determine if any circuit breakers are tripped.

   If no circuit breakers are tripped, proceed to Step 4.

   If any circuit breaker is tripped, proceed to Step 2.

2. Reset the circuit breaker.

   If the circuit breaker does not trip again, proceed to Step 7.

   If the circuit breaker trips again, proceed to Step 3.

3. The corrective action to be taken depends on the tripped circuit breaker.

   Replacement of components associated with the circuit breaker may be required.

   Wiring or cabling associated with the circuit breaker should be checked.

4. At the remote carrier group location, check the power cord to the AC outlet.

   If the power cord is connected, proceed to Step 6.

   If the power cord is not connected, proceed to Step 5.

5. Connect the power cord to the AC outlet and proceed to Step 7.

6. Determine if the commercial power at the remote carrier group is available.

   If the commercial power is not available, report the problem to the customer.

   If the commercial power is available, proceed to Step 7.

7. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

8. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

   Determine if the same entry and environmental cause for unit type 74 is displayed.

9. If the same entry and environmental cause is not displayed, corrective action is complete.

10. If the same entry and environmental cause is displayed, check the wiring and and cabling associated with the circuit breaker, power cord, and commercial power at the remote carrier group location.

RCG Converter Environmental Alarm

The faulty DC/DC converter or 634WAAB1 power unit is identified within the remote carrier group by its illuminated **RED** LED.

In the event of protective shutdown a reset toggle switch is located behind the front panel faceplate of the DC/DC converter or 634WAAB1 power unit.

1. At the remote carrier group location, check the circuit breaker associated with the DC/DC converter or 634WAAB1 power unit.

   If the circuit breaker is tripped, proceed to Step 2.

   If the circuit breaker is not tripped, proceed to Step 3.

2. Reset the circuit breaker.

   If the circuit breaker does not trip, proceed to Step 9.

   If the circuit breaker trips again, check the wiring between the circuit breaker and the DC/DC converter or 634WAAB1 power unit.

3. At the remote carrier group, measure the output voltage using a Digital Voltmeter (DVM) at the test points of the DC/DC converter or 634WAAB1 power unit.

   If the voltage reading is greater than 0, proceed to Step 4.

   If the voltage reading is 0, perform Steps 5 through 8.

4. Replace the DC/DC converter or 634WAAB1 power unit and proceed to Step 9.

5. Unseat all circuit packs in the remote carrier group associated with the DC/DC converter or 634WAAB1 power unit.

   CAUTION

   Ensure that the toggle switch is in the up position before reseating the handle.

   Activate the reset toggle switch by pulling the DC/DC converter or 634WAAB1 power unit handle halfway out without unseating the DC/DC or 634WAAB1 circuit board, and then reseating the handle.

6. Measure the output voltage at the DC/DC converter or 634WAAB1 power unit.

7. If the voltage reading is 0, reseat all circuit packs, replace the DC/DC converter or 634WAAB1 power unit, and proceed to Step 9.

8. If the voltage reading is greater than 0, reseat the circuit packs one at a time.

   The **RED** LED lights on the DC/DC converter or 634WAAB1 power unit when the faulty circuit pack is seated.

   Replace the faulty circuit pack, reseat any disconnected circuit packs and proceed to Step 9.

9. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

10. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

    Determine if the same entry and environmental cause for unit type 74 is displayed.

11. If the same entry and environmental cause is not displayed, corrective action is complete.

12. If the same entry and environmental cause is displayed, check the backplane wiring for a short causing overcurrent shutdown and the wiring associated with the faulty circuit pack.

RCG Low 48-volt Environmental Alarm

1. Determine the type of power source installed in the remote carrier group.
2. If a DC/DC converter or 634WAAB1 power unit is the power source, proceed to isolation and repair step **RCG Converter Environmental Alarm** above and perform Steps 3 through 12 (as appropriate).
3. If an external rectifier is the power source, proceed to isolation and repair step **Cabinet AC Rectifier Environmental Alarm** below and perform Steps 5 through 14 (as appropriate).

Cabinet AC Rectifier Environmental Alarm

A **GREEN** pilot LED located on the front panel of the rectifier is lighted when the rectifier is producing -48 volts on its output.

The **GREEN** pilot LED does not indicate that the output voltage is within regulation limits.

Appropriate test points are available on the front panel of the rectifier for measuring the output voltage and determining the rectifier performance.

1. At the rectifier, determine if the **GREEN** pilot LED is lighted.

   If the **GREEN** pilot LED is not lighted, proceed to Step 2.

   If the **GREEN** pilot LED is lighted, proceed to Step 8.
2. Determine if the circuit breaker associated with the rectifier is tripped.

   If the circuit breaker is tripped, proceed to Step 3.

   If the circuit breaker is not tripped, proceed to Step 5.
3. Reset the circuit breaker.

   If the circuit breaker does not trip, proceed to Step 11.

   If the circuit breaker trips again, replace the rectifier.

   NOTE

   Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacing the rectifier.

4. If the circuit breaker does not trip again after replacing the rectifier, proceed to Step 11.

   If the circuit breaker trips again after replacing the rectifier, check the wiring associated with the rectifier.
5. Measure the rectifier output voltages at the test points using a digital multimeter.

   NOTE

   At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and -52.6 volts, respectively.

   If all voltages are within tolerance, proceed to Step 11.

   If the voltages are not within tolerance, proceed to Step 6.

6. Replace the rectifier.

   NOTE

   Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacing the rectifier.

7. Measure the output voltages.

   NOTE

   At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and -52.6 volts, respectively.

   If all voltages are within tolerance, proceed to Step 11.

   If voltages are not within tolerance, check the wiring associated with the rectifier.

8. Determine if marginal or fluctuating voltages exist at the rectifier test points by measuring the output voltages using a digital multimeter.

   NOTE

   At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -48 volts and -52.6 volts, respectively.

   If all voltages are within tolerance without fluctuation, proceed to Step 11.

   If the voltages are marginal or fluctuating, proceed to Step 9.

9. Replace the rectifier.

   NOTE

   Refer to AUXILIARY COMPONENT REPLACEMENT for steps on replacing the rectifier.

10. Measure the output voltages.

    NOTE

    At the auxiliary cabinet rectifier, minimum and maximum voltage readings should be between -46 volts and 52.6 volts, respectively.

    If all voltages are within tolerance and do not fluctuate, proceed to Step 11.

    If voltages are not within tolerance or fluctuate, check the wiring associated with the rectifier.

11. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

    Wait at least 5 to 10 minutes.

12. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

    Determine if the same entry and environmental cause for unit type 74 is displayed.

13. If the same entry and environmental cause is not displayed, corrective action is complete.

14. If the same entry is displayed, check the wiring associated with the rectifier.

CDM Environmental Alarm

Fault isolation techniques for CEM, CDM, and NCTE units are provided below.

1. On-site isolation among the units that are provided between the RCG port and the span line interface is performed by activating built-in tests on individual units and by using patch cords to provide external looparound and to bypass equipment external to the RCG port.

2. On-site tests for the specific unit should be run as needed in accordance with the maintenance documentation (or other vendor documentation) provided for the specific unit.

3. At the local **MAAP** or remote maintenance facility (if available), external looparound should be performed by changing Field 12 of **PROC 260** to a 1 and executing **PROC 620**, Test 2 on the RCG circuit pack.

   Test 2 performs external looparound on the RCG circuit pack to the first looparound on the RCG link outside the switch.

4. When CEMs are provided, a preferred looparound is on a patch field such as the ED-2C780 Jack Panel (X IN to X OUT or Y IN to Y OUT).

   NOTE

   The CEM switches looparound data back to the CEM. The switches do not loop data back towards the switch.

5. If a CDM is also provided, the CDM should be bypassed by manually forcing it into looparound.

6. If Test 2 of **PROC 620** fails, the RCG circuit pack should be replaced and the tests repeated.

   If Test 2 still fails, check the wiring between the RCG circuit pack and the associated units.

7. If Test 2 passes, activate the CEM loop switches and observe that no equipment alarm exists on the CEM.

   If no alarms are observed, loop the data at the NCTE (X IN to X OUT patch cord) and remove the line Z loop on the CEM via the loop control switch.

8. Observe that the CEM runs alarm free after reset is depressed.

   If the CEM displays alarms, trouble with the NCTE and the wiring to the NCTE probably exist.

   If the CEM does not display alarms, trouble with the facility probably exists.

CEM Environmental Alarm

1. The CEM maintenance procedures are specified in AT&T Practice 365-287-100.

   In general, the CEM circuit pack with the RED LED lighted is the first choice.

   If none are lighted, power should be checked at the test points on the power unit.

   Following the repair the CEM reset button must be depressed to clear the alarm condition.

2. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 625**, Test 1 and check the health status of the RCG facility.

3. If the health status indicates that the RCG facility is presently operational, the alarms should be retired using **PROC 620**, Test 1 at the local MAAP or remote maintenance facility (if available), and no destructive testing of the RCG facility should be performed.

4. If the health status indicates that the RCG facility is not healthy or **if you desire to verify that the RCG facility is functioning**, use the following test call prior to testing the RCG using **PROC 620**.

   Make a terminal-to-trunk test call using **PROC 642** on the RCG.

   CAUTION

   The RCG tests executed by PROC 620, Tests 2 through 5 are service affecting and should only be executed during periods of low traffic, during out-of-hours, or after a service outage has already occurred and is verified using one of the above tests. PROC 625, Test 1 should always be used when the current health of a RCG digital service is in question.

5. After repair of the CEM, the RCG circuit must be tested to clear the alarmed entry in PMIDS.

   CAUTION

   Busying out a RCG circuit pack disrupts calls in progress on all 24 ports of the RCG circuit pack.

   At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 4 and busy out the RCG circuit by depressing **BUSY OUT**. One circuit cannot be busied out by **PROC 620**. If all 24 circuits on the RCG circuit pack are busied out in any busy out procedure, testing can be performed.

   NOTE

   If the RCG circuit pack is not busied out the test **will** fail with a specific fault code of 13 (RCG in-use) if any channel on the RCG is in-use when the test is performed.

   Perform Steps 1 through 67 (as required) of isolation and repair step **One Digital Network Circuit Failure** to retire the alarm cause.

RCG Analog Ringing Generator Environmental Alarm

1. At the remote carrier group location, replace circuit pack CAL1.

   NOTE

   Circuit pack CAL1 should only be replaced during low traffic if digital circuits are provided, and should be replaced immediately if analog circuits are provided.

2. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

3. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

   Determine if the same entry and environmental cause for unit type 74 is displayed.

4. If the same entry and environmental cause is not displayed, corrective action is complete.

5. If the same entry and environmental cause is displayed, check the wiring associated with the CAL1 circuit pack.

RCG Over Temp Environmental Alarm

An overtemperature alarm cause signifies that a predetermined remote carrier group temperature is exceeded.

1. Determine if the fan in the remote carrier group is running.

   If the fan is running, proceed to Step 2.

   If the fan is not running, proceed to Step 3.

2. Determine if the fan is operating properly.

   If the fan is operating properly, proceed to Step 4.

   If the fan is not operating properly, replace the fan, allow sufficient time for the remote carrier group interior to cool and proceed to Step 4.

3. Replace the fan, allow sufficient time for the remote carrier group interior to cool, and proceed to Step 4.

4. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

5. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

   Determine if the same entry and environmental cause for unit type 74 is displayed.

6. If the same entry and environmental cause is not displayed, corrective action is complete.

7. If the same entry and environmental cause is displayed, check the wiring associated with the fan.

RCG Fan Environmental Alarm

1. Determine if the fan in the remote carrier group is running.

   If the fan is running, proceed to Step 2.

   If the fan is not running, proceed to Step 3.

2. Determine if the fan is operating properly.

   If the fan is operating properly, proceed to Step 4.

   If the fan is not operating properly, replace the fan, allow sufficient time for the remote carrier group interior to cool and proceed to Step 4.

3. Replace the fan, allow sufficient time for the remote carrier group interior to cool, and proceed to Step 4.

RCG Fan Environmental Alarm

1. Determine if the fan in the remote carrier group is running.

   If the fan is running, proceed to Step 2.

   If the fan is not running, proceed to Step 3.

2. Determine if the fan is operating properly.

   If the fan is operating properly, proceed to Step 4.

   If the fan is not operating properly, replace the fan, allow sufficient time for the remote carrier group interior to cool and proceed to Step 4.

3. Replace the fan, allow sufficient time for the remote carrier group interior to cool, and proceed to Step 4.

4. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.

5. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

   Determine if the same entry and environmental cause for unit type 74 is displayed.

6. If the same entry and environmental cause is not displayed, corrective action is complete.

7. If the same entry and environmental cause is displayed, check the wiring associated with the fan.

Cabinet Battery Holdover Environmental Alarm

Nominal or extended holdover is provided by a 312 power unit, a J87462A power unit (consisting of a charger and battery system) or a DC filter.

Except for a DC filter, the holdover alarm is detected by software when **RSV FAIL** or **BTY ON LINE** on the 312 power unit or when **RSV ALM** or **BTY ON LINE** on the J87462A power unit is active.

Except for the DC filter, LEDs on the 312 power unit or J87462A power unit determine whether the switch failed or is drawing battery power because cabinet AC voltage is absent.

Appropriate test points are available on the 312 power unit or J87462A power unit for determining the power unit's performance.

1. Determine the type of holdover power unit installed in the cabinet housing the remote group carrier.
2. If a DC filter is the type of holdover power unit installed in the cabinet housing the remote carrier group, replace the DC filter.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC filter.

   If a DC filter is not the type of holdover power unit installed in the cabinet housing the remote carrier group, proceed to Step 7.
3. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

   Wait at least 5 to 10 minutes.
4. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

   Determine if the same entry and environmental cause for unit type 74 is displayed.
5. If the same entry and environmental cause is not displayed, corrective action is complete.
6. If the same entry and environmental cause is displayed, check the wiring associated with the DC filter.
7. At the cabinet housing the remote carrier group, determine the cause of the holdover alarm by checking the LEDs on the appropriate power unit (312 or J87462A).

   If the **BTY ON LINE** LED is lighted, check the cabinet AC voltage (the cabinet is being powered from the battery system of the appropriate power unit, i.e., 312 or J87462A).
8. If the **RSV FAIL** or **RSV ALM** LED is lighted, use the test points on the appropriate power unit (312 or J87462A) to determine the cause of the problem.

   Check for -48 volts using a digital voltmeter connected between test points **-48V** and **GRD**.

   Check for BTY (-48 volts) using a digital voltmeter connected between test points **BTY** and **GRD**.

9. If -48 volts is present but BTY is not, proceed to Step 10.

   If -48 volts is absent, check the wiring between the appropriate power unit and the voltage source.

10. Replace the CP1 circuit pack (charger and alarm board) in the 312 power unit or the AMC-1 circuit pack (power board) in the J87462A power unit.

    NOTE

    If the AMC-1 circuit pack in the J87462A power unit has a AMD-1 circuit pack (logic board) attached to it, replace both circuit packs as a set.

11. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

    Wait at least 5 to 10 minutes.

12. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

    Determine if the same entry and environmental cause for unit type 74 is displayed.

13. If the same entry and environmental cause is not displayed, corrective action is complete.

14. If the same entry and environmental cause is displayed, proceed to Step 15.

15. If the nominal or extended holdover is a 312A or 312C power unit, or a J87462A List 6 or List 7 power unit, repeat Steps 10 through 15 for the other CP1 or AMC-1 circuit pack.

    If the nominal or extended holdover is a 312B power unit or a J87462A List 5 power unit, proceed to Step 16.

    If both CP1 or AMC-1 circuit packs are replaced, proceed to Step 16.

16. At the cabinet housing the remote carrier group, replace the 312 power unit or J87462A power unit (as appropriate).

17. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and clear the alarmed entry.

    Wait at least 5 to 10 minutes.

18. At the local **MAAP** or remote maintenance facility (if available), enter **PROC 620**, Test 1 and depress **EXECUTE**.

    Determine if the same entry and environmental cause for unit type 74 is displayed.

19. If the same entry and environmental cause is not displayed, corrective action is complete.

20. If the same entry and environmental cause is displayed, check the wiring associated with the 312 power unit or J87462A power unit (as appropriate).

Remote Module Interface (Unit Type 71) Failures

Overview Fault isolation of Remote Module Interface (RMI) circuit failures depends on whether the RMI is the central (switch end) or the remote RMI.

The equipment location displayed in Fields 2 through 6 (Field 7 is dashed) for the RMI (TN456) is **always** the central RMI equipment location.

Specific fault codes displayed in Field 12 assist in determining whether the TN456 to be replaced is a central or remote RMI. Reference to Unit Type 71 in Table AH, PROC 620 - Fault Code Definitions by Unit Type, lists the central or remote TN456 to replace, depending on whether it is the first, second, or third (as appropriate) circuit pack to replace.

Fault Isolation Perform the following procedure to isolate RMI failures.

1. Enter **PROC 620**, Test 4.

   NOTE

   The alarmed circuit that was displayed in Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

2. Record the specific fault code displayed in Field 12 which was detected by on-line periodic software tests and logged in PMIDS.
3. Check the circuit status displayed in Field 10.

   If Field 10 equals 1 (on-line and in-use), Test 4 cannot be performed for the RMI circuit. Wait until the circuit is not in-use or perform tests on other circuits.

   If Field 10 equals 4 (unable to communicate or not plugged in), proceed to Step 4.

   NOTE

   A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 10 before Test 4 is executed.

   If Field 10 does not equal 4, proceed to Step 5.

4. If Test 4 is being run remotely, proceed to Step 5.

   If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

   If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 5.

   If the circuit pack is firmly seated, proceed to Step 5.

5. Depress **EXECUTE**.
6. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the network digital circuit cannot be tested.

   If special error code 81 or 83 is not displayed, proceed to Step 9.
7. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

   If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

   If TN380 or TN381 fails, perform Steps 11 through 29 below (as required).

   If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.
8. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.
9. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

NOTE

The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

10. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a faulty ID chip on the circuit pack is the problem. Proceed to Step 30.

    If the circuit status does not equal 4, proceed to Step 35.
11. If the circuit fails, indicated by a specific fault code displayed in Field 12 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

CAUTION

Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

12. Check the specific fault code displayed in Field 12.

    If the specific fault code displayed in Field 12 is 396, reseat the remote RMI circuit pack. Otherwise, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.
13. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

NOTE

A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

14. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a faulty ID chip on the circuit pack is the problem. Proceed to Step 30.

    If the circuit status does not equal 4, proceed to Step 35.

15. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    Check the specific fault code displayed in Field 12.

    If the specific fault code displayed in Field 12 is 396, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 2 through 6.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

16. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 35.

17. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no alternate circuit pack is available for replacement.

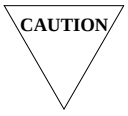
    Refer to RMI circuit pack LEDs described in Step 36 and isolation and repair step **Specific Fault Codes** for further isolation techniques.

18. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the original circuit pack goes off, and the **RED** LED on the alternate circuit pack is lighted.

19. Check the specific fault code displayed in Field 12.

    If the specific fault code displayed in Field 12 is 393, 394, or 397, reseat the remote RMI circuit pack. Otherwise, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

20. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 35.

21. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    Check the specific fault code displayed in Field 12.

If the specific fault code displayed in Field 12 is 393, 394, or 397, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 2 through 6.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

22. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 35.

23. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no other alternate circuit pack is available for replacement.

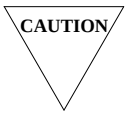
    Refer to RMI circuit pack LEDs described in Step 36 and isolation and repair step **Specific Fault Codes** for further isolation techniques.

24. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the first alternate circuit pack goes off, and the **RED** LED on the second alternate circuit pack is lighted.

25. Check the specific fault code displayed in Field 12.

    If the specific fault code displayed in Field 12 is 395, reseat the remote RMI circuit pack. Otherwise, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.



Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

26. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    Proceed to Step 35.

27. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

    Check the specific fault code displayed in Field 12.

    If the specific fault code displayed in Field 12 is 395, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 2 through 6.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

28. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    Proceed to Step 35.

29. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

    Refer to RMI circuit pack LEDs described in Step 36 and isolation and repair step **Specific Fault Codes** for further isolation techniques.

30. When a circuit status of 4 indicates a faulty ID chip, perform Steps 31 through 34.

31. Check the specific fault code displayed in Field 12.

    If the specific fault code displayed in Field 12 is 396, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 3 through 6.

32. Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

    Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

33. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 35.

34. If the circuit pack fails, the **RED** LED is lighted on the faceplate of the circuit pack. Check the wiring associated with the circuit pack replaced.

35. The **NETWORK SWITCH** fault indicator goes off when the circuit passes Test 4.

    The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

36. The LEDs on the RMI circuit pack may assist in isolating problems with RMI failures.

    The **RED** LED (LFAIL indicator) in position 11 of the RMI circuit pack when lighted indicates the channel between the RMI central and remote RMI is not in communication.

    The **GREEN** LED (FTA indicator) in position 14 of the RMI circuit pack when lighted indicates transmission to the remote RMI over the fiber.

    The **GREEN** LED (FRA indicator) in position 16 of the RMI circuit pack when lighted indicates reception from the remote RMI over the fiber.

37. Examine the LEDs on the RMI circuit pack.

    If the **RED** LED in position 11 is not lighted, then communication between the central and remote RMIs is good. Proceed to Step 38.

    If the **RED** LED in position 11 is lighted, check the communication path between the central and remote RMIs.

38. Examine the **GREEN** LEDs in positions 14 and 16 of the RMI circuit pack.

    Perform corrective action based on whether transmission or reception is failing.

TSI Demand Test

Overview To ensure the integrity of the switch, the TSI demand test is executed prior to leaving the customer's premises when any circuit packs in unit type 8 (maintenance interface), unit type 9 (module clock), unit type 10 (TSI ALU), unit type 11 (TSI PSTORE), unit type 13 (PDS), and unit type 15 (PDI) are replaced.

Fault Isolation To run the TSI demand test, perform the following steps:

1. Step to Test 2 of **PROC 620**.
2. Use the **CHANGE FIELD** sequence to enter unit type 99 in Field 2:

   CHANGE FIELD; 2; ENTER; 99; ENTER.

   NOTE

   Unit type 99 cannot be stepped to by using **NEXT UNIT**.

3. Depress **EXECUTE**.

   If Test 2 passes the TSI demand test, all corrective action is complete.

   If Test 2 fails the TSI demand test, proceed to Step 4.

4. Enter Test 4 and test the following unit types in the order listed by using **NEXT UNIT** and **NEXT CIRCUIT** (as applicable) to select the unit type and circuit pack to be tested. Perform Steps 6 through 66 (as required) of isolation and repair step **One Digital Network Circuit Failure** for each unit type and circuit pack (as applicable) that fails.

   Unit type 11 - TSI PSTORE.

   Unit type 13 - PDS (test all PDS circuit packs, 0 through 5).

   Unit type 15 - PDI (test all PDI circuit packs, 0 through 23).

   Unit type 9 - Module clock.

   Unit type 8 - MIF.

   Unit type 10 - TSI ALU.

5. When all unit types pass Test 4, corrective action is complete.

Special Error Code 88

Overview Assumption: **PROC 620**, Test 4 displays special error code 88 when testing the MCC or a trouble exists where the common control cannot communicate with a network module.

The problem lies somewhere above the MCC or in the cabling between the MCC and the 4 MHZ channels.

Fault Isolation

1. Execute Test 2 of **PROC 611** (Common Control I/O Tests).
2. If Test 2 of **PROC 611** fails, perform the corrective action listed in the repair guide part of **PROC 611** until Test 2 passes.
3. Perform Test 4 of **PROC 620** and test the MCC (unit type 6).

   If Test 4 passes, corrective action is complete.

   If Test 4 fails, check the cabling and wiring between the MCC and the common control.

Special Error Code 90

Overview Assumption: **PROC 620**, Test 4 displays special error code 90 (test passed, see documentation) when performing a diagnostic or verification test.

Special error code 90 (test passed, see documentation) can occur when testing unit type 23 (TMS/network duplication), a trunk in unit type 27 (GPP), or a trunk in unit type 72 (EIA trunk) after the diagnostic or verification test **passes**.

Special error code 90 (test passed, see documentation) indicates that further diagnosis of the possible trouble should be performed.

Unit Type 23 (TMS/network duplication) Fault Isolation

1. Record the TMS/network duplication channel displayed in Fields 2 through 7.
2. Enter **PROC 621**, Test 2 and perform a soft switch of the TMS/network duplication channel displaying special error code 90 by performing the following:

   Enter the module, cabinet, and carrier number (recorded in Step 1) in Fields 3 through 5 of **PROC 621**.

   Depress **EXECUTE**.

   Depress **CHANGE FIELD; 8; ENTER; 1; ENTER**.

   Depress **EXECUTE**.

   NOTE

   The first time **EXECUTE** is depressed, the soft switch does not occur. Special error code 85 (push EXECUTE twice to switch) is displayed in the **MAAP** error code field.

   Depress **EXECUTE**.
3. Enter **PROC 620**, Test 4 and enter the TMS/network duplication channel recorded in Step 1 in Fields 2 through 7.
4. Depress **EXECUTE**.

5. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

NOTE

The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

6. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

   Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a fault ID chip on the circuit pack is the problem. Proceed to Step 29.

   If the circuit status does not equal 4, proceed to Step 33.

7. If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code board, corrective action is complete.

NOTE

Both sides of the TMS/network duplication channel have been checked and passed with a **GREEN** LED lighted on the faceplate of the circuit pack and special error code 90 displayed.

8. If the circuit fails, indicated by a specific fault code displayed in Field 12 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

CAUTION

Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

9. At the equipment location displayed in Fields 3 through 6, reseat the circuit pack.

   Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

10. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

NOTE

A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

11. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

12. If special error code 90 (test passed, see documentation) is displayed in the **MAAP** error code board, corrective action is complete.

NOTE

Both sides of the TMS/network duplication channel have been checked and passed with a **GREEN** LED lighted on the faceplate of the circuit pack and special error code 90 displayed.

13. Check the circuit status displayed in Field 10. If the circuit status equals 4 (unable to communicate or not plugged in), a faulty ID chip on the circuit pack is the problem. Proceed to Step 29.

    If the circuit status does not equal 4, proceed to Step 33.

14. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    At the equipment location displayed in Fields 2 through 6, replace the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

15. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 33.

16. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

    Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no alternate circuit pack is available for replacement.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

17. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the original circuit pack goes off, and the **RED** LED on the alternate circuit pack is lighted.

18. At the equipment location displayed in Fields 3 through 6, reseat the alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

19. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 33.

20. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    At the equipment location displayed in Fields 2 through 6, replace the alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

21. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

    Proceed to Step 33.

22. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

    Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If Fields 2 through 14 are dashed, no other alternate circuit pack is available for replacement.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

23. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

    The **RED** LED on the first alternate circuit pack goes off, and the **RED** LED on the second alternate circuit pack is lighted.

24. At the equipment location displayed in Fields 3 through 6, reseat the second alternate circuit pack.

    CAUTION

    Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

25. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    Proceed to Step 33.

26. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

    At the equipment location displayed in Fields 3 through 6, replace the second alternate circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

27. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

    Proceed to Step 33.

28. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

    Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

29. When a circuit status of 4 indicates a faulty ID chip, perform Steps 30 through 32.

30. At the equipment location displayed in Fields 3 through 6, replace the circuit pack.

    Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.

31. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

    If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

    Proceed to Step 33.

32. If the circuit pack fails, the **RED** LED is lighted on the faceplate of the circuit pack. Check the wiring associated with the circuit pack replaced.

33. The **NETWORK SWITCH** fault indicator goes off when the circuit passes Test 4.

    The **MAJOR** or **MINOR** alarm indicator also goes off if no other sources are affecting both alarm indicators.

Unit Type 27 (GPP) Trunk Fault Isolation

1. Perform Test 1 of **PROC 646** on the equipment location displayed in Fields 3 through 7.
2. If the GPP trunk fails Test 1 of **PROC 646**, replace circuit pack SN270B or SN271 at the equipment location displayed in Fields 7 through 11 of **PROC 646**.
3. Repeat Test 1 of **PROC 646**.
4. If Test 1 of **PROC 646** passes, return to Test 4 of **PROC 620** to retire the cause of the fault indicator.

   If Test 1 of **PROC 646** fails again, check the wiring associated with the circuit pack replaced.

Unit Type 72 (EIA) Trunk Fault Isolation

1. Perform Test 1 of **PROC 646** on the equipment location displayed in Fields 3 through 7.
2. If the EIA trunk fails Test 1 of **PROC 646**, replace circuit pack SN238 at the equipment location displayed in Fields 7 through 11 of **PROC 646**.
3. Repeat Test 1 of **PROC 646**.
4. If Test 1 of **PROC 646** passes, return to Test 4 of **PROC 620** to retire the cause of the fault indicator.

   If Test 1 of **PROC 646** fails again, check the option settings on the terminal associated with the equipment location displayed in Fields 7 through 11 of **PROC 646**.
5. Repeat Test 1 of **PROC 646**.
6. If Test 1 of **PROC 646** passes, return to Test 4 of **PROC 620** to retire the cause of the fault indicator.

   If Test 1 of **PROC 646** fails again, check the wiring between the SN238 and the associated terminal.

Specific Fault Codes

Overview A specific fault code is a number used to provide a description of a failure.

1. This description provides more detail about the failure associated with a circuit.
2. The failure is directly observed at a hardware sensor point or is the result of processing data observed at several hardware sensor points.

Specific fault codes are recorded during periodic or time available testing in PMIDS. Demand testing specific fault codes are recorded in DMIDS.

Both the PMIDS and DMIDS specific fault codes (normally the same) are available for display during testing.

Specific Fault Code Lists A list of the specific fault codes is provided in 2 tables.

1. Table AG, PROC 620 - Specific Fault Code Definitions, lists the specific fault codes in numerical sequence with a definition for each specific fault code.
2. Table AH, PROC 620 - Specific Fault Code Definitions By Unit Type, lists the specific fault codes displayed when testing a circuit within the unit type listed. In addition, Table AH provides other circuits that could cause (with lower probability) the same failure.

Fault Isolation Using Specific Fault Code Tables Further isolation of a failure may be accomplished as follows:

1. Analyze the specific fault codes recorded from PMIDS (first specific fault code recorded before executing Test 4) and DMIDS (second specific fault code recorded after Test 4 failed).
2. Determine from the specific fault codes recorded (using Table AG, PROC 620 - Specific Fault Code Definitions, or Table AH, PROC 620 - Specific Fault Code Definitions By Unit Type) if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

NOTE

The circuit packs listed as circuits 1, 2, and 3 probably have been replaced as the primary candidate and the alternate circuit packs for the failure being investigated.

3. Specific fault codes not listed in Table AG or Table AH are not displayed by **PROC 620** for Release 2, Version 3.
4. Check the wiring associated with the circuit pack(s) replaced [point to point depending upon specific fault code(s) recorded].

Table 5-34.

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
0	**No failure**
2	**TPIO error from a maintenance routine**
3	**No response to an EOM from a maintenance routine**
4	**Data parity error on a maintenance or module (or TMS) processor bus write**
5	**Other non-SYSIO error on a maintenance or module (or TMS) processor bus write**
6	**No positive acknowledge using QUI_port, INIT_TSI, or module processor bus write**
7	**Distribute data after byte incorrect to a PDI**
8	**Distribute data after byte incorrect to a PCI**
9	**Distribute data after byte incorrect to a port**
10	**No positive acknowledge after maintenance order to TMS processor**
11	**Bus problem caused module (or TMS) processor shutdown**
12	**Time slot unavailable**
13	**Circuit in-use by call processing**
14	**ID chip failure**
15	**Major module (or TMS) processor failure—no switch required**
16	**Major failure found in module (or TMS) processor test**
17	**Major duplication/update failure in module (or TMS) processor test**
18	**Major module (or TMS) processor failure**
19	**Minor module (or TMS) processor failure**
21	**Bad MCC/module (or TMS) processor communications**
22	**Module (or TMS) processor address parity failure**
23	**Can not manipulate MCC status register bits**
24	**Critical MCC circuit failure**
27	**Can not manipulate MCC status register bits or AEH4 alarm distribution and air flow monitor**
28	**Bus problem caused module (or TMS) processor shutdown**
29	**Circuit pack pulled or 4-Mhz cable disconnected**
30	**Incorrect clock output sequence (incorrect SAC)**
31	**Maintenance interface failure caused incorrect SAC readout**
32	**GPP data clock lost momentarily (incorrect DCE readout)**
33	**Maintenance interface failure caused incorrect DCE readout**
34	**Clock out of lock with reference clock, module on-line (simplex with SCS)**
35	**Clock out of lock with reference clock, module off-line (simplex with SCS)**
36	**MIF failure caused incorrect OOL readout, module on-line**

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
37	MIF failure caused incorrect OOL readout, module off-line
38	Clock frequency generator failed
39	MIF failure caused incorrect DCE OOL readout
40	Off-line clock appears as master with no SCS/LGI present
41	MIF failure caused off-line clock to appear as master with no SCS/LGI present
42	Clock appears as master with SCS/LGI present
43	MIF failure caused clock to appear as master with SCS/LGI present
44	On-line clock appears as slave with no SCS/LGI present
45	MIF failure caused maintenance interface appearance of on-line clock as slave with no SCS/LGI present
50	TSI PSTORE resources not available
51	Port resources not available
52	TSI PSTORE intermittently reports invalid network test activity
53	A zero value can not be read over the PST maintenance bus path
54	Intermittent addressing fault within the TSI
55	A non-zero value can not be read over the PST maintenance bus path
56	At least one PDS is receiving PCM data from a double-connect
57	Intermodule data store or module clock out of lock caused TSI test failure
58	Test vector 128-255 output from MIF incorrect
59	PDS data or addressing in output store incorrect
60	PDI addressing or control incorrect
61	ALU receives incorrect data from PDS
62	PDI output data incorrect
63	Intermittent fault in PCM data path
64	Intermittent PDI read error over port command bus
65	Intermittent ALU read error over maintenance bus path
66	Intermittent PDS read error over maintenance bus path
67	PST erroneously reports network test activity
68	MIF outputs test vectors when shut off
69	PDS output store generates network test flags on ports not presently in-use or illegal connection to port
70	PDS input store generates network test flags
71	PDI generates network test flags
72	ALU accumulator to destination SPN zero addressing fault
73	MIF test vector circuitry faulty

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
74	MIF TVB contents incorrect
75	Bad PST memory parity
76	PST not cycling
77	Intermittent PDS read error over maintenance bus path
78	ALU address processing suspected
79	PDS address processing suspected
80	PDI loop-around or data failure
81	PDS input store addressing or data failure
82	PST instruction addressing fault
83	PDS internal addressing fault or illegal connection to port
84	PST address or memory fault or illegal connection to port
85	PST memory or output fault
86	ALU address processing fault
87	ALU PCM data fault
88	ALU data fault or faulty interface on PCM bus by TN440 PDS or TN441 IDS
89	TSI PSTORE has multiple parity errors
90	Failed the module (or TMS) processor based DUP_TST
92	DUP board status bits would not set or clear
93	On-line TN530 error flag was set
94	Off-line TN530 error flag was set
95	State of health comparator test failed
96	Double write control test failed
97	Double write with bad parity test failed
98	Duplication channel did not detect bad parity
99	Detected double writes off and turned them on
100	Non-zero idle port control register
101	Defective gate array A
102	Defective gate array B
103	Defective gate array C
104	Faulty port select in gate array A
105	Faulty port select in gate array B
106	Faulty port select in gate array C
109	Faulty set of LA flip-flop
110	Faulty set of CPU flip-flop
118	Faulty clear of LA flip-flop
120	Valid tone present bit stuck active in summary board scan

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
121	Valid tone present not indicated in summary board scan (reorder or data answer tone used)
122	Valid tone present not indicated in tone register (reorder or data answer tone used)
123	Tone not detected in tone register (reorder or data answer tone used)
124	Faulty clear of CPU flip-flop
125	Off-hook error possibly from attached station
126	Off-hook error from bad LA clear or attached station
128	Ring detection error possibly from attached CO
129	Ground detection error possibly from external circuit signaling
130	Active SEZD* error possibly from busy code call circuit
131	Terminated line failed to indicate off-hook
133	Off-hook status failed to latch
134	CPT reflection detector failed to stabilize
135	CPT tone test detection failed to stabilize
136	CPT reflection data ready flag stuck active
137	CPT tone test data ready flag stuck active
138	Normal current detector stuck active
139	Ground detector failed to detect ground
140	GS relay stuck operated
141	Reverse current detector stuck active
142	CPT tone test detection failed to stabilize
143	Code call digit done* improperly active
144	Code call digit done* improperly inactive
145	Faulty code call chime period
146	Faulty digital signal processor
147	Code SEZD* improperly inactive
149	Insufficient 440-hz on-hook reflection
150	Excessive 440-hz on-hook reflection
151	Insufficient 440-hz off-hook reflection
152	Excessive 440-hz off-hook reflection
153	Excessive signal at other than 440-hz
154	On-hook status failed to power down CODEC
155	CODEC power up stuck active
156	Faulty first tone test frequency idle indication
157	Faulty second tone test frequency idle indication

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
158	Faulty first tone test quiet time idle indication
159	Faulty second tone test quiet time idle indication
160	Faulty 440-hz frequency
161	Faulty dial tone first tone frequency or tone test non-idle indication
162	Faulty dial tone second tone frequency or tone test non-idle indication
163	Faulty first tone test quiet time non-idle indication
164	Faulty second tone test quiet time non-idle indication
165	Faulty interrupted dial tone first tone frequency
166	Faulty interrupted dial tone second tone frequency
167	Faulty interrupted dial tone first tone quiet time
168	Faulty interrupted dial tone second tone quiet time
169	Faulty audible ring first tone frequency
170	Faulty audible ring second tone frequency
171	Faulty audible ring first tone quiet time
172	Faulty audible ring second tone quiet time
173	Faulty special audible ring first tone frequency
174	Faulty special audible ring second tone frequency
175	Faulty special audible ring first tone quiet time
176	Faulty special audible ring second tone quiet time
177	Faulty intercept first tone frequency
178	Faulty intercept second tone frequency
179	Faulty intercept first tone quiet time
180	Faulty intercept second tone quiet time
181	Faulty busy first tone frequency
182	Faulty busy second tone frequency
183	Faulty busy first tone quiet time
184	Faulty busy second tone quiet time
185	Faulty reorder first tone frequency
186	Faulty reorder second tone frequency
187	Faulty reorder first tone quiet time
188	Faulty reorder second tone quiet time
189	Faulty 440-hz reflection detector idle indication
190	Faulty broad band reflection detector idle indication
191	Faulty 440-hz reflection detector non-idle indication
192	Faulty broad band reflection detector non-idle indication
193	Faulty reception of auxiliary immediate ring back tone

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
194	Battery feed reversal stuck active or idle circuit indicates loop closure
196	Battery field reversal stuck inactive
197	Faulty dial tone first tone frequency or tone test non-idle indication
198	Faulty dial tone second tone frequency or tone test non-idle indication
199	Busy out failed
200	Can not test: This is the only available facility
201	Defective gate array D
202	Faulty port select in gate array D
203	E OR M signal indicator stuck active
204	Failure of OP set
205	M-signal sent indicator stuck inactive
206	Possible external circuit signaling
208	Clearing loop-around fails to remove 440-hz signal
211	Off-hook status (ground signal detector) fails to power up the CODEC
214	Failure of gate array or E-signal receiver
215	Failure of OP flip-flop
216	Incorrect encode in TIE trunk ID chip
218	Network order failed
219	Release busy out failed
220	DSP checksum stuck active
235	440-hz transmission failure between 2 ports
236	Excessive signal other than 440-hz at send port
237	Improper 440-hz transmission from receive input to send output on the same port
239	Test vector 0-127 output from MIF incorrect
240	Maintenance bus to TSI ALU is bad
241	TSI ALU lossing/linearizing fault
242	TSI ALU opcode failure
243	TSI ALU accumulator failure
244	TSI ALU accumulator addressing fault
245	ALU/MIF interface error
246	Idle code generator failure
247	TSI accumulator resources not available
264	Port command bus—bad test register value from IOBI
265	Port command bus—bad test register value from PCI
266	Port command bus—bad test register value from PDI

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
267	Port command bus—bad test register value from port
268	Maintenance bus—bad test register value from MIF
269	Maintenance bus—bad test register value from target board
270	Port command bus—bad SAC value from IOBI
271	Port command bus—bad SAC value from PCI
272	Port command bus—end of message timeout
273	Port command bus—bad clock on MIF
274	Port command bus—IOBI did not flag bad parity
275	Port command bus—bad (on/off) line control
276	Port command bus—bad control complex signal to TN454 and TN452
277	Maintenance interface bus—bad SAC value
278	Maintenance bus—MIF did not flag bad parity
280	MLP controller fault
281	MLP 48-V overload
282	MLP driver circuitry failure
283	MLP failed to return ID request
284	MLP responded to off-hook test with something besides on, off, or no response
285	Idle sender summary scan indicates dial tone detected
286	Idle sender status register indicates port busy
287	Idle sender status register indicates digit queue full
288	Idle sender status register indicates test tone not sent
289	Sender circuit summary check failure
290	Sender not busy while test tone being sent
291	Sender status register indicates test tone complete while sending
292	Sender fails to send 440-hz test tone
293	No idle receiver found for sender retest
294	Sender not busy while sending valid tone
295	Sender status register indicates touch-tone signal done while being sent
296	Sender fails to send a valid touch-tone
297	No touch-tone digit received at receiver
298	Sender fails to detect dial tone
299	Sender detects dial tone after dial tone removed
300	No transmission through receiver, low path to high path
301	No transmission through receiver, high path to low path
302	No idle sender found for receiver retest

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
303	Idle receiver summary scan indicates reception of touch-tone
304	Idle receiver port control register indicates reception of valid touch-tone
305	Receiver fails to receive low level digit
306	Receiver fails to recognize touch-tone
307	Receiver fails to recognize low level digit
308	Receiver receives false tone
309	Sender circuit summary check failure
310	Sender not busy while sending valid tone
311	Sender status register indicates touch-tone signal done while being sent
312	Expected valid touch-tone digit not found in receiver digit register. Failure could not be isolated to either sender or receiver
313	No touch-tone digit received at receiver. Failure could not be isolated to either sender or receiver
315	Loop closure detection may be due to CO attempting seize
316	Insufficient 600-ohm termination reflection possibly caused by open transmission option switch
317	Excessive 600-ohm termination reflection
318	Insufficient short circuit termination reflection
319	Excessive short circuit termination reflection
330	TSI PSTORE instruction parity checking circuitry failed
331	TSI ALU data parity checking circuitry failed
334	PDI data parity checking circuitry failed
337	Hyperactive port (receiving too many signals)
338	Data module does not respond to a query
340	All GPP ports failed the data clock test
344	Insufficient touch-tone signal reflection
345	Excessive touch-tone signal reflection
350	GPP DTL fault (non-remoted board or remoted board) or ADFTC digital self-test fault
351	GPP DTL idle bit set (non-remoted board or remoted board) or ADFTC DTL idle bit set
352	GPP DTLI and DTLF together (non-remoted board or remoted board) or ADFTC digital self-test and DTLI together
353	GPP 48-VOL bit set (current overload) (non-remoted board or remoted board) or ADFTC analog self-test fault
354	GPP 48-VOL and DTLF bits set (non-remoted board or remoted board) or ADFTC analog and digital self-test fault together

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
355	GPP 48-VOL and DTLI bits set (non-remoted board or remoted board) or ADFTC analog self-test and DTLI together
356	GPP 48-VOL, DTLI, and DTLF bits set (non-remoted board or remoted board) or ADFTC analog, digital self-test fault, and DTLI together
357	One S channel retransmission to the port has occurred (non-remoted board or remoted board)
358	More than one S channel retransmission to the port has occurred (non-remoted board or remoted board)
359	GPP test received no response from ADFTC or associated DI (non-remoted board or remoted board) after ID request
360	GPP test found state of health bit set for ADFTC or associated DI (non-remoted board or remoted board)
361	Failure of port BLA set (non-remoted board or remoted board)
362	SAC failed to clear in port DTL loop-around test
363	Invalid SAC signature in port DTL loop-around test
364	Error in TDR in port DTL loop-around test (non-remoted board or remoted board)
365	Soft switch failed
366	Hard switch failed
367	On-line initialization failed
368	Off-line initialization failed
369	Unable to read module health status during initialization
370	Unable to write to load signal register during initialization
371	Negative acknowledge from initialize IOBI order
372	Off-line module (or TMS) processor initialized
373	Port processor fault
374	Signaling processor fault
375	Port processor and signaling processor fault
376	Loss of data fault and port processor fault
377	Loss of data, port processor, and signaling processor faults
378	Signaling processor fault, initialization successful
379	Signaling and port processor faults, initialization successful
380	Loss of data, signaling and port processor faults, initialization successful
381	Signaling processor fault, initialization failed
382	Signaling and port processor faults, initialization failed
383	Loss of data, signaling and port processor faults, initialization failed

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
384	Port processor fault, reset successful
385	Loss of data fault, reset successful
386	Port processor fault, reset failed
387	Loss of data fault, reset failed
391	Unable to read RMI status
392	Unable to write RMI control
393	RMI LPFAIL bit found set, expected to be cleared
394	RMI FRMERR bit found set, expected to be cleared
395	4-Mhz channel error on remote end RMI
396	Remote RMI failure
397	RMI fiber link or remote RMI power failure
398	4-Mhz channel to central RMI failure (RMI status normal)
399	Central RMI failure (4-Mhz loop-back and RMI status failed)
400	Unknown FIFO 14 error code
401	TSI shutdown
402	Module processor interface error
403	Module clock error
404	Intermodule data store error
405	Module system clock synchronizer error
406	TSI PSTORE memory parity error
407	TSI PCM data parity error
408	PDI PCM data parity error
409	Light guide interface error
410	Error FIFO data out of synchronization
411	TMS clock oscillator error (OOL bit set)
412	TMS clock oscillator error (other)
413	TMS clock oscillator after initialization error (MFP bit set)
414	TMS clock oscillator after initialization error (other)
415	Local clock termination error (ERR bit set)
416	Local clock termination error (other)
417	Local clock termination after initialization error (MFP or ACT bit set)
418	Local clock termination after initialization error (other)
419	Module interface error
420	Failed MPX RAM
421	MPX RAM parity error recovery failure
422	MPX initialization error

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
423	MPX initialization alarm
424	MPX RAM parity error
425	TSI running but indicates it is shutdown
426	Ring trip circuit failure
427	Control/summary—scan register read error
429	Port digital signal processor error
430	TMIF PFAIL/late make alarm
432	Burst of TSI PSTORE parity errors
433	Multiple PCM data parity errors from PDI
434	All ports of DVDP board bad
436	MLP controller fault, initialization failed
437	DCLOCK signal does not get through PDS
441	MLP controller fault, initialization successful
444	TSI PSTORE write failure
445	MIF write failure
446	IOBI write failure
447	TMIF write failure
449	Initialization TMS MPX RAM test error
450	Initialization TMS MPX RAM parity checker error
451	TMS interface error
452	Illegal MPX RAM entry error
453	TMS system clock synchronizer error
454	DTLF fault on ADFTC (digital self-test)
455	48-VOL fault on ADFTC (analog self-test)
456	48-VOL and DTLF faults together on ADFTC
457	Protocol error on ADFTC
458	DTL idle on ADFTC
459	BLA bit on port control register failed to clear or set
460	DTLF fault on DVDP
462	Protocol error on EIA
463	EIA signaling processor fault, initialization successful
464	EIA signaling processor fault, initialization failed
465	EIA port fault, reset successful
466	EIA port fault, reset failed
467	EIA loss of data, reset successful
468	EIA loss of data, reset failed

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
469	Module interface out of frame error
500	TMS clock oscillator MFP failure
501	Single local clock termination MFP failure with more than 1 local clock termination circuit installed
502	Two local clock termination MFP failures with more than 2 local clock termination circuits installed
503	Three local clock termination MFP failures with more than 3 local clock termination circuits installed
504	All local clock termination circuits have MFP failures—more than 1 local clock termination circuit installed
505	Single local clock termination MFP failure—1 local clock termination circuit installed
506	TMS clock oscillator maintenance circuit has MFP fault
507	Local clock termination maintenance circuit has MFP fault
508	TMS clock oscillator state determination and duplication control incorrect
509	Maintenance interface failure caused TMS clock oscillator failure
510	TMS clock oscillator OOL error
511	TMS clock oscillator PFL error
512	Can not complete TMS clock oscillator force error sequence
513	Local clock termination PFL error
514	IOBI bus error caused Local clock termination failure
515	Local clock termination ERR bit set—reset worked
516	Local clock termination ERR bit set—can not reset
517	Local clock termination ACT failure
518	Can not complete Local clock termination force error sequence
520	TMS IOBI bus—bad test register value from IOBI
521	TMS IOBI bus—bad test register value from UPCI
522	TMS IOBI bus—bad test register value from IOBI space board
523	TMS IOBI bus—bad SAC value from UPCI
524	TMS IOBI bus—bad SAC value from IOBI
525	TMS IOBI bus—end of message timeout
526	TMS IOBI bus—bad clock on TMIF
527	TMS IOBI bus—IOBI did not flag bad parity
528	TMS maintenance bus—bad test register value from TMIF
529	TMS maintenance bus—bad test register value from target IOBI board

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
530	TMS maintenance bus—bad SAC value
531	TMS maintenance bus—TMIF did not flag bad parity
550	TMS light guide interface parity checking circuit failed to detect a bad parity word
551	TMS module interface parity checking circuit failed to detect a bad parity word
552	TMS module interface time slot integrity circuit failed to detect a buffer error
553	TMS PMX parity checking circuit failed to detect a bad parity word
554	TMS clock oscillator MFP checking circuit failed to detect a missing frame pulse
555	TMS local clock termination ACT checking circuit failed to detect no activity error
556	TMS local clock termination ERR checking circuit failed to detect a clock error
557	TMS local clock termination MFP checking circuit failed to detect a missing frame pulse
558	TMS light guide interface out of frame circuit failed to detect a framing error
559	TMS module interface out of frame circuit failed to detect a framing error
566	TMS light guide interface parity error can not be cleared
567	TMS module interface parity error can not be cleared
568	TMS module interface time slot integrity error can not be cleared
569	TMS MPX parity error can not be cleared
570	TMS clock oscillator MFP error can not be cleared
571	TMS local clock termination ACT error can not be cleared
572	TMS local clock termination ERR error can not be cleared
573	TMS local clock termination MFP error can not be cleared
574	TMS light guide interface out of frame error can not be cleared
575	TMS module interface out of frame error can not be cleared
576	TMS abbreviated IOBI bus test failure
577	TMS abbreviated maintenance bus test failure
582	TMS MPX RAM has 32 or more busied out time slots
584	TMS MPX RAM parity error recovery failure corrected
585	TMS MPX RAM parity error recovery failure not corrected
586	TMS MPX RAM initialization test error corrected

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
587	TMS MPX RAM initialization test error not corrected
588	TMS MPX failed RAM corrected
589	TMS MPX failed RAM not corrected
600	Undiagnosed module interface buffer error from OEP (periodic only)
601	Undiagnosed module interface buffer error from OEP (periodic only)
602	Intermodule data store input store generates network test flags
604	ALU generates network test flags
605	TMIF generates test vectors when shut off
606	Intermodule data store output store generates network test flags
607	LGL to module interface suspected of generating network test flags
608	Intermodule data store transmits network test flags to TMS
609	Fan out generates network test flags
610	Fan in generates network test flags
611	MPX generates network test flags
612	LGL to light guide interface suspected of generating network test flags
613	Light guide interface transmits network test flags to modules
614	Light guide interface output to TMS generates network test flags
615	Light guide interface input from TMS generates network test flags
616	LGL to module interface generates network test flags
617	LGL to light guide interface generates network test flags
618	Module interface output generates network test flags
619	Module interface input generates network test flags
620	ALU read error
621	TMIF read error
623	Module interface read error
624	Light guide interface cross-coupling failure
625	Intermodule data store cross-coupling failure
626	ALU addressing error
627	TMIF test vector output incorrect
628	Intermodule data store read error
629	Intermodule data store output store fault
630	Fault suspected in LGL to module interface
631	Intermodule data store transmit to TMS fault
632	Fan out read error
633	Fan out PCM error
634	Fan in read error

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
635	Fan in PCM error
636	MPX PCM error
637	Light guide interface read error
638	Fault suspected in LGL to light guide interface
639	Intermodule data store input store failure
640	Light guide interface PCM transmit to module fault
641	Light guide interface output to TMS fault
642	Light guide interface input from TMS fault
643	LGL to module interface fault
644	LGL to light guide interface fault
645	Module interface input fault
646	Module interface output fault
647	Intermodule data store PSTORE connection not double written
648	TMS connection not double written
649	TMS processor did not build connection
650	MPX RAM contents incorrect for connection
651	TMS processor did not write connection into MPX RAM
701	High accuracy clock—temporary loss of signal
702	Main phase locked loop—temporary loss of signal
703	Main phase locked loop—temporary out of lock
704	High accuracy clock loss of signal—build out control enabled—main phase locked loop operating correctly
705	High accuracy clock loss of signal—build out control had to be re-enabled—main phase locked loop operating correctly
706	Main phase locked loop loss of signal—simplex system
707	Main phase locked loop out of lock and the system is on the high accuracy clock—simplex system
708	Main phase locked loop out of lock and going to the high accuracy clock fixed the main phase locked loop—simplex system
709	Main phase locked loop out of lock and going to the high accuracy clock did not fix the main phase locked loop—simplex system
710	High accuracy clock loss of signal—main phase locked loop OK—duplex system
711	Main phase locked loop loss of signal—duplex system
712	Main phase locked loop out of lock—duplex system
713	Primary reference temporary loss of signal
714	All translated references temporary loss of signal

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
715	Secondary reference temporary loss of signal
716	Secondary reference steady loss of signal—primary reference healthy
717	Primary reference steady loss of signal—secondary reference healthy
718	All translated references steady loss of signal
719	Secondary reference temporary out of lock
720	All translated references out of lock
721	Secondary reference steady out of lock
722	Primary reference temporary out of lock
723	Primary reference steady out of lock—secondary reference healthy
724	All translated references steady out of lock
725	Invalid data in DS-1 data facility error FIFO
726	DS-1 to SCS cable(S) disconnected
727	DS-1 board processor sanity
728	Unusable reference reported by system clock synchronizer
729	Loss of signal at DS-1
730	Yellow alarm received
731	Board health
732	Major error rate
733	Minor error rate
734	Red alarm detected
735	Carrier group alarm
736	Slip rate exceeded—references switched
737	Slip rate threshold exceeded
738	Misframe threshold exceeded
739	Misframe threshold exceeded—significant slips also occurring
740	Misframe threshold exceeded—secondary reference available
741	Reference source selection hardware does not agree with status memory—high accuracy clock on line
742	Reference source selection hardware does not agree with status memory—references are reversed—references switched
743	Reference source selection hardware does not agree with status memory—references are reversed—switch of references can not be made
744	TMS status bit not consistent with translation
745	Both system clock synchronizer on-line bits set or cleared
746	Both system clock synchronizer on-line bits backwards
747	Build out control bit had to be reset

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
748	Build out control bit set and can not be cleared
749	Reference source selection does not agree with status memory—bus test failed
750	Misframe threshold exceeded on primary and secondary references
751	System clock synchronizer circuit pack pulled or on-line bit stuck
752	On-line system clock synchronizer OK—off-line system clock synchronizer has out of lock condition
753	System clock synchronizer cross-coupling signal incorrect
754	System clock synchronizer loss of signal detection circuitry faulty
755	System clock synchronizer primary/secondary loss of signal detection circuit faulty
758	Loss of signal between both DS-1 interfaces (or between RCL and RCC) before global initialization
759	Loss of multi-frame alignment on the signaling channel before global initialization (OOF on signaling channel)
760	Loss of multi-frame alignment on the signaling channel after global initialization (OOF)
761	Remote multi-frame alarm on the signaling channel before global initialization (OOF at far end)
762	Red alarm raised after global initialization (out of frame)
763	Remote multi-frame alarm on the signaling channel after global initialization (OOF at far end)
764	Blue alarm before global initialization (non-local out of service DS-1 facility)
765	Loss of processor sanity after global initialization
766	Interface can not be globally initialized
767	DS-1 reference just tested can not be switched on-line
768	High accuracy clock could not be switched on-line
770	Loss of signal from the DS-1 to the system clock synchronizer
771	Daily limit exceeded for slips before global initialization
772	Daily limit exceeded for misframes before global initialization
773	Red alarm raised, out of frame before global initialization
774	Major alarm from error rate before global initialization
775	Minor alarm from error rate before global initialization
776	Blue alarm after global initialization (non-local out of service DS-1 facility)
777	Maintenance control register is defective
778	Option control register is defective

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
779	Scan mode control register is defective
780	Disable signaling control register is defective
781	Port control register is defective
782	No communication from far end before global initialization
783	Summary scan register is defective
784	Status reset control register is defective
785	DS-1, RCL, or RCC interface is not maintenance busy
788	I/O bus failure
789	Maintenance bus failure
995	Use PROC 646 to complete tests on this circuit
996	Duplication board must be tested in other on-line—off-line mode to pass verification
997	Module soft lock failed or module already locked
998	Can not test untranslated port
999	Requested test not provided for this unit
1000	Could not send an S message
1001	Facility not tested for more than X cycles
1005	No bits received on a one-port ADFTC self-test
1006	Data transmission interrupted: one-port ADFTC self-test
1007	Bit error rate exceeded for one-port ADFTC self-test
1008	Block error rate exceeded for one-port ADFTC self-test
1009	EIA update failure during a one-port ADFTC self-test
1010	Error overflow during a one-port ADFTC self-test
1011	Undefined error during a one-port ADFTC self-test
1012	No bits received on a two-port normal ADFTC self-test
1013	Data transmission interrupted: two-port normal ADFTC self-test
1014	Bit error rate exceeded for two-port normal ADFTC self-test
1015	Block error rate exceeded for two-port normal ADFTC self-test
1016	EIA update failure during a two-port normal ADFTC self-test
1017	Error overflow during a two-port normal ADFTC self-test
1018	Undefined error during a two-port normal ADFTC self-test
1019	No bits received on a two-port reverse ADFTC self-test
1020	Data transmission interrupted: two-port reverse ADFTC self-test
1021	Bit error rate exceeded for two-port reverse ADFTC self-test
1022	Block error rate exceeded for two-port reverse ADFTC self-test
1023	EIA update failure during a two-port reverse ADFTC self-test
1024	Error overflow during a two-port reverse ADFTC self-test

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1025	Undefined error during a two-port reverse ADFTC self-test
1026	Unsent stop message received by ADFTC
1027	Did not receive expected: test aborted S message
1028	Did not receive expected: test completed S message
1029	The bit and/or block error rates were not received
1425	ADFTC did not return a setup (handshake) result message
1426	ADFTC did not receive a set test (start handshake) message
1601	Yellow alarm received before global initialization
1602	Yellow alarm received after global initialization
1604	Loss of signal and no communication from the far end after global initialization
1606	No communication from far end after global initialization
1607	Failures in 1 or 2 of the three NIB chips
1608	Option control register and administered value mismatch
1612	Processor sanity and health error
1613	Processor sanity and control path and health error
1614	Processor sanity and NIB and health error
1615	Processor sanity and RAM and health error
1616	Processor sanity and ROM and health error
1619	Failure on remote port board 1 before global initialization
1620	Failure on remote port board 1 after global initialization
1621	Failure on remote port board 2 before global initialization
1622	Failure on remote port board 2 after global initialization
1623	Failure on remote port board 3 before global initialization
1624	Failure on remote port board 3 after global initialization
1625	One or more environmental errors have been detected
1626	Reflected signal is above the high threshold
1627	Reflected signal is below the low threshold
1628	No valid reflected signal was received
1629	Sanity and health and I/O failure
1630	Port failure on remote analog board
1631	RCC interface has error bits set
1632	RCL interface has error bits set
1633	Port failure on remote EIA board
1634	Firmware error on RCC interface
1635	Firmware error on RCL interface

Table 5-34. (Contd)

PROC 620—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1636	Port failure on remote GPP board
1637	Major alarm from error rate on RCC interface
1638	Major alarm from error rate on RCL interface
1639	Minor alarm from error rate on RCC interface
1640	Minor alarm from error rate on RCL interface
1641	Port failure on remote MFAT board
1642	Port failure on remote MFET board
1643	Processor sanity and health and per time-slot PCM failure
1644	Fiber status register contents do not agree with administered value for the RCL T1/fiber option
1647	No response from firmware test 1 request
1648	Loss of signal between fiber termination point and DS-1 chip set on the RCL
1649	Loss of signal between RCL and RCC with a fiber connection
1651	Error reported in processor status register
1652	Error reported in fiber status register
1653	Other error reported but no error found
1850	Board processor sanity
1851	Error reported in processor status register
1852	Error reported in environment register
1853	Loss of signal reported by SCS board
1854	Error reported in fiber status register
1855	Loss of signal reported by DS-1 board
1856	Excessive slips
1857	Excessive misframes
1858	Loss of framing reported by far end (yellow alarm)
1859	Board health error
1860	Major error rate alarm
1861	Minor error rate alarm
1862	Loss of framing report (red alarm)
1863	Loss of multi-frame alignment
1864	Loss of multi-frame alignment reported by far end
1865	Far end in loop around (blue alarm)
1866	Other error report - no errors found
2005	Bad packet checksum
2006	Maintenance busy out failed, I/O failure
2007	Release maintenance busy out failed, I/0 failure

Table 5-35.

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
6	11	TN401	TN444	TN400	Bus problem caused module (or TMS) processor shutdown - all TN400 boards in carrier, TN530, TN445, and TN380 (TN381) are also suspect
	16	TN401	TN530	TN380 or TN381	Major failure found in module (or TMS) processor test
	21	TN401	TN380 or TN381		Bad MCC/module (or TMS) processor communications
	23	TN401			Can not manipulate MCC status register bits
	24	TN401			Critical MCC circuit failure
	27	TN401	AEH4		Can not manipulate MCC status register bits or AEH4 alarm distribution and air flow monitor
	28	TN401	TN444 or TN482	TN400	Bus problem caused module (or TMS) processor shutdown - all TN400 boards in carrier, TN530, TN445, and TN380 (TN381) are also suspect
	29	TN401	TN380 or TN381		Circuit pack pulled or 4-Mhz cable disconnected
	269	TN401	TN444		Maintenance bus - bad test register value from target board
	370	TN401	TN402	Cable	Unable to write to load signal register during initialization
	402	TN401			Module processor interface error
	529	TN401	TN482		TMS maintenance bus - bad test register value from target IOBI board
7	2	TN380 or TN381	TN401	TN402	TPIO error from a maintenance routine
	3	TN380 or TN381	TN401	TN444 or TN482	No response to an EOM from a maintenance routine
	15	TN380 or TN381	TN401	TN444 or TN482	Major module (or TMS) processor failure - no switch required

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
7 (Contd)	18	TN380 or TN381	TN401	TN444 or TN482	Major module (or TMS) processor failure
	19	TN380 or TN381	TN401	TN530	Minor module (or TMS) processor failure
	22	TN380 or TN381	TN401		Module (or TMS) processor address parity failure
	269	TN380	TN444		Maintenance bus - bad test register value from target board
	362	TN380 or TN381	TN401	TN444	Off-line module (or TMS) processor initialized
	367	TN380 or TN381	TN401	TN444	On-line initialization failed. All boards in upper half carrier are suspect. 4-Mhz cable also suspect
	368	TN380 or TN381	TN401	TN444	Off-line initialization failed. All boards in upper half carrier are suspect. 4-Mhz cable also suspect
	369	TN380 or TN381	TN401		Unable to read module health status during initialization
	400	TN380 or TN381			Unknown FIFO 14 error code
	410	TN380 or TN381			Error FIFO data out of sync
	529	TN381	TN482		TMS maintenance bus - bad test register value from target IOBI board
	649	TN381	TN470		TMS processor did not build connection
	651	TN381			TMS processor did not write connection into MPX RAM
	725	TN380			Invalid data in DS-1 data facility error FIFO
	2005	TN380			Bad packet checksum
	2006	TN380			Maintenance busy out failed. I/O failure
	2007	TN380			Release maintenance busy out failed. I/O failure.

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
8	4	TN444 or TN482	TN380 or TN381		Data parity error on a maintenance or module (or TMS) processor bus write
	5	TN444 or TN482	TN380 or TN381		Other non-SYSIO error on a maintenance or module (or TMS) processor bus write
	58	TN444	TN441 or TN460		Test vector 128-255 output from MIF incorrect. Bad test vectors caused by power failure are restored after reporting this specific fault code
	68	TN444			MIF outputs test vectors when shut off
	73	TN444	TN441 or TN460		MIF test vector circuitry faulty
	74	TN444			MIF TVB contents incorrect. Bad test vectors caused by power failure are restored after reporting this specific fault code
	239	TN444	TN441 or TN460		Test vector 0-127 output from MIF incorrect
	245	TN444	TN446		ALU/MIF interface error
	246	TN444			Idle code generator failure
	268	TN444			Maintenance bus - bad test register value from MIF
	269	TN444	TN444		Maintenance bus - bad test register value from target board
	273	TN444	TN400	TN380	Port command bus - bad clock on MIF
	277	TN444			Maintenance interface bus - bad SAC value
	278	TN444			Maintenance bus - MIF did not flag bad parity
	402	TN444			Module processor interface error
	407	TN444			TSI PCM data parity error
	445	TN444			MIF write failure
9	32	TN460	TN444		GPP data clock lost momentarily (incorrect DCE readout)
	33	TN460	TN444		Maintenance interface failure caused incorrect DCE readout

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
9 (Contd)	34	TN460	TN444		Clock out of lock with reference clock, module on-line (simplex, no SCS)
		TN460	TN460		Clock out of lock with reference clock, module on-line (duplex, no SCS)
		TN460	TN463	TN444	Clock out of lock with reference clock, module on-line (simplex with SCS)
	35	TN460	TN444		Clock out of lock with reference clock, module off-line (simplex, no SCS)
		TN460	TN460		Clock out of lock with reference clock, module off-line (duplex, no SCS)
		TN460	TN463	TN444	Clock out of lock with reference clock, module off-line (simplex with SCS)
	36	TN460	TN444		MIF failure caused incorrect OOL readout, module on-line
	37	TN460	TN444		MIF failure caused incorrect OOL readout, module off-line
	38	TN460	TN444		Clock frequency generator failed
	39	TN460	TN444		MIF failure caused incorrect DCE OOL readout
	40	TN460	TN444	TN530	Off-line clock appears as master with no SCS/LGI present
	41	TN460	TN444		MIF failure caused off-line clock to appear as master with no SCS/LGI present
	42	TN460	TN463	TN444	Clock appears as master with SCS/LGI present
	43	TN460	TN444		MIF failure caused clock to appear as master with SCS/LGI present
	44	TN460	TN444		On-line clock appears as slave with no SCS/LGI present
	45	TN460	TN444		MIF failure caused maintenance interface appearance of on-line clock as slave with no SCS/LGI present
	57	TN460			Intermodule data store or module clock out of lock caused TSI test failure
	269	TN441 or TN460	TN444		Maintenance bus - bad test register value from target board

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
9 (Contd)	340	TN441 or TN460	TN440	TN454	All GPP ports under this unit type failed the data clock test. Other indictments are SN270/SN271 GPP boards or unplugged digital instruments in the same half carrier as a failing Unit Type 15, TN454 PDI
	403	TN460			Module clock error
10	65	TN446	TN444		Intermittent ALU read error over maintenance bus path
	72	TN446	TN445		ALU accumulator to destination SPN zero addressing fault
	78	TN446	TN445		ALU address processing suspected
	86	TN446	TN445		ALU address processing fault
	87	TN446	TN445		ALU PCM data fault
	88	TN446	TN445		ALU data fault. Also caused by faulty interface on PCM bus by TN440 PDS or TN441 IDS
	240	TN446	TN444		Maintenance bus to TSI ALU is bad
	241	TN446	TN445		TSI ALU lossing/linearizing fault
	242	TN446	TN445		TSI ALU opcode failure
	243	TN446	TN445		TSI ALU accumulator failure
	244	TN446	TN445		TSI ALU accumulator addressing fault
	247	TN446			TSI accumulator resources not available
	269	TN446	TN444		Maintenance bus - bad test register value from target board
	331	TN446			TSI ALU data parity checking circuitry failed
	407	TN446			TSI PCM data parity error
	604	TN446	TN445	TN444	ALU generates network test flags
	620	TN446	TN444		ALU read error
	626	TN446	TN445	TN444	ALU addressing error
11	6	TN445	TN380		No positive acknowledge using QUI_port, INIT_TSI, or module processor bus write
	52	TN445	TN444	TN440	TSI PSTORE intermittently reports invalid network test activity
	53	TN445	TN444		A zero value can not be read over the PST maintenance bus path
	54	TN445	TN446	TN440	Intermittent addressing fault within the TSI

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
11 (Contd)	55	TN445	TN444		A non-zero value can not be read over the PST maintenance bus path
	67	TN445			PST erroneously reports network test activity
	75	TN445	TN444		Bad PST memory parity
	76	TN445	TN441 or TN460	TN444	PST not cycling
	82	TN445	TN444		PST instruction addressing fault
	84	TN445	TN444		PST address or memory fault. Also caused by illegal connection to port
	85	TN445			PST memory or output fault
	89	TN445	TN444		TSI PSTORE has multiple parity errors
	269	TN445	TN444		Maintenance bus - bad test register value from target board
	330	TN445			TSI PSTORE instruction parity checking circuitry failed
	401	TN445			TSI shutdown
	402	TN445			Module processor interface error
	406	TN445			TSI PSTORE memory parity error
	425	TN445			TSI running, but indicates it’s shutdown
	432	TN445			Burst of TSI PSTORE parity errors
	444	TN445			TSI PSTORE write failure
12	264	TN400			Port command bus - bad test register value from IOBI
	269	TN400	TN444		Maintenance bus - bad test register value from target board
	270	TN400			Port command bus - bad SAC value from IOBI
	272	TN400			Port command bus - end of message timeout
	274	TN400			Port command bus - IOBI did not flag bad parity
	371	TN400	TN444	TN380	Negative acknowledge from initialize IOBI order - all TN400 boards in carrier are suspect
	402	TN400			Module processor interface error
	446	TN400			IOBI write failure
	451	TN400			TMS interface error

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
12 (Contd)	514	TN400	TN462		IOBI bus error caused local clock termination failure
	520	TN400			TMS IOBI bus - bad test register value from IOBI
	524	TN400			TMS IOBI bus - bad SAC value from IOBI
	525	TN400			TMS IOBI bus - end of message timeout
	527	TN400			TMS IOBI bus - IOBI did not flag bad parity
	529	TN400	TN482		TMS maintenance bus - bad test register value from target IOBI board
13	56	TN440	TN446		At least one PDS is receiving PCM data from a double-connect
	59	TN440	TN446	TN444	PDS data or addressing in output STORE incorrect
	61	TN440	TN454	TN446	ALU receives incorrect data from PDS
	63	TN440	TN446		Intermittent fault in PCM data path
	66	TN440	TN444		Intermittent PDS read error over maintenance bus path
	69	TN440	TN446		PDS output STORE generatest network test flags on ports not presently in-use. Also caused by illegal connection to port
	70	TN440	TN454	TN446	PDS input store generates network test flags
	77	TN440	TN444		Intermittent PDS read error over maintenance bus path
	79	TN440	TN446		PDS address processing suspected
	81	TN440	TN446	TN454	PDS input store addressing or data failure
	83	TN440	TN446		PDS internal addressing fault. Also caused by illegal connection to port
	269	TN440	TN444		Maintenance bus - bad test register value from target board
	276	TN440	TN380	Cable	Port command bus - bad control complex signal to TN454 and TN452
	340	TN440	TN454	TN441 or TN460	All GPP ports under this unit type failed the data clock test. Other indictments are SN270/SN271 GPP boards or unplugged digital instruments in the same half carrier as a failing Unit Type 15, TN454 PDI
	407	TN440			TSI PCM data parity error

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
13 (Contd)	437	TN440			DCLOCK signal does not get through PDS. Fault may reside elsewhere along DCLOCK signal path (IDS/module clock, PDS, PDI, GPP)
14	8	TN452	TN400		Distribute data after byte incorrect to a PCI
	265	TN451 or TN452	TN400	TN451	Port command bus - bad test register value from PCI
	271	TN451 or TN452	TN400	TN451	Port command bus - bad SAC value from PCI
	275	TN451 or TN452	TN440	TN380	Port command bus - bad (on/off) line control
	521	TN452	TN400		TMS IOBI bus - bad test register value from UPCI
	523	TN452	TN400		TMS IOBI bus - bad SAC value from UPCI
	788	TN451	ANN11 or ANN15 or ANN16		I/O bus failure
	789	TN451	ANN11 or ANN15 or ANN16		Maintenance bus failure
15	7	TN454	TN452	TN400	Distribute data after byte incorrect to a PDI
	60	TN454	TN440	TN452	PDI addressing or control incorrect
	62	TN454	TN440		PDI output data incorrect
	64	TN454	TN452		Intermittent PDI read error over port command bus
	71	TN454	TN440		PDI generates network test flags
	80	TN454	TN440	TN452	PDI loop-around or data failure
	266	TN454	TN451 or TN452	TN451	Port command bus - bad test register value from PDI
	334	TN454	TN446		PDI data parity checking circuitry failed

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
15 (Contd)	340	TN454	TN440	TN441 or TN460	All GPP ports under this unit type failed the data clock test. Other indictments are SN270/SN271 GPP boards or unplugged digital instruments in the same half carrier as a failing Unit Type 15, TN454 PDI
	408	TN454			PDI PCM data parity error
	426	TN454			Ring trip circuit failure
	433	TN454			Multiple PCM data parity errors from PDI
16	12	SN250			Time slot unavailable
	134	SN250	TN454	TN452	CPT reflection detector failed to stablize
	135	SN250	TN454	TN452	CPT tone test detection failed to stablize
	136	SN250	TN454	TN452	CPT reflection data ready flag stuck active
	137	SN250	TN454	TN452	CPT tone test data ready flag stuck active
	142	SN250	TN454	TN452	CPT tone test detection failed to stablize
	156	SN250	TN454		Faulty first tone test frequency idle indication
	157	SN250	TN454		Faulty second tone test frequency idle indication
	158	SN250	TN454		Faulty first tone test quiet time idle indication
	159	SN250	TN454		Faulty second tone test quiet time idle indication
	161	SN250	TN454		Faulty dial tone first tone frequency or tone test non-idle indication
	162	SN250	TN454		Faulty dial tone second tone frequency or tone test non-idle indication
	163	SN250	TN454		Faulty first tone test quiet time non-idle indication
	164	SN250	TN454		Faulty second tone test quiet time non-idle indication
	165	SN250	TN454		Faulty interrupted dial tone first tone frequency
	166	SN250	TN454		Faulty interrupted dial tone second tone frequency
	167	SN250	TN454		Faulty interrupted dial tone first tone quiet time
	168	SN250	TN454		Faulty interrupted dial tone second tone quiet time

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
16 (Contd)	169	SN250	TN454		Faulty audible ring first tone frequency
	170	SN250	TN454		Faulty audible ring second tone frequency
	171	SN250	TN454		Faulty audible ring first tone quiet time
	172	SN250	TN454		Faulty audible ring second tone quiet time
	173	SN250	TN454		Faulty special audible ring first tone frequency
	174	SN250	TN454		Faulty special audible ring second tone frequency
	175	SN250	TN454		Faulty special audible ring first tone quiet time
	176	SN250	TN454		Faulty special audible ring second tone quiet time
	177	SN250	TN454		Faulty intercept first tone frequency
	178	SN250	TN454		Faulty intercept second tone frequency
	179	SN250	TN454		Faulty intercept first tone quiet time
	180	SN250	TN454		Faulty intercept second tone quiet time
	181	SN250	TN454		Faulty busy first tone frequency
	182	SN250	TN454		Faulty busy second tone frequency
	183	SN250	TN454		Faulty busy first tone quiet time
	184	SN250	TN454		Faulty busy second tone quiet time
	185	SN250	TN454		Faulty reorder first tone frequency
	186	SN250	TN454		Faulty reorder second tone frequency
	187	SN250	TN454		Faulty reorder first tone quiet time
	188	SN250	TN454		Faulty reorder second tone quiet time
	189	SN250	TN454		Faulty 440-hz reflection detector idle indication
	190	SN250	TN454		Faulty broad band reflection detector idle indication
	191	SN250	TN454		Faulty 440-hz reflection detector non-idle indication
	192	SN250	TN454		Faulty broad band reflection detector non-idle indication
	197	SN250	TN454		Faulty dial tone first tone frequency or tone test non-idle indication
	198	SN250	TN454		Faulty dial tone second tone frequency or tone test non-idle indication
	199	SN250			Busy out failed

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
16 (Contd)	218	SN250			Network order failed
	219	SN250			Release busy out failed
	267	SN250	TN451 or TN452	TN451	Port command bus - bad test register value from port
	429	SN250			Port digital signal processor error
	1628	SN250	TN454	TN451	No valid reflected signal was received
23	17	TN530	TN401	TN380 or TN381	Major duplication/update failure in module (or TMS) processor test
	90	TN530	TN400	TN380 or TN381	Failed the module (or TMS) processor based DUP_TST
	92	TN530	TN530	TN380 or TN381	Duplication board status bits would not set or clear
	93	TN530	TN530	TN380 or TN381	On-line TN530 error flag was set
	94	TN530	TN445	TN380 or TN381	Off-line TN530 error flag was set
	95	TN530	TN530	TN400	State of health comparator test failed
	96	TN530	TN530	TN400	Double write control test failed
	97	TN530	TN530	TN380 or TN381	Double write with bad parity test failed
	98	TN530	TN530	TN380 or TN381	Duplication channel did not detect bad parity
	99	TN530	TN530		Detected double writes off and turned them on
	269	TN530	TN444		Maintenance bus - bad test register value from target board
	365	TN530	TN380 or TN381	TN401	Soft switch failed

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
23 (Contd)	366	TN530	TN380 or TN381	TN401	Hard switch failed
	402	TN530			Module processor interface error
	529	TN530	TN482		TMS maintenance bus - bad test register value from target IOBI board
	647	TN530	TN530	TN441	Intermodule data store PSTORE connection not double written
	648	TN530	TN530	TN470	TMS connection not double written
	996				Duplication board must be tested in other on-line - off-line mode to pass verification
	997				Module soft-locked failed or module already locked
24	12	SN252			Time slot unavailable
	13	SN252			Circuit in use by call processing
	51	SN252			Port resources not available
	199	SN252			Busy out failed
	200	SN252			Cannot test: This is the only available facility
	218	SN252			Network order failed
	219	SN252			Release busy out failed
	285	SN252	TN452	TN400	Idle sender summary scan indicates dial tone detected
	286	SN252	TN452	TN400	Idle sender status register indicates port busy
	287	SN252	TN452	TN400	Idle sender status register indicates digit queue full
	288	SN252	TN452	TN400	Idle sender status register indicates test tone not sent
	289	SN252	TN452	TN400	Sender circuit summary check failure
	290	SN252	SN250	TN452	Sender not busy while test tone being sent
	291	SN252	SN250	TN452	Sender status register indicates test tone complete while sending
	292	SN252	SN250	TN454	Sender fails to send 440-hz test tone
	293	SN252			No idle receiver found for sender retest
	294	SN252	SN251	TN452	Sender not busy while sending valid tone
	295	SN252	SN251	TN452	Sender status register indicates touch-tone signal done while being sent

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
24 (Contd)	296	SN252	SN251	TN454	Sender fails to send a valid touch-tone
	297	SN252	SN251	TN454	No touch-tone digit received at receiver
	298	SN252	TN454	TN400	Sender fails to detect dial tone
	299	SN252	TN454	TN400	Sender detects dial tone after dial tone removed
	309	SN252	TN452	TN400	Sender circuit summary check failure
	310	SN252	SN251	TN452	Sender not busy while sending valid tone
	311	SN252	SN251	TN452	Sender status register indicates touch-tone signal done while being sent
	312	SN252	SN251	TN454	Expected valid touch-tone digit not found in receiver digit register. Failure could not be isolated to either sender or receiver, so pegged against both
	313	SN252	SN251	TN454	No touch-tone digit received at receiver. Failure could not be isolated to either sender or receiver, so pegged against both
25	12	SN251			Time slot unavailable
	13	SN251			Circuit in use by call processing
	51	SN251			Port resources not available
	199	SN251			Busy out failed
	200	SN251			Cannot test: This is the only available facility
	219	SN251			Release busy out failed
	285	SN251	SN252	TN452	Idle sender summary scan indicates dial tone detected
	286	SN251	SN252	TN452	Idle sender status register indicates port busy
	287	SN251	SN252	TN452	Idle sender status register indicates digit queue full
	288	SN251	SN252	TN452	Idle sender status register indicates test tone not sent
	297	SN251	SN252	TN454	No touch-tone digit received at receiver
	300	SN251	SN250	TN454	No transmission through receiver, low path to high path
	301	SN251	SN250	TN454	No transmission through receiver, high path to low path
	302	SN251			No idle sender found for receiver retest

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
25 (Contd)	303	SN251	SN252	TN452	Idle receiver summary scan indicates reception of touch-tone
	304	SN251	SN252	TN452	Idle receiver port control register indicates reception of valid touch-tone
	305	SN251	SN252	TN454	Receiver fails to receive low level digit
	306	SN251	SN252	TN454	Receiver fails to recognize touch-tone
	307	SN251	SN252	TN454	Receiver fails to recognize low level digit
	308	SN251	SN252	TN454	Receiver receives false tone
	312	SN251	SN252	TN454	Expected valid touch-tone digit not found in receiver digit register. Failure could not be isolated to either sender or receiver, so pegged against both
	313	SN251	SN252	TN454	No touch-tone digit received at receiver. Failure could not be isolated to either sender or receiver, so pegged against both
	427	SN251			Control/summary - scan register read error
27	199	SN270 or SN271			Busy out failed
	219	SN270 or SN271			Release busy out failed
	267	SN270 or SN271	TN451 or TN452	TN451	Port command bus - bad test register value from port
	337	SN270 or SN270			Hyperactive port (receiving too many signals)
	338	SN270 or SN271			Data module does not respond to a query
	350	SN270 or SN271	TN452	TN400	GPP DTL fault (non-remoted board)
	350	SN270 or SN271	ANN16		GPP DTL fault (remoted board)
	351	SN270 or SN271	TN452	TN400	GPP DTL idle bit set (non-remoted board)

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
27 (Contd)	351	SN270 or SN271	ANN16		GPP DTL idle bit set (remoted board)
	352	SN270 or SN271	TN452	TN400	GPP DTLI and DTLF together (non-remoted board)
	352	SN270 or SN271	ANN16		GPP DTLI and DTLF together (remoted board)
	353	SN270 or SN271	TN452	TN400	GPP 48-VOL bit set (current overload) (non-remoted board)
	353	SN270 or SN271	ANN16		GPP 48-VOL bit set (current overload) (remoted board)
	354	SN270 or SN271	TN452	TN400	GPP 48-VOL and DTLF bits set (non-remoted board)
	354	SN270 or SN271	ANN16		GPP 48-VOL and DTLF bits set (remoted board)
	355	SN270 or SN271	TN452	TN400	GPP 48-VOL and DTLI bits set (non-remoted board)
	355	SN270 or SN271	ANN16		GPP 48-VOL and DTLI bits set (remoted board)
	356	SN270 or SN271	TN452	TN400	GPP 48-VOL, DTLI, and DTLF bits set (non-remoted board)
	356	SN270 or SN271	ANN16		GPP 48-VOL, DTLI, and DTLF bits set (remoted board)
	357	SN270 or SN271	TN452	TN400	One S channel retransmission to the port has occurred (non-remoted board)
	357	SN270 or SN271	ANN16		One S channel retransmission to the port has occurred (remoted board)

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
27 (Contd)	358	SN270 or SN271	TN452	TN400	More than one S channel retransmission to the port has occurred (non-remoted board)
	358	SN270 or SN271	ANN16		More than one S channel retransmission to the port has occurred (remoted board)
	361	SN270 or SN271	TN452	TN400	Failure of port BLA set (non-remoted board)
	361	SN270 or SN271	ANN16		Failure of port BLA set (remoted board)
	362	SN270 or SN271	TN454		SAC failed to clear in port DTL loop-around test
	363	SN270 or SN271	TN454		Invalid SAC signature in port DTL loop-around test
	364	SN270 or SN271	TN454		Error in TDR in port DTL loop-around test (non-remoted board)
	364	SN270 or SN271	ANN16		Error in TDR in port DTL loop-around test (remoted board)
	434	SN270 or SN271			All ports of DVDP board bad
	459	SN270 or SN271			BLA bit on port control register failed to clear or set
	460	SN270 or SN271			DTLF fault on DVDP
	998	SN270 or SN271			Cannot test untranslated port
	1619	SN270 or SN271	ANN16		Failure on remote port board 1 before global initialization

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
27 (Contd)	1620	SN270 or SN271	ANN16		Failure on remote port board 1 after global initialization
	1621	SN270 or SN271	ANN16		Failure on remote port board 2 before global initialization
	1622	SN270 or SN271	ANN16		Failure on remote port board 2 after global initialization
	1623	SN270 or SN271	ANN16		Failure on remote port board 3 before global initialization
	1624	SN270 or SN271	ANN16		Failure on remote port board 3 after global initialization
	1636	SN270 or SN271			Port failure on remote GPP board
28	13	SN224			Circuit in use by call processing
	51	SN224			Port resources not available
	109	SN224	TN454	TN400	Faulty set of LA flip-flop
	110	SN224	TN452	TN400	Faulty set of CPU flip-flop
	118	SN224	TN452	TN400	Faulty clear of LA flip-flop
	124	SN224	TN452	TN400	Faulty clear of CPU flip-flop
	125	SN224	TN452	TN400	Off-hook error, possibly from attached station
	131	SN224	TN452	TN400	Terminated line failed to indicate off-hook
	149	SN224	TN454	SN250	Insufficient 440-hz on-hook reflection
	150	SN224	TN454	SN250	Excessive 440-hz on-hook reflection
	152	SN224	TN454	SN250	Excessive 440-hz off-hook reflection
	154	SN224	TN454	SN250	On-hook status failed to power down CODEC
	199	SN224			Busy out failed
	219	SN224			Release busy out failed
	267	SN224	TN451 or TN452	TN451	Port command bus - bad test register value from port
	280	SN224	TN452	TN400	MLP controller fault
	281	SN224	TN452	TN400	MLP 48-V overload

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
28 (Contd)	282	SN224	TN401		MLP driver circuitry failure
	283	SN224	TN452	TN400	MLP failed to return ID request
	436	SN224			MLP controller fault, initialization failed
	441	SN224			MLP controller fault, initialization successful
	998	SN224			Cannot test untranslated port
	999	SN224			Requested test not provided for this unit
	1619	SN224	ANN16		Failure on remote port board 1 before global initialization
	1620	SN224	ANN16		Failure on remote port board 1 after global initialization
	1621	SN224	ANN16		Failure on remote port board 2 before global initialization
	1622	SN224	ANN16		Failure on remote port board 2 after global initialization
	1623	SN224	ANN16		Failure on remote port board 3 before global initialization
	1624	SN224	ANN16		Failure on remote port board 3 after global initialization
	1642	SN224			Port failure on remote MFET board
29	12	SN228 or SN229			Time slot unavailable
	13	SN228 or SN229			Circuit in use by call processing
	51	SN228 or SN229			Port resources not available
	100	SN228 or SN229	TN452	TN400	Non-zero idle port control register
	101	SN228 or SN229	TN452	TN400	Defective gate array A
	102	SN228 or SN229	TN452	TN400	Defective gate array B

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
29 (Contd)	104	SN228 or SN229	TN452	TN400	Faulty port select in gate array A
	105	SN228 or SN229	TN452	TN400	Faulty port select in gate array B
	125	SN228 or SN229	TN452	TN400	Off-hook error, possibly from attached station
	126	SN228 or SN229	TN452	TN400	Off-hook error from bad LA clear or attached station
	131	SN228 or SN229	TN452	TN400	Terminated line failed to indicate off-hook
	133	SN228 or SN229	TN452	TN400	Off-hook status failed to latch
	149	SN228 or SN229	TN454	SN250	Insufficient 440-hz on-hook reflection
	150	SN228 or SN229	TN454	SN250	Excessive 440-hz on-hook reflection
	152	SN228 or SN229	TN454	SN250	Excessive 440-hz off-hook reflection
	153	SN228 or SN229	TN454	SN250	Excessive signal at other than 440-hz
	154	SN228 or SN229	TN454	SN250	On-hook status failed to power down CODEC
	160	SN228 or SN229	TN454	SN250	Faulty 400-hz frequency
	199	SN228 or SN229			Busy out failed

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
29 (Contd)	218	SN228 or SN229			Network order failed
	219	SN228 or SN229			Release busy out failed
	267	SN228 or SN229	TN451 or TN452	TN451	Port command bus - bad test register value from port
	337	SN228 or SN229			Hyperactive port (receiving too many signals)
	427	SN228 or SN229			Control/summary - scan register read error
	1619	SN228 or SN229	ANN16		Failure on remote port board 1 before global initialization
	1620	SN228 or SN229	ANN16		Failure on remote port board 1 after global initialization
	1621	SN228 or SN229	ANN16		Failure on remote port board 2 before global initialization
	1622	SN228 or SN229	ANN16		Failure on remote port board 2 after global initialization
	1623	SN228 or SN229	ANN16		Failure on remote port board 3 before global initialization
	1624	SN228 or SN229	ANN16		Failure on remote port board 3 after global initialization
	1630	SN228 or SN229			Port failure on remote analog board
31	13	SN253			Circuit in use by call processing
	51	SN253			Port resources not available
	130	SN253	TN452	TN400	Active SEZD* error, possibly from busy code call circuit

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
31 (Contd)	143	SN253	TN452	TN400	Code call digit done* improperly active
	144	SN253	TN452	TN400	Code call digit done* improperly inactive
	145	SN253	TN452	TN400	Faulty code call chime period
	146	SN253	TN452	TN400	Faulty digital signal processor
	147	SN253	TN452	TN400	Code call SEZD* improperly inactive
	193	SN253	TN454	SN250	Faulty reception of auxiliary immediate ring back tone
	199	SN253			Busy out failed
	219	SN253			Release busy out failed
	220	SN253	TN452	TN400	DSP checksum stuck active
	267	SN253	TN451 or TN452	TN451	Port command bus - bad test register value from port
	429	SN253			Port digital signal processor error
32	13	SN230			Circuit in use by call processing
	51	SN230			Port resources not available
	100	SN230	TN452	TN400	Non-zero idle port control register
	101	SN230	TN452	TN400	Defective gate array A
	103	SN230	TN452	TN400	Defective gate array C
	104	SN230	TN452	TN400	Faulty port select in gate array A
	106	SN230	TN452	TN400	Faulty port select in gate array C
	128	SN230	TN452	TN400	Ring detection error possibly from attached CO
	129	SN230	TN452	TN400	Ground detection error possibly from external circuit signaling
	138	SN230	TN452	TN400	Normal current detector stuck active
	139	SN230	TN452	TN400	Ground detector failed to detect ground
	140	SN230	TN452	TN400	GS relay stuck operated
	141	SN230	TN452	TN400	Reverse current detector stuck active
	149	SN230	TN454	SN250	Insufficient 440-hz on-hook reflection
	153	SN230	TN454	SN250	Excessive signal at other than 440-hz
	155	SN230	TN454	SN250	CODEC power up stuck active
	199	SN230			Busy out failed
	200	SN230			Cannot test: This is the only available facility
	219	SN230			Release busy out failed

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
32 (Contd)	267	SN230	TN451 or TN452	TN451	Port command bus - bad test register value from port
	337	SN230			Hyperactive port (receiving too many signals)
33	9	SN232	TN452	TN400	Distribute data after byte incorrect to a port
	13	SN232			Circuit in use by call processing
	51	SN232			Port resources not available
	100	SN232	TN452	TN400	Non-zero idle port control register
	131	SN232	TN452	TN400	Terminated line failed to indicate off-hook
	149	SN232	TN454	SN250	Insufficient 440-hz on-hook reflection
	150	SN232	TN454	SN250	Excessive 440-hz on-hook reflection
	151	SN232	TN454	SN250	Insufficient 440-hz off-hook reflection
	152	SN232	TN454	SN250	Excessive 440-hz off-hook reflection
	153	SN232	TN454	SN250	Excessive signal at other than 440-hz
	154	SN232	TN454	SN250	On-hook status failed to power down CODEC
	194	SN232	TN452	TN400	Battery feed reversal stuck active or idle circuit indicates loop closure
	196	SN232	TN452	TN400	Battery feed reversal stuck inactive
	199	SN232			Busy out failed
	200	SN232			Cannot test: This is the only available facility
	201	SN232	TN452	TN400	Defective gate array D
	202	SN232	TN452	TN400	Faulty port select in gate array D
	219	SN232			Release busy out failed
	267	SN232	TN451 or TN452	TN451	Port command bus - bad test register value from port
	315	SN232			Loop closure detection may be due to CO attempting seize
	337	SN232			Hyperactive port (receiving too many signals)
34	13	SN233 or SN243			Circuit in use by call processing

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
34 Contd)	51	SN233 or SN243			Port resources not available
	100	SN233 or SN243	TN452	TN400	Non-zero idle port control register
	109	SN233	TN452	TN400	Faulty set of LA flip-flop
	110	SN233	TN452	TN400	Faulty set of CPU flip-flop
	124	SN233	TN452	TN400	Faulty clear of CPU flip-flop
	125	SN243	TN452	TN400	Off-hook error, possibly from attached station
	126	SN243	TN452	TN400	Off-hook error from bad LA clear or attached station
	131	SN243	TN452	TN400	Terminated line failed to indicate off-hook
	133	SN243	TN452	TN400	Off-hook status failed to latch
	149	SN233 or SN243	TN454	SN250	Insufficient 440-hz on-hook reflection
	150	SN233 or SN243	TN454	SN250	Excessive 440-hz on-hook reflection
	152	SN243	TN454	SN250	Excessive 440-hz off-hook reflection
	153	SN233 or SN243	TN454	SN250	Excessive signal at other than 440-hz
	154	SN243	TN454	SN250	On-hook status failed to power down CODEC
	169	SN243	TN454	SN250	Faulty audible ring first tone frequency
	170	SN243	TN454	SN250	Faulty audible ring second tone frequency
	171	SN243	TN454	SN250	Faulty audible ring first tone quiet time
	172	SN243	TN454	SN250	Faulty audible ring second tone quiet time
	199	SN233 or SN243			Busy out failed
	200	SN233 or SN243			Cannot test: This is the only available facility

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
34 (Contd)	201	SN233 or SN243	TN452	TN400	Defective gate array D
	202	SN233 or SN243	TN452	TN400	Faulty port select in gate array D
	203	SN233	TN454	SN250	E or M signal indicator stuck active
	204	SN233	TN454	SN250	Failure of OP set
	205	SN233	TN452	TN400	M-signal sent indicator stuck inactive
	206	SN233	TN454	SN250	Possible external circuit signaling
	208	SN233	TN454	SN250	Clearing loop-around fails to remove 440-hz signal
	211	SN233	TN454	SN250	Off-hook status (ground signal detector) fails to power up the CODEC
	214	SN233	TN452	TN400	Failure of gate array or E-signal receiver
	215	SN233	TN452	TN400	Failure of OP flip-flop
	216	SN233	TN452	TN400	Incorrect encode in TIE trunk ID chip
	219	SN243			Release busy out failed
	267	SN233 or SN243	TN451 or TN452	TN451	Port command bus - bad test register value from port
	337	SN243			Hyperactive port (receiving too many signals)
44	13	SN233			Circuit in use by call processing
	51	SN233			Port resources not available
	100	SN233	TN452	TN400	Non-zero idle port control register
	109	SN233	TN452	TN400	Faulty set of LA flip-flop
	110	SN233	TN452	TN400	Faulty set of CPU flip-flop
	124	SN233	TN452	TN400	Faulty clear of CPU flip-flop
	149	SN233	TN454	SN250	Insufficient 440-hz on-hook reflection
	150	SN233	TN454	SN250	Excessive 440-hz on-hook reflection
	153	SN233	TN454	SN250	Excessive signal at other than 440-hz
	199	SN233			Busy out failed
	201	SN233	TN452	TN400	Defective gate array D
	202	SN233	TN452	TN400	Faulty port select in gate array D
	203	SN233	TN454	SN250	E or M signal indicator stuck active
	204	SN233	TN454	SN250	Failure of OP set

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
44 (Contd)	205	SN233	TN452	TN400	M-signal sent indicator stuck inactive
	206	SN233	TN454	SN250	Possible external circuit signaling
	208	SN233	TN454	SN250	Clearing loop-around fails to remove 440-hz signal
	214	SN233	TN452	TN400	Failure of gate array or E-signal receiver
	215	SN233	TN452	TN400	Failure of OP flip-flop
	216	SN233	TN452	TN400	Incorrect encode in TIE trunk ID chip
	219	SN233			Release busy out failed
	267	SN233	TN451 or TN452	TN451	Port command bus - bad test register value from port
	337	SN233			Hyperactive port (receiving too many signals)
45	13	SN231			Circuit in use by call processing
	51	SN231			Port resources not available
	100	SN231	TN452	TN400	Non-zero idle port control register
	101	SN231	TN452	TN400	Defective gate array A
	102	SN231	TN452	TN400	Defective gate array B
	104	SN231	TN452	TN400	Faulty port select in gate array A
	105	SN231	TN452	TN400	Faulty port select in gate array B
	129	SN231	TN452	TN400	Ground detection error possibly from external circuit signaling
	141	SN231	TN452	TN400	Reverse current detector stuck active
	153	SN231	TN454	SN250	Excessive signal at other than 440-hz
	199	SN231			Busy out failed
	200	SN231			Cannot test: This is the only available facility
	219	SN231			Release busy out failed
	267	SN231	TN451 or TN452	TN451	Port command bus - bad test register value from port
	316	SN231	TN454	SN250	Insufficient 600-ohm termination reflection possibly caused by open transmission option switch
	317	SN231	TN454	SN250	Excessive 600-ohm termination reflection
	318	SN231	TN454	SN250	Insufficient short circuit termination reflection

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
45 (Contd)	319	SN231	TN454	SN250	Excessive short circuit termination reflection
	337	SN231			Hyperactive port (receiving too many signals)
46	13	SN254			Circuit in use by call processing
	51	SN254			Port resources not available
	153	SN254	TN454	SN250	Excessive signal at other than 440-hz
	199	SN254			Busy out failed
	219	SN254			Release busy out failed
	235	SN254	TN454	SN250	440-hz transmission failure between 2 ports
	236	SN254	TN454	SN250	Excessive signal other than 440-hz at send port
	237	SN254	TN454	SN250	Improper 440-hz transmission from receive input to send output on the same port
	267	SN254	TN451 or TN452	TN451	Port command bus - bad test register value from port
50	411	TN461			TMS clock oscillator error (OOL bit set)
	412	TN461			TMS clock oscillator error (other)
	413	TN461			TMS clock oscillator after initialization error (MFP bit set)
	414	TN461			TMS clock oscillator after initialization error (other)
	500	TN461	Cable		TMS clock oscillator MFP failure
	504	TN461	Cable		All local clock termination circuits have MFP failures - more than one local clock termination circuit installed
	506	TN461	Cable		TMS clock oscillator maintenance circuit has MFP fault
	508	TN461	Cable		TMS clock oscillator state determination and duplication control incorrect
	510	TN461	TN461		TMS clock oscillator OOL error (off-line TMS clock oscillator first choice)
	511	TN461			TMS clock oscillator PFL error
	512	TN461			Cannot complete TMS clock oscillator force error sequence
	529	TN461	TN482		TMS maintenance bus - bad test register value from target IOBI board

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
50 (Contd)	554	TN461			TMS clock oscillator MFP checking circuit failed to detect a missing frame pulse
	570	TN461			TMS clock oscillator MFP error can not be cleared
	577	TN461	TN482		TMS abbreviated maintenance bus test failure
51	415	TN462			Local clock termination error (ERR bit set)
	416	TN462			Local clock termination error (other)
	417	TN462			Local clock termination after initialization error (MFP or ACT bit set)
	418	TN462			Local clock termination after initialization error (other)
	501	TN462	Cable	TN461	Single local clock termination MFP failure with more than one local clock termination circuit installed
	502	Cable	TN462	TN461	Two local clock termination MFP failures with more than two local clock termination circuits installed
	503	Cable	TN462	TN461	Three local clock termination MFP failures with more than three local clock termination circuits installed
	505	TN462	Cable	TN461	Single local clock termination MFP failure - one local clock termination circuit installed
	507	TN462	Cable		Local clock termination maintenance circuit has MFP fault
	513	TN462			Local clock termination PFL error
	515	TN462			Local clock termination ERR bit set - reset worked
	516	TN462			Local clock termination ERR bit set - cannot reset
	517	TN462	TN461		Local clock termination ACT failure
	518	TN462	TN461	Cable	Cannot complete local clock termination force error sequence
	522	TN462	TN452		TMS IOBI bus - bad test register value from IOBI space board
	555	TN462			TMS local clock termination ACT checking circuit failed to detect no activity error
	556	TN462			TMS local clock termination ERR checking circuit failed to detect a clock error

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
51 (Contd)	557	TN462			TMS local clock termination MFP checking circuit failed to detect a missing frame pulse
	571	TN462			TMS local clock termination ACT error cannot be cleared
	572	TN462			TMS local clock termination ERR error cannot be cleared
	573	TN462			TMS local clock termination MFP error cannot be cleared
	576	TN462	TN452	TN400	TMS abbreviated IOBI bus test failure
52	269	TN463	TN444		Maintenance bus - bad test register value from target board
	405	TN463			Module system clock synchronizer error
	453	TN463			TMS system clock synchronizer error
	529	TN463	TN482		TMS maintenance bus - bad test register value from target IOBI board
	701	TN463			High accuracy clock - temporary loss of signal
	702	TN463			Main phase locked loop - temporary loss of signal
	703	TN463			Main phase locked loop - temporary out of lock
	704	TN463			High accuracy clock loss of signal - build out control enabled - main phase locked loop operating correctly
	705	TN463			High accuracy clock loss of signal - build out control had to be re-enabled - main phase locked loop operating correctly
	706	TN463			Main phase locked loop loss of signal - simplex system
	707	TN463			Main phase locked loop out of lock and the system is on the high accuracy clock - simplex system
	708	TN463			Main phase locked loop out of lock and going to the high accuracy clock fixed the main phase locked loop - simplex system

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
52 (Contd)	709	TN463			Main phase locked loop out of lock and going to the high accuracy clock did not fix the main phase locked loop - simplex system
	710	TN463			High accuracy clock loss of signal - main phase locked loop OK - duplex system
	711	TN463			Main phase locked loop loss of signal - duplex system
	712	TN463			Main phase locked loop out of lock - duplex system
	714	TN463	ANN11	ANN11	All translated references temporary loss of signal
	718	TN463	ANN11	ANN11	All translated references steady loss of signal
	720	TN463	ANN11	ANN11	All translated references out of lock
	724	TN463	ANN11	ANN11	All translated references steady out of lock
	726	TN463			DS-1 to system clock synchronizer cable(s) disconnected
	728	TN463	ANN11		Unusable reference reported by system clock synchronizer
	741	TN463			Reference source selection hardware does not agree with status memory - high accuracy clock on-line
	742	TN463			Reference source selection hardware does not agree with status memory - references are reversed - references switched
	743	TN463			Reference source selection hardware does not agree with status memory - references are reversed - switch of references cannot be made
	744	TN463			TMS status bit not consistent with translation
	745	TN463			Both system clock synchronizers on-line bits set or cleared
	746	TN463			Both system clock synchronizers on-line bits backwards
	747	TN463			Build out control bit had to be reset

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
52 (Contd)	748	TN463			Build out control bit set and cannot be cleared
	749	TN463			Reference source selection does not agree with status memory - bus test failed
	751	TN463			System clock synchronizer circuit pack pulled or on-line bit stuck
	752	TN463			On-line system clock synchronizer OK - off-line system clock synchronizer has out of lock condition
	753	TN463			System clock synchronizer cross-coupling signal incorrect
	754	TN463			System clock synchronizer loss of signal detection circuitry faulty
	755	TN463			System clock synchronizer primary/ secondary loss of signal detection circuitry faulty
	768	TN463			High accuracy clock could not be switched on-line
53	10	TN470	TN381		No positive acknowledge after maintenance order to TMS processor
	420	TN470			Failed MPX RAM
	421	TN470			MPX RAM parity error recovery failure
	422	TN470			MPX initialization error
	423	TN470			MPX initialization alarm
	424	TN470			MPX RAM parity error
	449	TN470			Initialization TMS MPX RAM test error
	450	TN470			Initialization TMS MPX RAM parity checker error
	452	TN470			Illegal MPX RAM entry error
	522	TN470	TN452		TMS IOBI bus - bad test register value from IOBI space board
	553	TN470			TMS MPX parity checking circuit failed to detect a bad parity word
	569	TN470			TMS MPX parity error cannot be cleared
	576	TN470	TN452	TN400	TMS abbreviated IOBI bus test failure
	582	TN470			TMS MPX RAM has 32 or more busied out time slots

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
53 (Contd)	584	TN470			TMS MPX RAM parity error recovery failure corrected
	585	TN470			TMS MPX RAM parity error recovery failure not corrected
	586	TN470			TMS MPX RAM initialization test error corrected
	587	TN470			TMS MPX RAM initialization test error not corrected
	588	TN470			TMS MPX failed RAM corrected
	589	TN470			TMS MPX failed RAM not corrected
	611	TN470	TN480 or TN482	UN150	MPX generates network test flags
	636	TN470	TN480 or TN482	UN150	MPX PCM error
	650	TN470	TN381		MPX RAM contents incorrect for connection
54	522	TN473	TN452		TMS IOBI bus - bad test register value from IOBI space board
	609	TN473	TN480 or TN482		Fan out generates network test flags
	632	TN473	TN452	TN400	Fan out read error
	633	TN473	TN480 or TN482		Fan out PCM error
55	419	TN480			Module interface error
	469	TN480			Module interface out of frame error
	522	TN480	TN452		TMS IOBI bus - bad test register value from IOBI space board
	551	TN480	TN481		TMS module interface parity checking circuit failed to detect a bad parity word
	552	TN480	TN481	TN441	TMS module interface time-slot integrity circuit failed to detect a buffer error
	559	TN480	TN470		TMS module interface out of frame circuit failed to detect a framing error
	567	TN480	TN481	TN441	TMS module interface parity error cannot be cleared

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
55 (Contd)	568	TN480	TN481	TN441	TMS module interface time-slot integrity error cannot be cleared
	575	TN480	TN470		TMS module interface out of frame error cannot be cleared
	576	TN480	TN452	TN400	TMS abbreviated IOBI bus test failure
	600	TN480	TN481		Undiagnosed module interface buffer error from OEP (periodic only)
	607	TN481	TN480	TN441	LGL to module interface suspected of generating network test flags
	616	TN480	TN481		LGL to module interface generates network test flags
	618	TN480	TN482		Module interface output generates network test flags
	619	TN480	TN482	TN470	Module interface input generates network test flags
	623	TN480	TN452	TN400	Module interface read error
	630	TN481	TN480	TN441	Fault suspected in LGL to module interface
	643	TN480	TN481		LGL to module interface fault
	645	TN480	TN482	TN470	Module interface input fault
	646	TN480	TN482		Module interface output fault
56	30	TN441 or TN460	TN444		Incorrect clock output sequence (incorrect SAC)
	31	TN441 or TN460	TN444		Maintenance interface failure caused incorrect SAC readout
	32	TN441	TN444		GPP data clock lost momentarily (incorrect DCE readout)
	33	TN441	TN444		Maintenance interface failure caused incorrect DCE readout
	34	TN441	TN444		Clock out of lock with reference clock, module on-line (simplex, no SCS)
		TN441	TN441		Clock out of lock with reference clock, module on-line (duplex, no SCS)
		TN441	TN463 or TN481	TN444	Clock out of lock with reference clock, module on-line (simplex with SCS)

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
56 (Contd)	34 (Contd)	TN441	TN463 or TN481	TN462	Clock out of lock with reference clock, module on-line (duplex with SCS)
	35	TN441	TN444		Clock out of lock with reference clock, module off-line (simplex, no SCS)
		TN441	TN441		Clock out of lock with reference clock, module off-line (duplex, no SCS)
		TN441	TN463 or TN481	TN444	Clock out of lock with reference clock, module off-line (simplex with SCS)
		TN441	TN463 or TN481	TN462	Clock out of lock with reference clock, module off-line (duplex with SCS)
	36	TN441	TN444		MIF failure caused incorrect OOL readout, module on-line
	37	TN441	TN444		MIF failure caused incorrect OOL readout, module off-line
	38	TN441	TN444		Clock frequency generator failed
	39	TN441	TN444		MIF failure caused incorrect DCE OOL readout
	40	TN441	TN444	TN530	Off-line clock appears as master with no SCS/LGI present
	41	TN441	TN444		MIF failure caused off-line clock to appear as master with no SCS/LGI present
	42	TN441	TN463 or TN481	TN444	Clock appears as master with SCS/LGI present
	43	TN441	TN444		MIF failure caused clock to appear as master with SCS/LGI present
	44	TN441	TN444		On-line clock appears as slave with no SCS/LGI present
	45	TN441	TN444		MIF failure caused maintenance interface appearance of on-line clock as slave with no SCS/LGI present
	57	TN441			Intermodule data store or module clock out of lock caused TSI test failure
	404	TN441	TN461		Intermodule data store error
	407	TN441			TSI PCM data parity error

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
56 (Contd)	601	TN441			Undiagnosed module interface buffer error from OEP (periodic only)
	602	TN441	TN481	TN446	Intermodule data store input store generates network test flags
	606	TN441	TN446		Intermodule data store output store generates network test flags
	608	TN441			Intermodule data store transmits network test flags to TMS
	625	TN441	TN481	TN446	Intermodule data store cross-coupling failure
	628	TN441	TN444		Intermodule data store read error
	629	TN441	TN446		Intermodule data store output store fault
	631	TN441			Intermodule data store transmit to TMS fault
	639	TN441	TN481	TN446	Intermodule data store input store failure
57	409	TN481			Lightguide interface error
	550	TN481	TN480		TMS lightguide interface parity checking circuit failed to detect a bad parity word
	558	TN481	TN441		TMS lightguide interface out of frame circuit failed to detect a framing error
	566	TN481	TN480		TMS lightguide interface parity error cannot be cleared
	574	TN481	TN441		TMS lightguide interface out of frame error cannot be cleared
	577	TN481	TN444		TMS abbreviated maintenance bus test failure
	612	TN481	TN480	TN441	LGL to lightguide interface suspected of generating network test flags
	613	TN481			Lightguide interface transmits network test flags to modules
	614	TN481	TN441		Lightguide interface output to TMS generates network test flags
	615	TN481	TN441		Lightguide interface input from TMS generates network test flags
	617	TN481	TN480		LGL to lightguide interface generates network test flags
	624	TN481	TN441	TN480	Lightguide interface cross-coupling failure
	637	TN481	TN444		Lightguide interface read error

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
57 (Contd)	638	TN481	TN480	TN441	Fault suspected in LGL to lightguide interface
	640	TN481			Lightguide interface PCM transmit to module fault
	641	TN481	TN441		Lightguide interface output to TMS fault
	642	TN481	TN441		Lightguide interface input from TMS fault
	644	TN481	TN480		LGL to lightguide interface fault
58	522	UN150	TN452		TMS IOBI bus - bad test register value from IOBI space board
	610	UN150	TN473		Fan in generates network test flags
	634	UN150	TN452	TN400	Fan in read error
	635	UN150	TN473		Fan in PCM error
59	430	TN482			TMIF PFAIL/late make alarm
	447	TN482			TMIF write failure
	451	TN482			TMS interface error
	509	TN482	TN461		Maintenance interface failure caused TMS clock oscillator failure
	522	TN482	TN452		TMS IOBI bus - bad test register value from IOBI space board
	526	TN482	TN400	TN381	TMS IOBI bus - bad clock on TMIF
	528	TN482			TMS maintenance bus - bad test register value from TMIF
	529	TN482	TN482		TMS maintenance bus - bad test register value from target IOBI board
	530	TN482			TMS maintenance bus - bad SAC value
	531	TN482			TMS maintenance bus - TMIF did not flag bad parity
	605	TN482			TMIF generates test vectors when shut off
	621	TN482			TMIF read error
	627	TN482			TMIF test vector output incorrect
62	12	SN261			Time slot unavailable
	199	SN261			Busy out failed
	218	SN261			Network order failed
	219	SN261			Release busy out failed
	337	SN261			Hyperactive port (receiving too many signals)
	350	SN261	TN452	TN400	ADFTC digital self-test fault

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
62 (Contd)	351	SN261	TN452	TN400	ADFTC DTL idle bit set
	352	SN261	TN452	TN400	ADFTC digital self-test and DTLI together
	353	SN261	TN452	TN400	ADFTC analog self-test fault
	354	SN261	TN452	TN400	ADFTC analog and digital self-test fault together
	355	SN261	TN452	TN400	ADFTC analog self-test and DTLI together
	356	SN261	TN452	TN400	ADFTC analog, digital self-test fault, and DTLI together
	357	SN261	TN452	TN400	One S channel retransmission to the port has occurred
	358	SN261	TN452	TN400	More than one S channel retransmission to the port has occurred
	359	SN261			GPP test received no response from ADFTC after ID request
	360	SN261			GPP test found state of health bit set for ADFTC
	361	SN261	TN452	TN400	Failure of port BLA set (nonremoted board)
	362	SN261	TN454		SAC failed to clear in port DTL looparound test
	363	SN261	TN454		Invalid SAC signature in port DTL looparound test
	364	SN261	TN454		Error in TDR in port DTL looparound test (nonremoted board)
	454	SN261			DTLF fault on ADFTC (digital self-test)
	455	SN261			48-VOL fault on ADFTC (analog self-test)
	456	SN261			48-VOL and DTLF faults together on ADFTC
	457	SN261			Protocol error on ADFTC
	458	SN261			DTL idle on ADFTC
	1000	SN261			Could not send an S message
	1001	SN261			Facility not tested for more than X cycles
	1005	SN261			No bits received on a one port ADFTC self-test
	1006	SN261			Data transmission interrupted: one port ADFTC self-test
	1007	SN261			Bit error rate exceeded for one port ADFTC self-test

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
62 (Contd)	1008	SN261			Block error rate exceeded for one port ADFTC self-test
	1009	SN261			EIA update failure during a one port ADFTC self-test
	1010	SN261			Error overflow during a one port ADFTC self-test
	1011	SN261			Undefined error during a one port ADFTC self-test
	1012	SN261			No bits received on a two port normal ADFTC self-test
	1013	SN261			Data transmission interrupted: two port normal ADFTC self-test
	1014	SN261			Bit error rate exceeded for two port normal ADFTC self-test
	1015	SN261			Block error rate exceeded for two port normal ADFTC self-test
	1016	SN261			EIA update failure during a two port normal ADFTC self-test
	1017	SN261			Error overflow during a two port normal ADFTC self-test
	1018	SN261			Undefined error during a two port normal ADFTC self-test
	1019	SN261			No bits received on a two port reverse ADFTC self-test
	1020	SN261			Data transmission interrupted: two port reverse ADFTC self-test
	1021	SN261			Bit error rate exceeded for two port reverse ADFTC self-test
	1022	SN261			Block error rate exceeded for two port reverse ADFTC self-test
	1023	SN261			EIA update failure during a two port reverse ADFTC self-test
	1024	SN261			Error overflow during a two port reverse ADFTC self-test
	1025	SN261			Undefined error during a two port reverse ADFTC self-test
	1026	SN261			Unsent stop message received by ADFTC
	1027	SN261			Did not receive expected: test aborted S message

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
62 (Contd)	1028	SN261			Did not receive expected: test completed S message
	1029	SN261			The bit- and/or block-error rates were not received
	1425	SN261			ADFTC did not return a setup (handshake) result message
	1426	SN261			ADFTC did not receive a set test (start handshake) message
66	100	SN255	TN452	TN400	Non-zero idle port control register
	120	SN255	TN452	TN400	Valid tone present bit stuck active in summary board scan
	121	SN255	TN454	SN250 or SN253	Valid tone present not indicated in summary board scan (reorder or data answer tone used)
	122	SN255	TN454	SN250 or SN253	Valid tone present not indicated in tone register (reorder or data answer tone used)
	123	SN255	TN454	SN250 or SN253	Tone not detected in tone register (reorder or data answer tone used)
	146	SN255	TN452	TN400	Faulty digital signal processor
	427	SN255			Control/summary - scan register read error
68	199	ANN11			Busy out failed
	219	ANN11			Release busy out failed
	267	ANN11	TN451 or TN452	TN451	Port command bus - bad test register value from port
	337	ANN11			Hyperactive port (receiving too many signals)
	364	ANN11			Error in TDR in port DTL looparound test
	713	ANN11	TN463		Primary reference temporary loss of signal
	715	ANN11	TN463		Secondary reference temporary loss of signal
	716	ANN11	TN463		Secondary reference steady loss of signal - primary reference healthy
	717	ANN11	TN463		Primary reference steady loss of signal - secondary reference healthy

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
68 (Contd)	719	ANN11	TN463		Secondary reference temporarily out of lock
	721	ANN11	TN463		Secondary reference steady out of lock
	722	ANN11	TN463		Primary reference temporarily out of lock
	723	ANN11	TN463		Primary reference steady out of lock - secondary reference healthy
	727	ANN11			Board processor sanity
	729	Fac	ANN11		Loss of signal at DS-1
	730	Fac	ANN11		YELLOW alarm received
	731	ANN11			Board health
	732	Fac	ANN11		Major error rate
	733	Fac	ANN11		Minor error rate
	734	Fac	ANN11		RED alarm detected
	735	Fac	ANN11		Carrier group alarm
	736	Fac	ANN11		Slip rate exceeded - references switched
	737	Fac	ANN11		Slip rate threshold exceeded
	738	Fac	ANN11		Misframe threshold exceeded
	739	Fac	ANN11		Misframe threshold exceeded - significant slips also occurring
	740	Fac	ANN11		Misframe threshold exceeded - secondary reference available
	750	Fac	ANN11	ANN11	Misframe threshold exceeded on primary and secondary references
	758	Link	ANN11		Loss of signal between both DS-1 interfaces before global initialization
	759	Link	ANN11		Loss of multiframe alignment on the signaling channel before global initialization (OOF on signaling channel)
	760	Link	ANN11		Loss of multiframe alignment on the signaling channel after global initialization (OOF)
	761	ANN11	Link		Remote multiframe alarm on the signaling channel before global initialization (OOF at far end)
	762	Fac	Link	ANN11	RED alarm raised after global initialization (out of frame)
	763	ANN11	Link		Remote multiframe alarm on the signaling channel after global initialization (OOF at far end)

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
68 (Contd)	764	Link	ANN11		BLUE alarm before global initialization (non-local out of service DS-1 facility)
	765	ANN11			Loss of processor sanity after global initialization
	766	ANN11			Interface cannot be globally initialized
	767				DS-1 reference just tested cannot be switched on-line
	770	Ref Wire	TN463	ANN11	Loss of signal from the DS-1 to the system clock synchronizer
	771	Fac	Link	ANN11	Daily limit exceeded for slips before global initialization
	772	Fac	Link	ANN11	Daily limit exceeded for misframes before global initialization
	773	Fac	Link	ANN11	RED alarm raised, out of frame before global initialization
	774	Fac	Link	ANN11	Major alarm from error rate before global initialization
	775	Fac	Link	ANN11	Minor alarm from error rate before global initialization
	776	Link	ANN11		BLUE alarm after global initialization (non-local out of service DS-1 facility)
	777	ANN11			Maintenance control register is defective
	778	ANN11			Option control register is defective
	779	ANN11			Scan mode control register is defective
	780	ANN11			Disable signaling control register is defective
	781	ANN11			Port control register is defective
	783	ANN11			Summary scan status register is defective
	784	ANN11			Status reset control register is defective
	785				DS-1 reference is not maintenance busy. Warning: If this interface is a reference, then busying out the circuit and testing it may be service affecting to other digital facilities because the capability to communicate at a digital rate would be lost for the duration of the test
	1601	Link	ANN11		YELLOW alarm received before global initialization

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
68 (Contd)	1602	Link	ANN11		YELLOW alarm received after global initialization
	1850	ANN11			Board processor sanity
	1851	ANN11			Error reported in processor status register
	1852	ANN11			Error reported in environment registers
	1853	ANN11			Loss of signal reported by system clock synchronizer board
	1854	ANN11			Error reported in fiber status register
	1855	ANN11			Loss of signal reported by DS-1 board
	1856	ANN11			Excessive slips
	1857	ANN11			Excessive misframes
	1858	ANN11			Loss of framing reported by far end (YELLOW alarm)
	1859	ANN11			Board health error
	1860	ANN11			Major error rate alarm
	1861	ANN11			Minor error rate alarm
	1862	ANN11			Loss of framing report (RED alarm)
	1863	ANN11			Loss of multiframe alignment
	1864	ANN11			Loss of multiframe alignment reported by far end
	1865	ANN11			Far-end in looparound (BLUE alarm)
	1866	ANN11			Other error report - no errors found
69	13	ANN17			Circuit in use by call processing
	51	ANN17			Port resources not available
	109	ANN17	TN452	TN400	Faulty set of LA flip-flop
	110	ANN17	TN452	TN400	Faulty set of CPU flip-flop
	118	ANN17	TN452	TN400	Faulty clear of LA flip-flop
	124	ANN17	TN452	TN400	Faulty clear of CPU flip-flop
	125	ANN17	TN452	TN400	Off-hook error, possibly from attached station
	131	ANN17	TN452	TN400	Terminated line failed to indicate off-hook
	149	ANN17	TN454	SN250	Insufficient 400-Hz on-hook reflection
	150	ANN17	TN454	SN250	Excessive 400-Hz on-hook reflection
	152	ANN17	TN454	SN250	Excessive 400-Hz off-hook reflection
	153	ANN17	TN454	SN250	Excessive signal at other than 400-Hz
	154	ANN17	TN454	SN250	On-hook status failed to power down CODEC

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
69 (Contd)	199	ANN17			Busy out failed
	219	ANN17			Release busy out failed
	267	ANN17	TN451 or TN452	TN451	Port command bus - bad test register value from port
	280	ANN17	TN452	TN400	MLP controller fault
	281	ANN17	TN452	TN400	MLP 48-V overload
	282	ANN17	TN401		MLP driver circuitry failure
	283	ANN17	TN452	TN400	MLP failed to return ID request
	284	ANN17	TN452	TN400	MLP responded to off-hook test with something besides on, off, or no response
	344	ANN17	TN454	SN250	Insufficient touch-tone signal reflection
	345	ANN17	TN454	SN250	Excessive touch-tone signal reflection
	436	ANN17			MLP controller fault, initialization failed
	441	ANN17			MLP controller fault, initialization successful
	998	ANN17			Cannot test untranslated port
	999	ANN17			Requested test not provided for this unit
	1619	ANN17	ANN16		Failure on remote port board 1 before global initialization
	1620	ANN17	ANN16		Failure on remote port board 1 after global initialization
	1621	ANN17	ANN16		Failure on remote port board 2 before global initialization
	1622	ANN17	ANN16		Failure on remote port board 2 after global initialization
	1623	ANN17	ANN16		Failure on remote port board 3 before global initialization
	1624	ANN17	ANN16		Failure on remote port board 3 after global initialization
	1641	ANN17			Port failure on remote MFAT board
71	391	TN456 Central	TN452	TN400	Unable to read remote module interface status
	392	TN456 Central	TN452	TN400	Unable to write remote module interface control
	393	TN456 Central	TN456 Remote	Fiber	Remote module interface LFAIL bit found set, expected to be cleared

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
71 (Contd)	394	TN456 Central	TN456 Remote	Fiber	Remote module interface FRMERR bit found set, expected to be cleared
	395	TN401	Cable	TN456 Remote	4-MHz channel error on remote end remote module interface
	396	TN456 Remote	TN456 Central	Fiber	Remote RMI failure
	397	Fiber	TN456 Remote	TN456 Central	Remote module interface fiber link or remote RMI power failure
	398	TN402	Cable	TN456 Central	4-MHz channel to central remote module interface failure (RMI status normal)
	399	TN456 Central	TN452	TN400	Central remote module interface failure (4-MHz loop back failed and RMI status failed)
72	13	SN238			Circuit in use by call processing
	199	SN238			Busy out failed
	219	SN238			Release busy out failed
	337	SN238			Hyperactive port (receiving too many signals)
	357	SN238	TN452	TN400	One S channel retransmission to the port has occurred (nonremoted board)
	357	SN238	ANN16		One S channel retransmission to the port has occurred (remoted board)
	358	SN238	TN452	TN400	More than one S channel retransmission to the port has occurred (nonremoted board)
	358	SN238	ANN16		More than one S channel retransmission to the port has occurred (remoted board)
	359	SN238			GPP test received no response from associated DI after ID request (nonremoted board)
	359	SN238	ANN16		GPP test received no response from associated DI after ID request (remoted board)
	360	SN238			GPP test found state of health bit set for associated DI (nonremoted board)
	360	SN238	ANN16		GPP test found state of health bit set for associated DI (remoted board)
	373	SN238			Port processor fault
	374	SN238			Signaling processor fault

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
72 (Contd)	375	SN238			Port processor and signaling processor fault
	376	SN238			Loss of data fault and port processor fault
	377	SN238			Loss of data, port processor, and signaling processor faults
	378	SN238			Signaling processor fault, initialization successful
	379	SN238			Signaling and port processor faults, initialization successful
	380	SN238			Loss of data, signaling, and port processor faults, initialization successful
	381	SN238			Signaling processor fault, initialization failed
	382	SN238			Signaling and port processor faults, initialization failed
	383	SN238			Loss of data, signaling, and port processor faults, initialization failed
	384	SN238			Port processor fault, reset successful
	385	SN238			Loss of data fault, reset successful
	386	SN238			Port processor fault, reset failed
	387	SN238			Loss of data fault, reset failed
	462	SN238			Protocol error on EIA
	463	SN238			EIA signaling processor fault, initialization successful
	464	SN238			EIA signaling processor fault, initialization failed
	465	SN238			EIA port fault, reset successful
	466	SN238			EIA port fault, reset failed
	467	SN238			EIA loss of data, reset successful
	468	SN238			EIA loss of data, reset failed
	995	SN238			Use PROC 646 to complete tests on this circuit
	998	SN238			Cannot test untranslated port
	1619	SN238	ANN16		Failure on remote port board 1 before global initialization
	1620	SN238	ANN16		Failure on remote port board 1 after global initialization

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
72 (Contd)	1621	SN238	ANN16		Failure on remote port board 2 before global initialization
	1622	SN238	ANN16		Failure on remote port board 2 after global initialization
	1623	SN238	ANN16		Failure on remote port board 3 before global initialization
	1624	SN238	ANN16		Failure on remote port board 3 after global initialization
	1633	SN238			Port failure on remote EIA board
74	364	ANN15			Error in TDR in port DTL looparound test
	758	Link	ANN15 or ANN16		Loss of signal between RCL and RCC before global initialization
	762	Link	ANN15 or ANN16		RED alarm raised after global initialization (out of frame)
	765	ANN15 or ANN16			Loss of processor sanity after global initialization
	766	ANN15 or ANN16			Interface cannot be globally initialized
	771	Link	ANN15 or ANN16		Daily limit exceeded for slips before global initialization
	772	Link	ANN15 or ANN16		Daily limit exceeded for misframes before global initialization
	773	Link	ANN15 or ANN16		RED alarm raised, out of frame before global initialization
	774	Link	ANN15 or ANN16		Major alarm from error rate before global initialization
	775	Link	ANN15 or ANN16		Minor alarm from error rate before global initialization
	777	ANN15 or ANN16			Maintenance control register is defective

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
74 (Contd)	782	Link	ANN16	ANN15	No communication from far end before global initialization
	784	ANN15 or ANN16			Status reset control register is defective
	785				RCL or RCC interface is not maintenance busy
	1601	Link	ANN15 or ANN16		YELLOW alarm received before global initialization
	1602	Link	ANN15 or ANN16		YELLOW alarm received after global initialization
	1604	Link	ANN15		Loss of signal and no communication from the far end after global initialization
	1606	Link	ANN15		No communication from far end after global initialization
	1607	ANN15			Failures in one or two of the three NIB chips
	1608	ANN15			Option control register and administered values mismatch
	1612	ANN15 or ANN16			Processor sanity and health error
	1613	ANN15			Processor sanity and control path and health error
	1614	ANN15			Processor sanity and NIB and health error
	1615	ANN15 or ANN16			Processor sanity and RAM and health error
	1616	ANN15 or ANN16			Processor sanity and ROM and health error
	1625				One or more environmental errors have been detected
	1626	ANN16	Link		Reflected signal is above the high threshold
	1627	ANN16	Link		Reflected signal is below the low threshold
	1629	ANN16			Sanity and health and I/O failure

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
74 (Contd)	1631	ANN16	Link		RCC interface has error bits set
	1632	ANN15	Link		RCL interface has error bits set
	1634	ANN16			Firmware error on RCC interface
	1635	ANN15			Firmware error on RCL interface
	1637	Link	ANN16		Major alarm from error rate on RCC interface
	1638	Link	ANN15		Major alarm from error rate on RCL interface
	1639	Link	ANN16		Minor alarm from error rate on RCC interface
	1640	Link	ANN15		Minor alarm from error rate on RCL interface
	1643	ANN16			Processor sanity and health and per time slot PCM failure
	1644				Fiber status register contents do not agree with administered value for the RCL T1/fiber option
	1647	Link			No response from firmware test 1 request
	1648	ANN15			Loss of signal between fiber termination point and DS-1 chip set on the RCL
	1649	Link	ANN15		Loss of signal between RCL and RCC with a fiber connection
	1651	ANN16			Error reported in processor status register
	1652	ANN16			Error reported in fiber status register
	1653	ANN16			Other error reported but no error found
	1850	ANN15 or ANN16			Board processor sanity
	1851	ANN15 or ANN16			Error reported in processor status register (I/O error - loss of protocol)
	1852	ANN15 or ANN16			Error reported in environment registers
	1853	ANN15 or ANN16			Loss of signal reported by system clock synchronizer board

Table 5-35. (Contd)

PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE					
UNIT TYPE	FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION
74 (Contd)	1854	ANN15 or ANN16			Error reported in fiber status register
	1855	ANN15 or ANN16			Loss of signal reported by DS-1 board
	1856	ANN15 or ANN16			Excessive slips
	1857	ANN15 or ANN16			Excessive misframes
	1858	ANN15 or ANN16			Loss of framing reported by far end (YELLOW alarm)
	1859	ANN15 or ANN16			Board health error
	1860	ANN15 or ANN16			Major error-rate alarm
	1861	ANN15 or ANN16			Minor error-rate alarm
	1862	ANN15 or ANN16			Loss of framing report (RED alarm)
	1863	ANN15 or ANN16			Loss of multiframe alignment
	1864	ANN15 or ANN16			Loss of multiframe alignment reported by far end
	1865	ANN15 or ANN16			Far end in looparound (BLUE alarm)
	1866	ANN15 or ANN16			Other error report - no errors found

PROC 621 - NETWORK DUPLICATION CHANNEL

Purpose

PROC 621 is used to determine the current state of health of both sides of the TMS or network duplication channel.

PROC 621 provides the capability to perform a soft or hard switch between sides of the TMS or network module control complex to support maintenance of the digital network.

PROC 621 provides the capability to reinitialize the TMS control or network module carrier, if it is duplicated, on-line, off-line, or unduplicated.

PROC 621 is used to:

1. Display the times and causes of the last seven (maximum) switches that occurred in any TMS or module control complex.
2. Display the current state of health for both sides of the TMS or network module.
3. Perform a soft switch of the TMS or network module control complex.
4. Perform a hard switch of the TMS or network module control complex.
5. Prevent a soft switch to the off-line side of a TMS or network module.
6. Reinitialize the TMS control or network module carrier.

Field Definitions and Codes

Each field of **PROC 621** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AI, PROC 621 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Field 2 - Select equipment type (TMS or network module duplication channel) to be tested or displayed.
3. Field 3 - Select a specific module to be tested or displayed (Test 1 only).
4. Fields 3 through 5 - Select a specific equipment location to be tested or displayed (Tests 2 through 4 only).
5. Field 8 - Enable a switch (soft or hard) to be performed (Tests 2 and 3 only) or enable a reinitialization (Test 4 only).

Operation of Procedure

Overview

PROC 621 is used to determine the number and cause of switches, the current state of health for both sides of a control complex, to lock a control complex off-line, to perform a soft or hard switch of a control complex, and to perform a reinitialization of control carriers.

To call in **PROC 621**, perform the following:

1. Depress **PROC NO; 621; ENTER**.
2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 1 of **PROC 621**.

   Field 1 (test number) is blinking, indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to reinitialize an unduplicated TMS control or network module carrier.
3. For duplicated TMS control or network module complexes, Test 1 is automatically selected.

   Field 1 displays a 1, Field 2 displays a 1 (defaults to network module duplication channel equipment type) and all other fields are dashed.
4. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Four tests are available for duplicated TMS or network module control complexes. Only Test 4 can be used for unduplicated TMS or network control channels.

1. Test 1 - Displays the time and cause of the last seven switches and clears the switch history.
2. Test 2 - Allows a soft switch of the TMS or network module control complex.

   Test 2 is also used to prevent a soft switch from taking place by **soft locking** the off-line TMS or network module duplication channel.

Table 5-36.

PROC 621 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-4	Test number.	8	0-1	Switch/Initialization:
2	1,2	Equipment type:		0	Disabled.
	1	Network module duplication channel.		1	Enabled.
	2	Time multiplexed switch (TMS) duplication channel.	9-14		Health code: 0 = Condition not present. 1 = Condition present.
3-5		Equipment location of displayed duplication channel:	9	0,1	CC - Driven by MCC on command from 501CC.
3	0-30	Network module number.	10	0,1	Shutdown - Set when TMS or module processor is stopped.
	99	TMS module number.			
4	0-7	Cabinet number.	11	0,1	SOFTB - Set by TMS or module processor software.
5	0-3	Carrier number.			
6	0-3	On-line status:	12	0,1	SOFTA1 - Set by 501CC maintenance software.
	0	On-line.			
	1	On-line and soft locked.	13	0,1	SOFTA2 - Set by 501CC maintenance software.
	2	Off-line.	14	0,1	SOFTA3 - Set by 501CC maintenance software.
	3	Off-line and soft locked.			
7	0-2	Switch status:	15	0-7	Switch index: Index into the switch time and cause table.
	0	Soft switch permitted.			
	1	Soft switch permitted but problems exist.	16-18		Time switched on-line:
	2	Soft switch not permitted.	16	1-31	Day of month.
			17	0-23	Hour of day.
			18	0-59	Minute of hour.

Table 5-36. (Contd)

PROC 621 - FIELD DEFINITIONS AND CODES		
FIELD	**CODE**	**DEFINITION**
19	1-5	Switch type:
	1	32-hour periodic soft switch.
	2	Hard switch caused by craft request.
	3	Soft switch caused by craft request.
	4	Recovery soft switch.
	5	Hardware failure hard switch.
20		Unit type of failure causing switch. (See unit type list for PROC 600.)

3. Test 3 - Allows a hard switch of the network module control complex.
4. Test 4 - Allows a reinitialization of an unduplicated or duplicated TMS control or network module carrier.

Test 1

Test 1 is used to determine the time and cause when the last seven switches occurred for the on-line duplication channel entered in Fields 2 through 5.

Test 1 is also used to clear the table of last seven switches (maximum) for the duplication channel displayed in Fields 2 through 5.

1. Test 1 is the default test when entering **PROC 621** or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 1 of **PROC 621**.
3. Field 1 (test number) is blinking, indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to reinitialize an unduplicated TMS control or network module carrier.
4. When Test 1 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

   Field 2 is blinking, indicating an optional entry field.

5. The default equipment location can be the last equipment location displayed in Test 2 through 4 of **PROC 621** or can be passed from **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure) while it is still displayed in **PROC 600** or **PROC 620** when it is passed.
6. A specific TMS or network module duplication channel or the default equipment location can be tested.

   To test the default equipment location displayed in Fields 2 through 5, proceed to Step 11.
7. A specific TMS or network module duplication channel can be selected for testing by one of the following methods (Steps 8 through 10) depending on whether or not a default equipment location is displayed.
8. Depress **NEXT CIRCUIT** to step through the duplication channels until the equipment type and on-line duplication channel to be tested is displayed in Fields 2 through 5.

   Proceed to Step 11.
9. Depress **NEXT UNIT** until the equipment type to be tested is displayed in Field 2.

   NOTE

   Field 2 defaults to a 1 (network module duplication channel equipment type) when Test 1 is entered and no default equipment location is displayed.

   Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be tested is displayed in Fields 3 through 5.

   Proceed to Step 11.
10. If no default equipment location is displayed, either the duplication channel can be directly entered, or the **CHANGE FIELD** sequence can be used:

    (Equipment type); ENTER; (Module number of duplication channel to be tested); ENTER.

    CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; **(Module number of duplication channel to be tested)**; **ENTER**.

    Proceed to Step 11.
11. To start Test 1, depress **EXECUTE**.
12. If no switches occurred for the duplication channel selected for testing, the following is displayed:

    Field 1 - 1.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of duplication channel tested.

    Fields 6 through 14 - Dashed.

    Field 15 - 0 (indicating no switches occurred for the duplication channel tested).

    Fields 16 through 20 - Dashed.

13. If any switches occurred for the duplication channel selected for testing, the following is displayed:

    Field 1 - 1.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of duplication channel tested.

    Field 6 - On-line status when switch occurred (0 = on-line, 1= on-line and locked, 2 = off-line, 3 = off-line and locked).

    Fields 7 through 14 - Dashed.

    Field 15 - Number of switches that occurred (maximum of 7) for the duplication channel tested.

    Field 16 - Day of month the switch occurred.

    Field 17 - Hour of day the switch occurred.

    Field 18 - Minute of day the switch occurred.

    Field 19 - Switch type (1 through 5).

    Field 20 - Unit type that caused the switch.

    NOTE

    Fields 16 through 20 display the latest switch that occurred and the switch cause (switch type and unit type) of the switch for the duplication channel tested. Refer to Table G, PROC 600 - Field Definitions and Codes on page 85 to determine the unit type of the failure that caused the switch.

14. When Field 15 is greater than 1, depressing **NEXT DATA** decrements Field 15 and displays (in Fields 16 through 20) when the next to last switch occurred and the cause (switch type and unit type) of the switch for the duplication channel tested.

15. Depressing **NEXT DATA** repeatedly displays the remaining switches that occurred (and the cause [switch type and unit type] for each switch) for the duplication channel tested.

    When the last switch is displayed, depressing **NEXT DATA** again dashes Fields 7 through 20.

16. Depressing **NEXT DATA** once more begins the sequence over starting with the latest switch that occurred for the duplication channel tested.

17. The **CLEAR DATA; EXECUTE** sequence can be used to clear the table of last 7 switches for the duplication channel displayed in Fields 2 through 5 after **EXECUTE** is used to initiate Test 1.

18. To clear the table of last 7 switches for the duplication channel displayed in Fields 2 through 5, perform the following:

    Depress **CLEAR DATA; EXECUTE**.

    Fields 15 through 20 display dashes, indicating the table of last 7 switches for the duplication channel displayed in Fields 2 through 5 is cleared.

    NOTE

    The tables of last 7 switches for other duplication channels are not affected. Only the table for the duplication channel displayed in Fields 2 through 5 is cleared.

19. When another duplication channel is to be tested, the **CHANGE FIELD** sequence or **NEXT CIRCUIT** and/or **NEXT UNIT** and **NEXT CIRCUIT** can be used to select the specific duplication channel to be tested (Steps 19 through 21).
20. **CHANGE FIELD; 2; ENTER; (Equipment type); ENTER**; **(Module number of duplication channel to be tested)**; **ENTER**.
21. Depress **NEXT CIRCUIT** to step through the duplication channels until the equipment type and on-line duplication channel to be tested are displayed in Fields 2 through 5.
22. Depress **NEXT UNIT** until the equipment type to be tested is displayed in Field 2. Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be tested is displayed in Fields 3 through 5.
23. **EXECUTE** must be depressed to test the specific duplication channel selected for testing.

Test 2

Test 2 is used to perform a user-transparent soft switch of TMS or network module control complexes and updates memory after the switch. The soft switch may not be transparent to data connections.

Soft switches cannot be performed if the off-line state-of-health is worse than the on-line state-of-health.

Problems in the modules affect the module's state-of-health which can affect the soft switch of modules. Problems in the TMS affect the TMS's state-of-health which can affect the soft switch of TMSs.

TN481 (Light Guide Interface) installed in the module control carrier affects the soft switch of the TMS and **not** the soft switch of the modules.

To assist in troubleshooting network problems, Test 2 is used to prevent a soft switch from taking place by **soft locking** the off-line TMS or network module duplication channel.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.
2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 2 of **PROC 621**.
3. Field 1 (test number) is blinking, indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to reinitialize an unduplicated TMS control or network module carrier.
4. When Test 2 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

   Field 2 is blinking, indicating an optional entry field.

5. The default equipment location can be the last equipment location displayed in Test 1, 3, or 4 of **PROC 621** or can be passed from **PROC 600** or **PROC 620** while it is still displayed in **PROC 600** or **PROC 620** when it is passed.

6. A specific on-line TMS or network module duplication channel or the default equipment location can be selected to be soft switched.

   To soft switch the default equipment location displayed in Fields 2 through 5, proceed to Step 11.

7. A specific on-line TMS or network module duplication channel can be selected to be soft switched by one of the following methods (Steps 8 through 10) depending on whether or not a default equipment location is displayed.

8. Depress **NEXT CIRCUIT** to step through the duplication channels until the equipment type and on-line duplication channel to be soft switched is displayed in Fields 2 through 5.

   Proceed to Step 11.

9. Depress **NEXT UNIT** until the equipment type to be soft switched is displayed in Field 2.

   Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be soft switched is displayed in Fields 3 through 5.

   Proceed to Step 11.

10. If no default equipment location is displayed, either the on-line duplication channel can be directly entered, or the **CHANGE FIELD** sequence can be used:

    (Equipment type); ENTER; (Module number of on-line duplication channel to be soft-switched); ENTER.

    CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; **(Module number of on-line duplication channel to be soft switched); ENTER**.

    Proceed to Step 11.

11. To start Test 2, depress **EXECUTE**.

12. When **EXECUTE** is depressed, the following is displayed:

    Field 1 - 2.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of duplication channel to be soft switched.

    Field 6 - On-line status (0 = on-line, 1 = on-line and locked).

    Field 7 - Switch status (0 = soft switch permitted, 1 = soft switch permitted but problems exist, 2 = soft switch not permitted).

    Field 8 - 0 (switch disabled).

    Fields 9 through 14 - State of health code for the duplication channel displayed in Fields 2 through 5 (0 = pass, 1 = condition present).

    Fields 15 through 20 - Dashed.

13. To perform a soft switch of the TMS or network module control complex, check the switch status in Field 7.

    If Field 7 equals 2, a soft switch cannot be performed.

    NOTE

    If a switch of the TMS or network module control complex is still required, proceed to Test 3 and perform a hard switch.

14. If Field 7 equals 0 or 1, a soft switch of the TMS or network module control complex is possible.

    Check the on-line status displayed in Field 6.

    If Field 7 equals 0, proceed to Step 18.

    If Field 6 equals 1, proceed to Step 15.

    NOTE

    A soft switch of the TMS or network module control complex cannot be performed if the off-line side is **soft locked**.

15. Depress **RLS BUSY OUT** to release the TMS or network module control complex from the locked condition.

    NOTE

    In the event that the state of health for the on-line side is worse than the off-line side, a hard switch may occur. Special error code 82 (hard switch will occur) is displayed in the **MAAP** error code field.

16. If special error code 82 is not displayed, proceed to Step 18.

    CAUTION

    A hard switch causes a disruption of service and affects normal call processing.

17. If special error code 82 is displayed and a switch of the network control complex is still required, depress **RLS BUSY OUT** again.

    Field 6 displays a 3 for the duplication channel displayed in Fields 2 through 5, indicating that the channel is off-line and locked.

18. To enable the soft switch of the TMS or network module control complex, change Field 8 to a 1 using the **CHANGE FIELD** sequence:

    CHANGE FIELD; 8; ENTER; 1; ENTER.

    NOTE

    Prior to a switch of the TMS, the network modules **must** be working.

19. Depress **EXECUTE**.

    The first time **EXECUTE** is depressed, the soft switch does not occur.

    NOTE

    Special error code 85 (push **EXECUTE** twice to switch) is displayed in the **MAAP** error code field indicating that **EXECUTE must** be depressed twice to perform a soft switch.

20. Depress **EXECUTE**.

    NOTE

    If the soft switch cannot be performed after **EXECUTE** is depressed twice, Field 8 displays a 1 (switch enabled) and special error code 80 (switch failed) is displayed in the **MAAP** error code field.

    If a switch of the TMS or network module control complex is still required, proceed to Test 3 and perform a hard switch.

21. The **WAIT** indicator on the **MAAP** is lighted while the switch is taking place.

22. When the **WAIT** indicator goes off and the switch is successful, the following is displayed:

    Field 1 - 2.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of the now off-line duplication channel.

    Field 6 - On-line status (2 = off-line).

    Field 7 - Switch status (0 = soft switch permitted, 1 = soft switch permitted but problems exist, 2 = soft switch not permitted).

    Field 8 - 0 (switch disabled).

    Fields 9 through 14 - State of health code for the duplication channel displayed in Fields 2 through 5 (0 = pass, 1 = condition present).

    Fields 15 through 20 - Dashed.

    NOTE

    The cause and time of the switch is updated in status memory.

23. If the switch passes but automatically switches back to the previous configuration, some type of failure in the original off-line side occurred to lower its state-of-health. An alarm on the original off-line side may be indicated by **PROC 600**, Test 1.

24. If the switch failed, indicated by a 1 displayed in Field 8 (switch enabled) and special error code 80 (switch failed) displayed in the **MAAP** error code field, use **PROC 620**, Test 4 to test the duplication channel (unit type 23) displayed in Fields 2 through 5. Perform corrective action as required.

An off-line TMS or network module duplication channel can be **soft locked** to prevent a soft switch from taking place while maintenance personnel are working on the off-line TMS or network module control carrier.

A hardware failure that causes a switch of the TMS or network module control complex overrides a **soft lock**.

A **soft lock** of the off-line TMS or network module duplication channel is normally performed after a demand soft switch by maintenance personnel. However, any TMS or network module duplication channel can be **soft locked**.

A **soft lock** of an off-line TMS or network module duplication channel is performed as follows:

1. Depress **NEXT UNIT** until the equipment type to be **soft locked** is displayed in Field 2.

   Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the off-line duplication channel to be **soft locked** is displayed in Fields 3 through 5.

2. Depress **EXECUTE**.

   The on-line status and state of health for the off-line TMS or network module duplication channel is displayed in Fields 6 and 9 through 14.

3. Depress **BUSY OUT**.

   Field 6 changes from a 2 (off-line) to a 3 (off-line and locked).

4. The **BUSY OUT** indicator on the **MAAP** is lighted if not already lighted from another circuit that is busied out.

   CAUTION

   If PROC 621 is exited with a TMS or network module duplication channel soft locked, a soft switch of the TMS or network module control complex cannot be performed.

5. Prior to exiting **PROC 621**, release the TMS or network module duplication channel that is **soft locked** from busy out by depressing **RLS BUSY OUT** when the TMS or network module duplication channel is displayed in Fields 2 through 5 and **EXECUTE** is depressed.

   CAUTION

   When BUSY OUT is depressed in Test 2 of PROC 621 the busy out status cannot be released by PROC 630 (busy out/release busy out).

Test 3

Test 3 is used to perform a hard switch of TMS or network module control complexes and updates memory after the switch.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 3 of **PROC 621**.

3. Field 1 (test number) is blinking, indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to reinitialize an unduplicated TMS control or network module carrier.

4. When Test 3 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

   Field 2 is blinking, indicating an optional entry field.

5. The default equipment location can be the last equipment location displayed in Test 1, 2, or 4 of **PROC 621** or can be passed from **PROC 600** or **PROC 620** while it is still displayed in **PROC 600** or **PROC 620** when it is passed.

6. A specific on-line TMS or network module duplication channel or the default equipment location can be selected to be hard switched.

   To hard switch the default equipment location displayed in Fields 2 through 5, proceed to Step 11.

7. A specific on-line TMS or network module duplication channel can be selected to be hard switched by one of the following methods (Steps 8 through 10) depending on whether or not a default equipment location is displayed.

8. Depress **NEXT CIRCUIT** to step through the duplication channels until the equipment type and on-line duplication channel to be hard switched is displayed in Fields 2 through 5.

   Proceed to Step 11.

9. Depress **NEXT UNIT** until the equipment type to be hard switched is displayed in Field 2.

   Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be hard switched is displayed in Fields 3 through 5.

   Proceed to Step 11.

10. If no default equipment location is displayed, either the on-line duplication channel can be directly entered, or the **CHANGE FIELD** sequence can be used:

    (Equipment type); ENTER; (Module number of on-line duplication channel to be hard switched); ENTER.

    CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; **(Module number of on-line duplication channel to be hard switched); ENTER**.

    Proceed to Step 11.

11. To start Test 3, depress **EXECUTE**.

12. When **EXECUTE** is depressed, the following is displayed:

    Field 1 - 3.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of duplication channel to be hard switched.

    Field 6 - On-line status (0 = on-line, 1 = on-line and locked).

    Field 7 - Dashed.

    Field 8 - 0 (switch disabled).

    Fields 9 through 14 - State of health code for the TMS or network module duplication channel displayed in Fields 2 through 5 (0 = pass, 1 = condition present).

    Fields 15 through 20 - Dashed.

13. To perform a hard switch of the TMS or network module control complex, check the on-line status in Field 6.

14. If Field 6 equals 0, proceed to Step 18.

    If Field 6 equals 1, proceed to Step 15.

NOTE

A hard switch of the TMS or network module control complex cannot be performed if the off-line side is **soft locked**.

15. Depress **RLS BUSY OUT** to release the TMS or network module control complex from the locked condition.

NOTE

In the event that the state of health for the on-line side is worse than the off-line side, a hard switch may occur. Special error code 82 (hard switch will occur) is displayed in the **MAAP** error code field.

16. If special error code 82 is not displayed, proceed to Step 18.

CAUTION

A hard switch causes a disruption of service and affects normal call processing.

17. If special error code 82 is displayed and a switch of the TMS or network control complex is still required, depress **RLS BUSY OUT** again.

    Field 6 displays a 3 for the TMS or network module duplication channel displayed in Fields 2 through 5, indicating that the channel is off-line and locked.

18. To enable the hard switch of the TMS or network module control complex, change Field 8 to a 1 using the **CHANGE FIELD** sequence:

    CHANGE FIELD; 8; ENTER; 1; ENTER.

19. Depress **EXECUTE**.

    The first time **EXECUTE** is depressed, the hard switch does not occur.

NOTE

Special error code 85 (push **EXECUTE** twice to switch) is displayed in the **MAAP** error code field indicating that **EXECUTE must** be depressed twice to perform a hard switch.

20. Depress **EXECUTE**.

    The **WAIT** indicator on the **MAAP** is lighted while the switch is taking place.

21. When the **WAIT** indicator goes off and the switch is successful, the following is displayed:

    Field 1 - 3.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of the now off-line duplication channel.

    Field 6 - On-line status (3 = off-line and locked).

    NOTE

    When a demand hard switch is completed, the now off-line side is automatically soft locked to prevent it from switching back in event the now off-line side's state of health is better than the on-line side.

    Field 7 - Dashed.

    Field 8 - 0 (switch disabled).

    Fields 9 through 14 - State of health code for the duplication channel displayed in Fields 2 through 5 (0 = pass, 1 = condition present).

    Fields 15 through 20 - Dashed.

    NOTE

    The cause and time of the switch is updated in status memory.

22. If the switch failed, indicated by a 1 displayed in Field 8 (switch enabled) and special error code 80 (switch failed) displayed in the **MAAP** error code field, use **PROC 620**, Test 3 to continuously test the duplication channel displayed in Fields 2 through 5. Suspect a cabling problem. Perform corrective action as required.

    In addition, if any soft A or soft B problems exist as indicated by Fields 11 through 14, use **PROC 600**, Test 2 to determine if any type of network problems exist. Perform corrective action as required.

Test 4

Test 4 is used to perform an initialization on the TMS or module control carrier.

Test 4 can be used to reinitialize the TMS or module control carrier, if it is duplicated, on-line, off-line, or unduplicated.

Test 4 is useful when the state of health bits (SOH) indicate the control carrier to be shutdown or when all tests for the TMS or module control carrier in **PROC 620** fail.

If the **GREEN** LED on TN380 (module processor) or TN381 (TMS processor) is not flashing (no heartbeat), reinitialization should be performed.

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

   Field 2 is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Test 1 through 3 of **PROC 621** or can be passed from **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure) while it is still displayed in **PROC 600** or **PROC 620** when it is passed.

4. A specific TMS or module control carrier or the default equipment location can be reinitialized.

   To reinitialize the default equipment location displayed in Fields 2 through 5, proceed to Step 9.

5. A specific TMS or module control carrier can be selected for reinitialization by one of the following methods (Steps 6 through 8) depending on whether or not a default equipment location is displayed.

6. Depress **NEXT CIRCUIT** to step through the duplication channels until the equipment type and on-line duplication channel to be reinitialized is displayed in Fields 2 through 5.

   Proceed to Step 9.

7. Depress **NEXT UNIT** until the equipment type to be reinitialize is displayed in Field 2.

   NOTE

   Field 2 defaults to a 1 (network module equipment type) when Test 4 is entered and no default equipment location is displayed.

   Depress **NEXT CIRCUIT** to step through the control carriers associated with the equipment type selected until the control carrier to be reinitialized is displayed in Fields 3 through 5.

   Proceed to Step 9.

8. If no default equipment location is displayed, either the TMS or module control carrier can be directly entered, or the **CHANGE FIELD** sequence can be used:

   (Equipment type); ENTER; (Module number of TMS or module control carrier to be reinitialized); ENTER.

   CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; **(Module number of TMS or module control carrier to be reinitialized); ENTER**.

   Proceed to Step 9.

9. To start Test 4, depress **EXECUTE**.

10. When **EXECUTE** is depressed, the following is displayed:

    Field 1 - 4.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of control carrier to be reinitialized.

    Field 6 - On-line status (0 = on-line, 1 = on-line and locked, 2 = off-line, 3 = off-line and locked).

    Field 7 - Dashed.

    Field 8 - 0 (initialization disabled).

    Fields 9 through 14 - State of health code for the control carrier displayed in Fields 2 through 5 (0 = pass, 1 = condition present).

Fields 15 through 20 - Dashed.

CAUTION

A reinitialization of the TMS or module control carrier causes a disruption of service and affects normal call processing if reinitialization of the TMS or module control carrier is performed on-line. Reinitialization should be performed on the off-line side of the TMS or module control carrier (if duplicated).

11. To enable the reinitialization of the TMS or module control carrier, change Field 8 to a 1 using the **CHANGE FIELD** sequence:

    CHANGE FIELD; 8; ENTER; 1; ENTER.

12. Depress **EXECUTE**.

    The first time **EXECUTE** is depressed, reinitialization does not occur.

NOTE

Special error code 85 (push **EXECUTE** twice to initialize) is displayed in the **MAAP** error code field indicating that **EXECUTE must** be depressed twice to perform reinitialization.

13. Depress **EXECUTE**.

    The **WAIT** indicator on the **MAAP** is lighted while reinitialization is taking place.

14. When the **WAIT** indicator goes off and reinitialization is successful, the following is displayed:

    Field 1 - 4.

    Field 2 - Equipment type (1 = network module, 2 = TMS).

    Fields 3 through 5 - Equipment location of control carrier reinitialized.

    Field 6 - On-line status (0 = on-line, 1 = on-line and locked, 2 = off-line, 3 = off-line and locked).

    Field 7 - Dashed.

    Field 8 - 0 (initialization disabled).

    Fields 9 through 14 - State of health code for the control carrier displayed in Fields 2 through 5 (0 = pass, 1 = condition present).

    Fields 15 through 20 - Dashed.

15. If the reinitialization failed, indicated by a 1 displayed in Field 8 (initialization enabled) and special error code 86 (initialization failed) displayed in the **MAAP** error code field, use **PROC 620**, Test 4 to test unit types 6 (MCC) and 7 (TMS/module processor) on the control carrier displayed in Fields 2 through 5.

PROC 622 - NETWORK PERIPHERALS

Purpose

PROC 622 is used when referenced from **PROC 600** (Alarm Causes/Error Log) or when the **NETWORK PERIPH EQPT** and **MINOR** or **WARNING** alarm indicators on the alarm panel are lighted.

PROC 622 is used to:

1. Display the failure history for network peripherals.

   Network peripherals include the Processor Data Module (PDM), 74 series terminal, Digital Telephone Data Module (DTDM), 72 series terminal, Trunk Data Module (TDM), Enhanced Processor Data Module (PDM/2), Enhanced Trunk Data Module (TDM/2), Integrated Display Terminal (IDT) voice station, IDT data module, Personal Terminal 510D voice station, 510D data module, BCT 515 voice station, BCT 515 data module, voice data station (VDS) voice station, voice data station (VDS) data module, AP32 DCP interface even port channel, AP32 DCP interface odd port channel, and Multifunctional Analog Terminal (MFAT) family of data modules.

2. Manually turn off any alarms activated because of a network peripheral failure.

NOTE

When the alarm indicator goes off, the alarmed entry for the network peripheral failure causing the alarm to be activated is marked as resolved in PMIDS.

3. Test one or more network peripherals once and display the test results.
4. Test one or more network peripherals in a continuous cycle and display the test results.
5. Continuously test the transmission quality to one or more network peripherals.
6. Automatically turn off the fault indicator when all network peripherals that caused an alarm to be raised are tested as good in Test 2 or 3.

NOTE

Alarmed network peripheral entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 622** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AJ, PROC 622 - Field Definitions and Codes.

Optional input fields are:

1. Field 2 - Select equipment type to be tested (Tests 2 through 4 only).

   Equipment types include: 1 = PDM, 2 = 74 series terminal, 3 = DTDM, 4 = 72 series terminal, 5 = TDM, 6 = PDM/2, 7 = TDM/2, 8 = IDT voice station, 9 = IDT data port, 10 = 510D voice station, 11 = 510D data port, 12 = BCT 515 voice station, 13 = BCT 515 data port, 14 = voice data station (VDS), voice station, 15 = voice data station (VDS), data port, 16 = AP32 DCP interface even port channel, 17 = AP32 DCP interface odd port channel, and 18 = MFAT.
2. Fields 3 through 7 - Select equipment location of a specific network peripheral, range of network peripherals, or all network peripherals in a equipment type to be tested (Tests 2 through 4 only).
3. Field 11 - Enable the mode of test (nonservice affecting or service affecting) to be performed (Tests 2 through 4 only).

Operation of Procedure

Overview

PROC 622 is used to determine the cause of the **NETWORK PERIPH EQPT** and **MINOR** or **WARNING** alarm indicators being lighted resulting from a network peripheral failure.

To call in **PROC 622**, perform the following:

1. Depress **PROC NO; 622; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Four tests are available:

1. Test 1 - Displays failure history by severity of alarm, equipment type and/or port equipment location within an equipment type.

Table 5-37.

PROC 622 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-4	Test number.	2 (Contd)	17	AP32 DCP interface odd port channel.
2	1-18	Equipment type:		18	Multifunctional analog terminal (MFAT).
	1	Processor data module (PDM).	3-7		Equipment location:
	2	74 Series terminal.	3	0-30	Module number.
	3	Digital telephone data module (DTDM).	4	0-7	Cabinet number.
	4	72 Series terminal.	5	0-3	Carrier number.
	5	Trunk data module (TDM).	6	00-03, 05-08, 13-16, 18-21	Slot number.
	6	Enhanced processor data module (PDM/2).	7	0-3	Circuit number.
	7	Enhanced trunk data module (TDM/2).	8	0-2	Local/Remote:
	8	Integrated display terminal (IDT) voice station.		0	Local.
	9	Integrated display terminal (IDT) data module.		1	Remoted via a T1 carrier.
	10	BCT 510 voice station.		2	Remoted via optical fiber.
	11	BCT 510 data module.	9	0-5	Alarm status:
	12	BCT 515 voice terminal.		0	No errors recorded.
	13	BCT 515 data module.		1	Major.
	14	Voice data station (VDS), voice station.		2	Minor.
	15	Voice data station (VDS), data module.		3	Warning.
	16	AP32 DCP interface even port channel.		4	Errors recorded.
				5	Alarm resolved.
			10	0-2	Circuit status:
				0	Circuit is idle.
				1	Circuit is in-use.
				2	Circuit is busied out.

Table 5-37. (Contd)

PROC 622 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
11	0,1	Test mode:	12 (Contd)	14	Both bits set in GPP status register (48-volt overload and DTL fault).
	0	Test does not affect service.		15	Both bits set in GPP status register (48-volt overload and DTL idle).
	1	Test affects service.		16	Three bits set in GPP status register (48-volt overload, DTL idle, and DTL fault).
12	0-99	Fault code:		17	Two bits set in MLP status register (MFET and controller failure).
	0	Test passed.		18	Two bits set in MLP status register (48-volt overload and controller failure).
	1	In-use.		19	Two bits set in MLP status register (48-volt overload and MFET failure).
	2	48-volt overload.		20	Three bits set in MLP status register (48-volt overload, MFET, and controller failure).
	3	DTL link idle.		21	Even channel of digital set is stuck in DTL looparound.
	4	DTL link fault.		22	Hyperactive data set or data module sending too many signals to the switch.
	5	MFET set failed.		23	Network peripheral error other than 48-volt fault.
	6	MLP controller failure.			
	7	Digital instrument has bad state of health.			
	8	Transmission failure to digital instrument.			
	9	DTL looparound failure at digital set.			
	10	DTL looparound failure at GPP.			
	11	Digital set did not reset correctly.			
	12	No response from digital set.			
	13	Both bits set in GPP status register (DTL idle and DTL fault).			

Table 5-37. (Contd)

PROC 622 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
12 (Contd)	24	Touch-tone digits sent on MFDT S channel.	12 (Contd)	29	Peripheral causing DTLF - frame error.
	25	No response from firmware DTL looparound test on remote peripheral.	13	0-9999	Number of devices tested or number of times device was tested.
	26	Cannot run firmware DTL looparound test on remote peripheral.	14	0-999	Number of devices failed or number of times device failed.
	27	Firmware DTL looparound test failed on remote peripheral.	15	0-99	Failure index: Index into PMIDS or DMIDS table of the failure record currently displayed.
	28	Odd channel of digital set is stuck in DTL looparound.			

Test 1 is also used to manually turn off the **NETWORK PERIPH EQPT** fault indicator.

NOTE

Alarmed network peripheral entries in PMIDS are marked as resolved.

2. Test 2 - Tests one or more network peripherals one time.
3. Test 3 - Tests one or more network peripherals continuously.
4. Test 4 - Continuously tests the transmission quality to one or more network peripherals.

Test 1

Test 1 provides a failure history of the network peripheral failures detected by the on-line software.

Failures are displayed in alarm order, i.e., failures with an alarm status of minor followed by failures with an alarm status of warning. Network peripherals with errors recorded against them are displayed by equipment type and then by port equipment location within equipment type.

Test 1 is also used to manually turn off the **NETWORK PERIPH EQPT** fault indicator and to resolve the network peripheral alarmed entries in PMIDS.

1. Test 1 is the default test when entering **PROC 622** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. When Test 1 is initially called in, Field 1 displays a 1, and all other fields are dashed.
3. To start Test 1, depress **EXECUTE**.
4. The network peripheral failure history is sorted and a summary is displayed.
5. If no network peripheral failures exist, the following summary is displayed:

   Field 1 - 1.

   Field 15 - 0 (indicating no failures).

6. If any network peripheral failures exist, the summary displays a 1 in Field 1, and the total number of network peripherals that failed in Field 14.
7. Depressing **NEXT CIRCUIT** displays the first failure in order of severity, as follows:

   Field 1 - 1.

   Field 2 - Equipment type of failing network peripheral.

   Fields 3 through 7 - Port equipment location of failing network peripheral.

   Field 8 - Local/remote status of failing port.

   Field 9 - Alarm status of failing network peripheral.

   Fields 10 and 11 - Dashed.

   Field 12 - Fault code.

   Field 13 - Dashed.

   Field 14 - Number of times that the network peripheral displayed in Fields 3 through 7 failed.

   Field 15 - Failure index.

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing network peripherals.
9. To step through the failure records for a specific equipment type, depressing **NEXT UNIT** causes the first failure of the next equipment type with failures to be displayed.

   Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

   NEXT CIRCUIT is used to step through the failures of the displayed equipment type.

10. When all failing network peripherals are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 13 and 15.

    Depressing **NEXT CIRCUIT** once more starts the sequence over, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

11. The **CLEAR DATA; EXECUTE** sequence is used to manually resolve individual alarmed network peripheral failures or all alarmed network peripheral failures after **EXECUTE** is used to initiate Test 1.

    The failures which are resolved are those failures with an alarm status of 2 or 3 displayed in Field 9.

12. To resolve individual network peripheral failures with an alarm status of 2 or 3, perform the following:

    Use **NEXT CIRCUIT** to display the failing network peripheral with an alarm status of 2 or 3 on the **MAAP**.

    Individual network peripheral failures cannot be resolved unless the failing network peripheral is displayed on the **MAAP**.

13. Depress **CLEAR DATA; EXECUTE**.

14. Field 9 (alarm status) displays a 5, indicating that the failing network peripheral entry in PMIDS is marked as resolved.

    The **NETWORK PERIPH EQPT** fault indicator goes off if no other network peripheral failures exist.

15. If the **CLEAR DATA; EXECUTE** sequence is performed when a dash is displayed in Field 2 (equipment type), all network peripheral failures with an alarm status of 2 or 3 are resolved and the **NETWORK PERIPH EQPT** fault indicator goes off.

16. All network peripheral failures with an alarm status of 2 or 3 can be resolved when the summary is initially displayed, i.e., upon entry to **PROC 622**, Test 1 and after displaying all network peripheral failures and then using **NEXT CIRCUIT** to display the summary.

    NOTE

    When the summary is displayed, Field 2 is dashed.

    CAUTION

    The network peripheral failures should be displayed and recorded prior to resolving the failures in order that a record of the equipment location and fault code of the network peripheral failures are available for maintenance personnel.

17. After entering Test 1 and depressing **EXECUTE**, the summary is displayed.

    Depress **CLEAR DATA; EXECUTE**.

18. Field 14 (number devices failed) changes to indicate the number of network peripheral failures with an alarm status of 2 or 3 which are resolved.

    All network peripheral failures with an alarm status of 2 or 3 are marked as resolved in PMIDS and the **NETWORK PERIPH EQPT** fault indicator goes off.

19. After displaying and recording all network peripheral failures, depress **NEXT CIRCUIT** until the summary is displayed.

    Then, depress **CLEAR DATA; EXECUTE**.

20. Field 14 (number devices failed) changes to indicate the number of network peripheral failures with an alarm status of 2 or 3 which are resolved.

    All network peripheral failures with an alarm status of 2 or 3 are marked as resolved in PMIDS and the **NETWORK PERIPH EQPT** fault indicator goes off.

21. The **MINOR** or **WARNING** alarm indicator also goes off when no other sources affecting the **MINOR** or **WARNING** alarm indicator are present.

Test 2

Test 2 is used to test one or more network peripherals once and display the results of the test.

Network peripherals can be selected for testing by equipment type, a range of port equipment locations, or on a single circuit basis.

Two modes of testing are provided in Test 2; i.e., service-affecting and nonservice-affecting.

1. The use of the nonservice-affecting test mode performs only transparent tests on network peripherals without affecting customer's service.
2. The service-affecting test mode provides complete testing of a network peripheral and is destructive, aborting any call in progress to a network peripheral and taking the network peripheral selected for testing out-of-service.

Test 2 automatically turns off the **NETWORK PERIPH EQPT** fault indicator when all network peripherals that raised an alarm pass Test 2.

Test 2 Data Entry

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 3 through 7. Field 9 displays the alarm status, Field 10 displays the circuit status, and Field 11 (test mode) displays a 0.

   Field 2 (equipment type) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Test 1, 3, or 4 of **PROC 622** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

   The default equipment location can also be passed from **PROC 620** as long as the equipment location is a network peripheral port equipment location and is still displayed in **PROC 620** when it is passed.

4. All network peripherals, a range of network peripherals, all network peripherals within an equipment type, a combination of equipment type and range (i.e., all network peripherals of an equipment type in the range specified), a specific network peripheral, or the default equipment location can be tested.

5. To select the entire switch to be tested, Fields 2 through 7 must be dashed.

   If no default equipment location is displayed, depress **ENTER**.

   If a default equipment location is displayed, depress **CHANGE FIELD; 2; ENTER; ENTER**.

   Test 2 starts with the first module, first cabinet and carrier and runs until all network peripherals in the switch are tested.

   Proceed to Step 23.

6. In addition to testing all network peripherals in the entire switch, a range of network peripherals (all network peripherals in a module, cabinet, carrier, or slot) can be selected for testing.

   NOTE

   Selection of a range of network peripherals to be tested depends on whether or not a default equipment location is displayed. If a default equipment location is displayed, the **CHANGE FIELD** sequence **must** be used. If no default equipment location is displayed, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the range of network peripherals to be tested.

7. To select all network peripherals in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

   ENTER; (Module number to be tested); ENTER.

   CHANGE FIELD; 2; ENTER; ENTER; **(Module number to be tested); ENTER**.

   Test 2 starts with the first network peripheral in the module selected and runs until all network peripherals in the module are tested.

   Proceed to Step 23.

8. To select all network peripherals in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

   ENTER; (Module number of cabinet to be tested); **ENTER; (Cabinet number to be tested); ENTER**.

   CHANGE FIELD; 2; ENTER; ENTER; **(Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

   Test 2 starts with the first network peripheral in the cabinet selected and runs until all network peripherals in the cabinet are tested.

   Proceed to Step 23.

9. To select all network peripherals in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

   ENTER; (Module number of carrier to be tested); ENTER; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

   CHANGE FIELD; 2; ENTER; ENTER; **(Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

   Test 2 starts with the first network peripheral in the carrier selected and runs until all network peripherals in the carrier are tested.

   Proceed to Step 23.

10. To select all network peripherals in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    ENTER; (Module number of slot to be tested); ENTER; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); **ENTER; (Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

Test 2 starts with the first network peripheral in the slot selected and runs until all network peripherals in the slot are tested.

Proceed to Step 23.

11. To select all network peripherals within an equipment type to be tested, the appropriate equipment type must be entered in Field 2.

    Equipment types include: 1 = PDM, 2 = 74 series terminal, 3 = DTDM, 4 = 72 series terminal, 5 = TDM, 6 = PDM/2, 7 = TDM/2, 8 = IDT voice station, 9 = IDT data port, 10 = 510D voice station, 11 = 510D data port, 12 = BCT 515 voice station, 13 = BCT 515 data port, 14 = voice data station (VDS), voice station, 15 = voice data station (VDS), data port, 16 = AP32 DCP interface even port channel, 17 = AP32 DCP interface odd port channel, and 18 = MFAT.

12. An equipment type can be selected in several ways; i.e., by depressing **NEXT UNIT** until the correct equipment type is displayed or by entering the equipment type and depressing **ENTER**.

13. If no default equipment location is displayed, enter the equipment type to be tested in Field 2 and depress **ENTER** or use **NEXT UNIT** to step through the equipment types in numerical sequence until the equipment type to be tested is displayed in Field 2.

    If a default equipment location is displayed, enter the equipment type to be tested in Field 2 and depress **ENTER**.

    Test 2 starts with the first network module, first cabinet and carrier, and runs until all network peripherals of the equipment type selected are tested.

    Proceed to Step 23.

14. In addition to testing all network peripherals in a specified equipment type, a range of network peripherals for the equipment type (all network peripherals for an equipment type in a module, cabinet, carrier, or slot) can be selected for testing.

15. To select all network peripherals for an equipment type in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Equipment type to be tested); ENTER; **(Module number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Equipment type to be tested); **ENTER; (Module number to be tested); ENTER**.

    Test 2 starts with the first network peripheral of the equipment type specified, in the module selected, and runs until all network peripherals of the equipment type in the module are tested.

    Proceed to Step 23.

16. To select all network peripherals for an equipment type in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Equipment type to be tested); ENTER; **(Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

CHANGE FIELD; 2; ENTER; (Equipment type to be tested); **ENTER; (Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

Test 2 starts with the first network peripheral of the equipment type specified, in the cabinet selected, and runs until all network peripherals of the equipment type in the cabinet are tested.

Proceed to Step 23.

17. To select all network peripherals for an equipment type in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Equipment type to be tested); ENTER; **(Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Equipment type to be tested); **ENTER; (Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    Test 2 starts with the first network peripheral of the equipment type specified, in the carrier selected, and runs until all network peripherals of the equipment type in the carrier are tested.

    Proceed to Step 23.

18. To select all network peripherals for an equipment type in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Equipment type to be tested); ENTER; **(Module number of slot to be tested); ENTER**; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Equipment type to be tested); **ENTER; (Module number of slot to be tested); ENTER**; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    Test 2 starts with the first network peripheral of the equipment type specified, in the slot selected, and runs until all network peripherals of the equipment type in the slot are tested.

    Proceed to Step 23.

19. A specific network peripheral can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

    (Equipment type of network peripheral to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

    CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER**.

    Proceed to Step 22.

20. A specific network peripheral can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

Depress **NEXT UNIT** until the equipment type of the network peripheral to be tested is displayed in Field 2.

Depress **NEXT CIRCUIT** until the port equipment location of the network peripheral to be tested is displayed in Fields 3 through 7.

Proceed to Step 22.

21. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 22.

CAUTION

Busying out a port equipment location results in loss of customer calls or data when the port equipment location is in use.

22. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

    Check the circuit status displayed in Field 10.

    If the circuit status = 2, proceed to Step 23.

    If the circuit status does not equal 2, depress **BUSY OUT** and proceed to Step 23.

NOTE

If Fields 3 through 7 are not entered, special error code 88 (Fields 3 through 7 must be entered before use of **BUSY OUT)** is displayed in the **MAAP** error code field.

23. Prior to starting Test 2, it must be determined if nonservice-affecting tests or service-affecting tests are to be executed.

CAUTION

A customer's normal service is aborted when service-affecting tests are performed as the network peripheral (or peripherals) is taken out-of-service while service-affecting tests are being performed.

24. To perform service-affecting tests, Field 11 (test mode) must be changed to a 1 using the **CHANGE FIELD** sequence:

    CHANGE FIELD; 11; ENTER; 1; ENTER.

Test 2 Execution

1. To start Test 2 after selecting the network peripheral(s) to be tested and the test mode, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. When an in-use network peripheral is encountered during Test 2 execution in the nonservice-affecting test mode (for a range of network peripherals or for a single network peripheral) the **IN-USE** indicator is lighted on the **MAAP** while the transparent test is being performed.

3. Test 2 operation and display of test results is different when a specific network peripheral or default equipment location is tested and when the entire switch or a range of network peripherals are tested.

4. For test operation and display of test results for a default equipment location or a specific network peripheral, proceed to Step 1 of Test 2 Operation and Test Result Display for a Single Circuit.

5. For test operation and display of test results for the entire switch or a range of network peripherals, proceed to Step 1 of Test 2 Operation and Test Result Display for a Range of Circuits.

Test 2 Operation and Test Result Display for a Single Circuit

1. When Test 2 is completed for a default equipment location or a specific network peripheral, the **WAIT** indicator goes off and the following is displayed:

   Field 1 - 2.

   Field 2 - Equipment type of network peripheral tested.

   Fields 3 through 7 - Port equipment location of network peripheral tested.

   Field 8 - Local/remote status of failing port.

   Field 9 - Alarm status of network peripheral tested.

   Field 10 - Current circuit status of network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

   Field 11 - Test mode (0 or 1).

   Field 12 - Dashed.

   Field 13 - 1 (indicating one network peripheral tested).

   Field 14 - 0 (indicating no failures were found for the peripheral tested) or 1 (indicating that the network network peripheral failed the test).

   Field 15 - Dashed.

2. When a specific network peripheral or the default equipment location fails Test 2 (indicated by a 1 in Field 14), depressing **NEXT DATA** displays the fault code recorded for the network peripheral tested in Field 12 and Field 15 (failure index) displays a 1.

   NOTE

   When the port equipment location was busied out and the test passed, or the problem was corrected, the circuit should be released from busy using **RLS BUSY OUT**.

3. When another specific network peripheral is to be tested, the **CHANGE FIELD** sequence must be used to select the specific network peripheral:

   CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER**.

4. **EXECUTE** must be depressed to test the specific network peripheral selected for testing.

Test 2 Operation and Test Result Display for a Range of Circuits

1. When the entire switch or a range of circuits is being tested for network peripheral failures, the **WAIT** indicator is lighted and the following fields are incremented as a circuit is tested:

   Field 2 - Equipment type of network peripheral being tested.

Fields 3 through 7 - Port equipment location of network peripheral being tested.

Field 8 - Dashed.

Field 9 - Alarm status of network peripheral being tested.

Field 10 - Current circuit status of network peripheral being tested (0 = idle, 1 = in-use, 2 = busied out).

Field 13 - Number of network peripherals tested.

Field 14 - Number of network peripherals failed (if any).

2. The failure information returned in the test is stored in DMIDS.

   If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator goes off.

   The last network peripheral tested is displayed in Fields 2 through 7, Field 11 displays the test mode, and special error code 82, (DMIDS overflow), is displayed in the **MAAP** error code field.

3. Results of the test can be examined at this time (See Steps 11 through 15 below) and Test 2 can be continued from where it was stopped; i.e., from the port equipment location displayed in Fields 3 through 7.

CAUTION

If Test 2 is continued from where it was stopped by a DMIDS overflow, any test results gathered to that point are lost and only new failure data is retained.

NOTE

Before depressing **EXECUTE** to continue Test 2 from where it was stopped because of a DMIDS overflow, the failure data should be examined and recorded.

4. If Test 2 is halted because of a DMIDS overflow, a new range of network peripherals to be tested can be entered instead of continuing the test from where it was stopped.

5. The **CHANGE FIELD** sequence must be used to enter the new range of network peripherals to be tested.

   Refer to Steps 7 through 10 of Test 2 Data Entry above to select a range of network peripherals to be tested in a module, cabinet, carrier, or slot.

   Refer to Steps 15 through 18 of Test 2 Data Entry above to select a range of network peripherals within an equipment type to be tested in a module, cabinet, carrier, or slot.

   EXECUTE must be depressed to begin Test 2 from the new range of network peripherals entered or from where the test was stopped.

6. **STOP** can be depressed when the entire switch or a range of network peripherals is being tested.

NOTE

Test 2 does not stop until the network peripheral being tested is completed. Special error code 86 (wait until test completes) is displayed in the **MAAP** error code field until the test is completed.

7. If Test 2 is stopped before one complete testing pass through the range of network peripherals specified is made, the total number of network peripherals tested and the total number of network peripherals failed (if any) are displayed in Fields 13 and 14.

The equipment type and port equipment location of the last network peripheral tested is displayed in Fields 2 through 7, Field 11 displays the test mode, and special error code 83 (test of range not completed) is displayed in the **MAAP** error code field.

8. Test result information for failing network peripherals (if any) can be stepped through as described in Steps 11 through 15 below when Test 2 is halted using **STOP** even though the entire range is not tested.

9. To restart the test when Test 2 is halted by use of **STOP** before the range of network peripherals are tested at least once, **EXECUTE** is depressed and Test 2 starts at the port equipment location following the last port equipment location tested.

NOTE

When Test 2 is continued from where it was stopped, any test results gathered to that point are lost and only new failure data is retained.

10. When the entire switch or a range of network peripherals are tested, the **WAIT** indicator goes off and a summary is displayed.

    If no network peripherals failed, the following summary is displayed:

    Field 1 - 2.

    Fields 2 through 6 - Equipment type and location of the range of network peripherals tested.

    Field 11 - Test mode (0 or 1).

    Field 13 - Number of network peripherals tested.

    Field 14 - 0 (indicating no failures).

11. If any network peripherals failed, the summary displays a 2 in Field 1, the equipment type and location of the range of network peripherals tested in Fields 2 through 6, the test mode in Field 11, the total number of network peripherals tested in Field 13, and the total number of failures in Field 14.

12. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

    Field 1 - 2.

    Field 2 - Equipment type of failing network peripheral.

    Fields 3 through 7 - Port equipment location of failing network peripheral.

    Field 8 - Local/remote status of failing port.

    Field 9 - Alarm status of failing network peripheral.

    Field 10 - Current circuit status of failing network peripheral (0 = idle, 1 = in-use, 2 = busied out).

    Field 11 - Test mode (0 or 1).

    Field 12 - Fault code.

    Field 13 - Number of times the network peripheral was tested.

    Field 14 - Number of times the network peripheral failed.

    Field 15 - Failure index.

13. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing network peripherals.
14. When more than one equipment type is tested, depressing **NEXT UNIT** causes the first network peripheral of the next equipment type with failures to be displayed.

    Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

    NEXT CIRCUIT is used to step through the failures of the displayed equipment type.
15. When all failing network peripherals are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 10 and 12 through 15.

    Depressing **NEXT CIRCUIT** or **NEXT UNIT** once more causes the number of devices tested and failed to be displayed in Fields 13 and 14, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.
16. To select another range of network peripherals to test, the **CHANGE FIELD** sequence must be used.

    Refer to Steps 7 through 10 of Test 2 Data Entry above to select a range of network peripherals to be tested in a module, cabinet, carrier, or slot.

    Refer to Steps 15 through 18 of Test 2 Data Entry above to select a range of network peripherals within a equipment type to be tested in a module, cabinet, carrier, or slot.

    EXECUTE must be depressed to test the range of network peripherals selected for testing.
17. The **NETWORK PERIPH EQPT** fault indicator goes off when Test 2 completes with no failures detected for all network peripherals that had raised an alarm.

    NOTE

    Network peripheral alarmed circuit entries in PMIDS are marked as resolved.
18. The **MINOR** or **WARNING** alarm indicator also goes off if no other sources are affecting the alarm indicator.

Test 3

Test 3 is used to test one or more network peripherals in a continuous cycle.

Two modes of testing are provided in Test 3; i.e., service-affecting and nonservice-affecting.

1. The use of the nonservice-affecting test mode performs only transparent tests on network peripherals without affecting customer's service.
2. The service-affecting test mode provides complete testing of a network peripheral and is destructive, aborting any call in progress to a network peripheral and taking the network peripheral selected for testing out-of-service.

Test 3 is mainly used when an intermittent fault is suspected, when using test equipment to further isolate a problem, or to trace wiring problems.

Network peripherals can be selected for testing by equipment type, a range of port equipment locations, or on a single circuit basis.

Test 3 Data Entry

1. Test 3 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 3.

2. When Test 3 is initially called in, a default equipment location may be displayed in Fields 3 through 7. Field 9 displays the alarm status, Field 10 displays the circuit status, and Field 11 (test mode) displays a 0.

   Field 2 (equipment type) is blinking, indicating an optional entry field.

3. Normally, a specific network peripheral or the default equipment location is tested in Test 3. However, network peripheral selection for testing in Test 3 is identical to Test 2.

   All network peripherals, a range of network peripherals, all network peripherals within an equipment type, a combination of equipment type and range (i.e., all network peripherals of an equipment type in the range specified), a specific network peripheral, or the default equipment location can be tested.

4. When all network peripherals in the switch are to be tested continuously, refer to Step 5 of Test 2 Data Entry for network peripheral selection.

   To select all network peripherals in a specific module to be tested continuously, refer to Step 7 of Test 2 Data Entry.

   To select all network peripherals in a specific cabinet to be tested continuously, refer to Step 8 of Test 2 Data Entry.

   To select all network peripherals in a specific carrier to be tested continuously, refer to Step 9 of Test 2 Data Entry.

   To select all network peripherals in a specific slot to be tested continuously, refer to Step 10 of Test 2 Data Entry.

   Proceed to Step 10.

5. When all network peripherals in an equipment type are to be tested continuously, refer to Steps 11 and 12 of Test 2 Data Entry for equipment type selection.

   To select all network peripherals of an equipment type in a specific module to be tested continuously, refer to Step 15 of Test 2 Data Entry.

   To select all network peripherals of an equipment type in a specific cabinet to be tested continuously, refer to Step 16 of Test 2 Data Entry.

   To select all network peripherals of an equipment type in a specific carrier to be tested continuously, refer to Step 17 of Test 2 Data Entry.

   To select all network peripherals of an equipment type in a specific slot to be tested continuously, refer to Step 18 of Test 2 Data Entry.

   Proceed to Step 10.

6. A specific network peripheral can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

   (Equipment type of network peripheral to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER**.

Proceed to Step 9.

7. A specific network peripheral can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

   Depress **NEXT UNIT** until the equipment type of the network peripheral to be tested is displayed in Field 2.

   Depress **NEXT CIRCUIT** until the port equipment location of the network peripheral to be tested is displayed in Fields 3 through 7.

   Proceed to Step 9.

8. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 9.

CAUTION

Busying out a port equipment location results in loss of customer calls or data when the port equipment location is in use.

9. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

   Check the circuit status displayed in Field 10.

   If the circuit status equals 2, proceed to Step 10.

   If the circuit status does not equal 2, depress **BUSY OUT** and proceed to Step 10.

NOTE

If Fields 3 through 7 are not entered, special error code 88 (Fields 3 through 7 must be entered before use of **BUSY OUT)** is displayed in the **MAAP** error code field.

10. Prior to starting Test 3, it must be determined if nonservice-affecting tests or service-affecting tests are to be executed.

CAUTION

A customer's normal service is aborted when service-affecting tests are performed as the network peripheral (or peripherals) is taken out-of-service while service-affecting tests are being performed.

11. To perform service-affecting tests, Field 11 (test mode) must be changed to a 1 using the **CHANGE FIELD** sequence:

    CHANGE FIELD; 11; ENTER; 1; ENTER.

Test 3 Execution

1. To start Test 3 after selecting the network peripheral(s) to be tested and the test mode, depress **EXECUTE**.

   The **WAIT** indicator is not lighted during Test 3 execution.

2. When an in-use network peripheral is encountered during Test 3 execution in the nonservice-affecting test mode (for a range of network peripherals or for a single network peripheral), the **IN USE** indicator is lighted on the **MAAP** while the transparent test is being performed.
3. If the DMIDS storage buffer becomes full, either during testing of a range of network peripherals or a single network peripheral, special error code 82, (DMIDS overflow), is displayed in the **MAAP** error code field.

NOTE

Testing is not stopped when the DMIDS buffer becomes full.

4. When multiple network peripherals are being tested, new errors detected are discarded. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed

   Refer to Test 3 Result Display for a Range of Circuits below.
5. When testing a single network peripheral, new errors detected are added to the failure list and the oldest errors are deleted. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed.

   Refer to Test 3 Result Display for a Single Circuit below.
6. Only 99 errors can be displayed when the DMIDS buffer becomes full. When multiple network peripherals are being tested, the 99 errors are the oldest errors recorded. When a single network peripheral is tested, the 99 errors are the newest errors recorded.
7. When the entire switch or a range of network peripherals is being tested continuously in Test 3, the following fields are incremented as an network peripheral is tested:

   Field 2 - Equipment type of network peripheral being tested.

   Fields 3 through 7 - Port equipment location of network peripheral being tested.

   Field 9 - Alarm status of network peripheral being tested.

   Field 10 - Current circuit status of network peripheral being tested (0 = idle, 1 = in-use, 2 = busied out).

   Field 13 - Number of network peripherals tested.

   Field 14 - Number of network peripherals failed (if any).
8. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

NOTE

Test 3 does not stop until the network peripheral being tested is completed. Special error code 86 (wait until test completes) is displayed in the **MAAP** error code field until the test is completed.

9. Display of test results is different when a specific network peripheral or default equipment location is tested and when the entire switch or a range of network peripherals are tested.
10. For display of test results when testing a default equipment location or a specific network peripheral, proceed to Step 1 of Test 3 Result Display for a Single Circuit.

    For display of test results when testing the entire switch or a range of network peripherals, proceed to Step 1 of Test 3 Result Display for a Range of Circuits.

Test 3 Result Display for a Single Circuit

1. When Test 3 is stopped while testing a default equipment location or a specific network peripheral, the following is displayed:

   Field 1 - 3.

   Field 2 - Equipment type of network peripheral tested.

   Fields 3 through 7 - Port equipment location of network peripheral tested.

   Field 8 - Local/remote status of failing port.

   Field 9 - Alarm status of network peripheral tested.

   Field 10 - Current circuit status of network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

   Field 11 - Test mode (0 or 1).

   Field 12 - Dashed.

   Field 13 - Number of times the network peripheral was tested.

   Field 14 - 0 (indicating no failures were detected for the network peripheral tested) or number of times the network peripheral failed.

   Field 15 - Dashed.

2. When a specific network peripheral or the default equipment location failed Test 3 (indicated by Field 14), depressing **NEXT DATA** displays the fault code recorded for the network peripheral tested in Field 12.

   Field 15 displays the number of fault codes recorded against the failing network peripheral.

3. Multiple fault codes may have been recorded for the failing network peripheral displayed in Fields 3 through 7 as indicated by Field 15 displaying more than 1 (which is an index to fault codes).

4. Depressing **NEXT FAULT** displays in Field 12 the next fault code (if any) recorded against the failing network peripheral and Field 15 is decremented corresponding to the number of fault codes which were the same.

   NOTE

   When **NEXT FAULT** is depressed, Fields 12 through 15 may be dashed. This indicates that all remaining fault codes were the same. Dashing of Fields 12 through 15 can occur at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 15 before **NEXT FAULT** was depressed.

5. When all fault codes for the failing network peripheral are displayed, depressing **NEXT FAULT** once more dashes Fields 12 through 15.

   Depressing **NEXT FAULT** again displays the first fault code recorded for the failing network peripheral.

6. When the port equipment location was busied out and the test passed, or the problem was corrected, the circuit should be released from busy using **RLS BUSY OUT**.

7. When another specific network peripheral is to be tested, the **CHANGE FIELD** sequence must be used to select the specific network peripheral:

   CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER**.

8. **EXECUTE** must be depressed to test the specific network peripheral selected for testing.

Test 3 Result Display for a Range of Circuits

1. When Test 3 is stopped while testing the entire switch or a range of network peripherals, a summary is displayed.
2. If no network peripherals failed, the following summary is displayed:

   Field 1 - 3.

   Fields 2 through 7 - Equipment type and location of the last network peripheral tested.

   Field 9 - Alarm status of the network peripheral tested.

   Field 10 - Current circuit status of the network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

   Field 11 - Test mode (0 or 1).

   Field 13 - Number of network peripherals tested.

   Field 14 - 0 (indicating no failures).

3. If any network peripherals failed, the summary displays a 3 in Field 1, the equipment type and location of the last network peripheral tested in Fields 2 through 7, the alarm status in Field 9, the current circuit status in Field 10, the test mode in Field 11, the total number of network peripherals tested in Field 13, and the total number of failures in Field 14.
4. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

   Field 1 - 3.

   Field 2 - Equipment type of failing network peripheral.

   Fields 3 through 7 - Port equipment location of failing network peripheral.

   Field 8 - Local/remote status of failing port.

   Field 9 - Alarm status of failing network peripheral.

   Field 10 - Current circuit status of failing network peripheral (0 = idle, 1 = in-use, 2 = busied out).

   Field 11 - Test mode (0 or 1).

   Field 12 - Fault code.

   Field 13 - Number of times the network peripheral was tested.

   Field 14 - Number of times the network peripheral failed.

   Field 15 - Failure index.

NOTE

Multiple fault codes are not recorded for each failing network peripheral when a range of network peripherals are tested.

5. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing network peripherals.
6. When more than one equipment type is tested, depressing **NEXT UNIT** causes the first network peripheral of the next equipment type with failures to be displayed.

   Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

   NEXT CIRCUIT is used to step through the failures of the displayed equipment type.
7. When all failing network peripherals are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 10, and 12 through 15.

   Depressing **NEXT CIRCUIT** or **NEXT UNIT** once more causes the number of devices tested and failed to be displayed in Fields 13 and 14, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.
8. Test 3 can be restarted without changing the default equipment location or range of network peripherals originally entered for testing by depressing **EXECUTE**.

   The same default equipment location or range of network peripherals is used as the basis for the new execution of Test 3.

   Any data gathered in the last execution of Test 3 is lost when **EXECUTE** is depressed.
9. To select another range of network peripherals to test, the **CHANGE FIELD** sequence must be used.

   Refer to Test 2 Data Entry, Steps 7 through 10 to select a range of network peripherals to be tested in a module, cabinet, carrier, or slot.

   Refer to Test 2 Data Entry, Steps 15 through 18 to select a range of network peripherals within a equipment type to be tested in a module, cabinet, carrier, or slot.

   EXECUTE must be depressed to test the range of network peripherals selected for testing.
10. The **NETWORK PERIPH EQPT** fault indicator goes off when Test 3 completes with no failures detected for all network peripherals that had raised an alarm.

NOTE

Network peripheral alarmed circuit entries in PMIDS are marked as resolved.

11. The **MINOR** or **WARNING** alarm indicator also goes off if no other sources are affecting the alarm indicator.

Test 4

Test 4 is used to continuously test the transmission quality to a specific network peripheral or a range of network peripherals.

Test 4 uses the Digital Transmission Link (DTL) loop-around test to detect bit errors over the DTL link.

Test 4 **must** be performed in the service-affecting test mode.

Network peripherals can be selected for testing by equipment type, a range of port equipment locations, or on a single circuit basis.

Test 4 Data Entry

1. Test 4 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 4.

2. When Test 4 is initially called in, a default equipment location may be displayed in Fields 3 through 7. Field 9 displays the alarm status, Field 10 displays the circuit status, and Field 11 (test mode) displays a 0.

   Field 2 (equipment type) is blinking, indicating an optional entry field.

3. Normally, a specific network peripheral or the default equipment location is tested in Test 4. However, network peripheral selection for testing in Test 4 is identical to Test 2.

   CAUTION

   Testing a range of network peripherals in the service-affecting test mode affects properly functioning network peripherals.

4. All network peripherals, a range of network peripherals, all network peripherals within an equipment type, a combination of equipment type and range (i.e., all network peripherals of an equipment type in the range specified), a specific network peripheral, or the default equipment location can be tested.

5. When all network peripherals in the switch are to be tested continuously, refer to Step 5 of Test 2 Data Entry for network peripheral selection.

   To select all network peripherals in a specific module to be tested continuously, refer to Step 7 of Test 2 Data Entry.

   To select all network peripherals in a specific cabinet to be tested continuously, refer to Step 8 of Test 2 Data Entry.

   To select all network peripherals in a specific carrier to be tested continuously, refer to Step 9 of Test 2 Data Entry.

   To select all network peripherals in a specific slot to be tested continuously, refer to Step 10 of Test 2 Data Entry.

   Proceed to Step 11.

6. When all network peripherals in an equipment type are to be tested continuously, refer to Steps 11 and 12 of Test 2 Data Entry for equipment type selection.

   To select all network peripherals of an equipment type in a specific module to be tested continuously, refer to Step 15 of Test 2 Data Entry.

   To select all network peripherals of an equipment type in a specific cabinet to be tested continuously, refer to Step 16 of Test 2 Data Entry.

   To select all network peripherals of an equipment type in a specific carrier to be tested continuously, refer to Step 17 of Test 2 Data Entry.

To select all network peripherals of an equipment type in a specific slot to be tested continuously, refer to Step 18 of Test 2 Data Entry.

NOTE

Special error code 87 (equipment type can not be tested in test 4) is displayed in the **MAAP** error code field if equipment type 4 (72 series terminal) or 18 (73 series terminal) is selected for testing and **EXECUTE** is depressed.

Proceed to Step 11.

7. A specific network peripheral can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

   (Equipment type of network peripheral to be tested); **ENTER; (Module number); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number to be tested); ENTER**.

   CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER**.

   Proceed to Step 10.

8. A specific network peripheral can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

   Depress **NEXT UNIT** until the equipment type of the network peripheral to be tested is displayed in Field 2.

   Depress **NEXT CIRCUIT** until the port equipment location of the network peripheral to be tested is displayed in Fields 3 through 7.

   Proceed to Step 10.

9. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 10.

CAUTION

Busying out a port equipment location results in loss of customer calls or data when the port equipment location is in use.

10. Individual port equipment locations can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 10.
11. If the circuit status equals 2, proceed to Step 13.
12. If the circuit status does not equal 2, depress **BUSY OUT** and proceed to Step 13.

NOTE

If Fields 3 through 7 are not entered, special error code 88 (Fields 3 through 7 must be entered before use of **BUSY OUT)** is displayed in the **MAAP** error code field.

CAUTION

A customer's normal service is aborted when service-affecting tests are performed as the network peripheral (or peripherals) is taken out-of-service while service-affecting tests are being performed.

13. To perform Test 4 (service-affecting), Field 11 (test mode) **must** be changed to a 1 using the **CHANGE FIELD** sequence:

    CHANGE FIELD; 11; ENTER; 1; ENTER.

NOTE

Special error code 84 (test 4 must be run in mode 1) is displayed in the **MAAP** error code field if Field 11 is not changed to a 1 and **EXECUTE** is depressed.

Test 4 Execution

1. To start Test 4 after selecting the network peripheral(s) to be tested and test mode 1, depress **EXECUTE**.

   The **WAIT** indicator is not lighted during Test 4 execution.

2. If the DMIDS storage buffer becomes full either during testing of a range of network peripherals or a single network peripheral, special error code 82 (DMIDS overflow) is displayed in the **MAAP** error code field.

   NOTE

   Testing is not stopped when the DMIDS buffer becomes full.

3. When multiple network peripherals are being tested, new errors detected are discarded. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed.

   Refer to Test 4 Result Display for a Range of Circuits below.

4. When testing a single network peripheral, new errors detected are added to the failure list, and the oldest errors are deleted. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed.

   Refer to Test 4 Result Display for a Single Circuit below.

5. Only 99 errors can be displayed when the DMIDS buffer becomes full. When multiple network peripherals are tested, the 99 errors are the oldest errors recorded. When a single network peripheral is tested, the 99 errors are the newest errors recorded.

6. When the entire switch or a range of network peripherals is being tested continuously in Test 4, the following fields are incremented as a network peripheral is tested:

   Field 2 - Equipment type of network peripheral being tested.

   Fields 3 through 7 - Port equipment location of network peripheral being tested.

   Field 9 - Alarm status of network peripheral being tested.

   Field 10 - Current circuit status of network peripheral being tested (0 = idle, 1 = in-use, 2 = busied out).

   Field 13 - Number of network peripherals tested.

   Field 14 - Number of network peripherals failed (if any).

7. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

   NOTE

   Test 4 does not stop until the network peripheral being tested is completed. Special error code 86 (wait until test completes) is displayed in the **MAAP** error code field until the test is completed.

8. Display of test results is different when a specific network peripheral or default equipment location is tested and when the entire switch or a range of network peripherals are tested.

9. For display of test results when testing a default equipment location or a specific network peripheral, proceed to Step 1 of Test 4 Result Display for a Single Circuit.
10. For display of test results when testing the entire switch or a range of network peripherals, proceed to Step 1 of Test 4 Result Display for a Range of Circuits.

Test 4 Result Display for a Single Circuit

1. When Test 4 is stopped while testing a default equipment location or a specific network peripheral, the following is displayed:

   Field 1 - 4.

   Field 2 - Equipment type of network peripheral tested.

   Fields 3 through 7 - Port equipment location of network peripheral tested.

   Field 8 - Local/remote status of failing port.

   Field 9 - Alarm status of network peripheral tested.

   Field 10 - Current circuit status of network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

   Field 11 - Test mode (1).

   Field 12 - Dashed.

   Field 13 - Number of times the network peripheral was tested.

   Field 14 - 0 (indicating no failures were detected for the network peripheral tested) or number of times the network peripheral failed.

   Field 15 - Dashed.

2. When a specific network peripheral or the default equipment location fails Test 4 (indicated by Field 14), depressing **NEXT DATA** displays the fault code recorded for the network peripheral tested in Field 12.

   Field 15 displays the number of fault codes recorded against the failing network peripheral.

3. Multiple fault codes may have been recorded for the failing network peripheral displayed in Fields 3 through 7 as indicated by Field 15 displaying more than 1 (which is an index to fault codes).

4. Depressing **NEXT FAULT** displays in Field 12 the next fault code (if any) recorded against the failing network peripheral and Field 15 is decremented corresponding to the number of fault codes which were the same.

   NOTE

   When **NEXT FAULT** is depressed, Fields 12 through 15 may be dashed. This indicates that all remaining fault codes were the same. Dashing of Fields 12 through 15 can occur at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 15 before **NEXT FAULT** was depressed.

5. When all fault codes for the failing network peripheral are displayed, depressing **NEXT FAULT** once more dashes Fields 12 through 15.

   Depressing **NEXT FAULT** again displays the first fault code recorded for the failing network peripheral.

6. When the port equipment location was busied out and the test passed, or the problem was corrected, the circuit should be released from busy using **RLS BUSY OUT**.
7. When another specific network peripheral is to be tested, the **CHANGE FIELD** sequence must be used to select the specific network peripheral:

   CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER**.

   Enter test mode 1 and depress **EXECUTE**.

Test 4 Result Display for a Range of Circuits

1. When Test 4 is stopped while testing the entire switch or a range of network peripherals, a summary is displayed.
2. If no network peripherals failed, the following summary is displayed:

   Field 1 - 4.

   Fields 2 through 7 - Equipment type and location of the last network peripheral tested.

   Field 11 - Test mode (1).

   Field 13 - Number of network peripherals tested.

   Field 14 - 0 (indicating no failures).
3. If any network peripherals failed, the summary displays a 4 in Field 1, the equipment type and location of the last network peripheral tested in Fields 2 through 7, the alarm status in Field 9, the current circuit status in Field 10, the test mode in Field 11, the total number of network peripherals tested in Field 13, and the total number of failures in Field 14.
4. Depressing **NEXT CIRCUIT** displays the first failure as follows:

   Field 1 - 4.

   Field 2 - Equipment type of failing network peripheral.

   Fields 3 through 7 - Port equipment location of failing network peripheral.

   Field 8 - Local/remote status of failing port.

   Field 9 - Alarm status of failing network peripheral.

   Field 10 - Current circuit status of failing network peripheral (0 = idle, 1 = in-use, 2 = busied out).

   Field 11 - Test mode (1).

   Field 12 - Fault code.

   Field 13 - Number of network peripherals tested.

   Field 14 - Number of network peripherals failed.

   Field 15 - Failure index.

NOTE

Multiple fault codes are not recorded for each failing network peripheral when a range of network peripherals are tested.

5. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing network peripherals.
6. When more than one equipment type is tested, depressing **NEXT UNIT** causes the first network peripheral of the next equipment type with failures to be displayed.

   Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

   NEXT CIRCUIT is used to step through the failures of the displayed equipment type.
7. When all failing network peripherals are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 10 and 12 through 15.

   Depressing **NEXT CIRCUIT** or **NEXT UNIT** once more causes the number of devices tested and failed to be displayed in Fields 13 and 14, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.
8. Test 4 can be restarted without changing the default equipment location or range of network peripherals originally entered for testing by depressing **EXECUTE**.

   The same default equipment location or range of network peripherals is used as the basis for the new execution of Test 4.

   Any data gathered in the last execution of Test 4 is lost when **EXECUTE** is depressed.
9. To select another range of network peripherals to test, the **CHANGE FIELD** sequence must be used.

   Refer to Test 2 Data Entry, Steps 7 through 10 to select a range off network peripherals to be tested in a module, cabinet, carrier, or slot.

   Refer to Test 2 Data Entry, Steps 15 through 18 to select a range of network peripherals within a equipment type to be tested in a module, cabinet, carrier, or slot.

   Enter test mode 1 and depress **EXECUTE**.

Repair Guide

Overview

The repair guide for network peripheral troubles is divided into three parts, Alarmed Troubles, Fault Isolation for Remoted Port Failures, and User Reported Troubles.

Alarmed Troubles

When the **NETWORK PERIPH EQPT**, and **MINOR** or **WARNING** alarm indicators on the alarm panel are lighted (indicating a network peripheral failure) or when **PROC 622** is referenced from **PROC 600** (Alarm Causes/Error Log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and manually record the failure history generated by the on-line maintenance software.

   Determine the failures that have an alarm status code of 2 or 3 (minor or warning).

2. Determine the local/remote status of the failing circuits displayed in Field 8.

   If the remote status displayed in Field 8 equals 0 (local), proceed to Step 3.

   If the remote status displayed in Field 8 equals 1 (remote port, T1 carrier) or 2 (remote port, fiber), refer to isolation and repair step **Fault Isolation for Remoted Port Failures** for further diagnosis of the the trouble.

3. When a 74 series terminal is the failing circuit, determine if the 74 series terminal is connected to a personal computer.

   NOTE

   It may not be possible for periodic or demand maintenance software to detect a defective 74 series terminal when it is connected to a powered-up personal computer that is in the PC mode.

   If the 74 series terminal is connected to a personal computer, request the customer to power down the personal computer or place the computer in the non-PC mode (off-line) before testing the 74 series terminal.

4. When a translated peripheral is the failing circuit, determine if the peripheral is connected. When the peripheral is powered by external sources (i.e., commercial power), the power to the peripheral **must** be turned on.

   NOTE

   Tests may fail with a fault code other than the expected fault code 3 (DTL link idle) failure when the peripheral is disconnected or does not have power on when required.

5. Execute Test 2.

   Test 2 runs a variable length of time depending on the number of network peripherals being tested; i.e., the entire switch, a range of network peripherals, a specific network peripheral, or the default equipment location.

6. Test 2 must be run for each network peripheral recorded in Test 1 with an alarm status of 2 or 3 (minor or warning) and for the default equipment location passed from **PROC 600**, Test 1 or 2 or from **PROC 620** (Network Procedure).

7. If all network peripherals pass Test 2, the **NETWORK PERIPH EQPT** fault indicator goes off.

   When Test 2 passes and network peripheral failures are recorded in Test 1 with an alarm status of 2 or 3 (minor or warning), proceed to Step 26 for further testing to ensure that no intermittent failures exist.

8. If any failures are detected in Test 2, display the network peripheral failure on the **MAAP**.

9. If Test 2 returns a single fault code of 2 (48 volt overload), determine the type of GPP circuit pack installed at the equipment location displayed in Fields 3 through 6.

   If SN270 is installed, proceed to Step 10.

   If SN270B or SN271 is installed, proceed to Step 16.

10. At the modular jack, disconnect the peripheral.

    Replace the blown fuse, and reseat SN270.

    NOTE

    Wait at least 30 seconds before performing Test 2.

11. Repeat Test 2.

    If Test 2 passes, proceed to Step 12.

    If Test 2 fails, check the wiring between SN270 and the modular jack (see port testing below).

12. Connect the peripheral to the modular jack.

    Repeat Test 2.

13. If Test 2 passes, corrective action is complete.

    If Test 2 fails, replace the peripheral and the fuse.

    NOTE

    Wait at least 30 seconds before performing Test 2.

14. Repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails, replace SN270.

15. Repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails, check the wiring associated with the circuit pack (see port testing below).

16. At the modular jack, disconnect the peripheral.

    NOTE

    Wait at least 30 seconds before performing Test 2.

    Repeat Test 2.

17. If Test 2 passes, proceed to Step 19.

    If Test 2 fails, replace SN270B or SN271.

18. Repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails, check the wiring between SN270B or SN271 and the modular jack (see port testing below).

19. Connect the peripheral to the modular jack.

    Repeat Test 2.

20. If Test 2 passes, corrective action is complete.

    If Test 2 fails, replace the peripheral.

21. Repeat Test 2.

    If Test 2 passes, corrective action is complete.

    If Test 2 fails, check the wiring associated with the circuit pack (see port testing below).

22. If Test 2 returns a single fault code of 7 (digital instrument has bad state of health), replace the network peripheral and proceed to Step 26.

23. If Test 2 returns a single fault code of 3 (DTL link idle) or 12 (no response from network peripheral), perform Steps 24 and 25.

24. When fault code 3 or 12 is displayed, maintenance personnel **must** go to the location of the suspect network peripheral and check the DTL cable.

NOTE

PROC 622 is unable to resolve the difference between a dead network peripheral and a severed DTL cable.

25. Check to see if phantom power is being supplied.

    If no voltage can be measured, the DTL cable should be inspected and repaired or replaced.

    If voltage is present, the network peripheral should be replaced with a network peripheral of the same type.

    Proceed to Step 26.

26. Execute Test 3 in a nonservice-affecting test mode.

    It may be the case that a malfunctioning network peripheral always looks in-use.

    If this is true, the nonservice-affecting mode of testing does not test the network peripheral. This situation requires the service-affecting mode of testing.

CAUTION

Testing a large range of network peripherals in the service-affecting mode may affect many properly functioning network peripherals.

NOTE

It is recommended that service-affecting mode testing be performed on only one network peripheral at-a-time.

    When network peripherals always look in-use (results are obtained from Test 2) use the service-affecting mode to test the network peripheral.

    The network peripheral being tested is the default equipment location from Test 2 of **PROC 622**.

27. Continuously test the suspect network peripheral to determine if it fails.

    If the network peripheral passes Test 3, proceed to Step 30.

    If the network peripheral fails Test 3, proceed to Step 28.

28. Use **PROC 620**, Test 4 (unit type 27, 28, or 29) to test the General Purpose Port (GPP), 72 series terminal, or 73 series terminal associated with the failing network peripheral.

    If **PROC 620** fails, take the appropriate corrective action.

    When **PROC 620** passes after taking corrective action, repeat Test 3 of **PROC 622** to ensure that the failure is corrected.

    Proceed to Step 33.

29. If **PROC 620** passes, replace the faulty network peripheral and repeat Test 3 of **PROC 622**.

    If Test 3 passes, proceed to Step 30.

    If Test 3 fails, check the wiring associated with the port equipment circuit pack and the network peripheral (see port testing below).

30. It may be the case that all network peripherals pass test 2 or 3, but occasional errors are still recorded in PMIDS or a user reports occasionally garbled data.

    NOTE

    These problems may be caused by noise on the DTL lines.

31. Test 4 tests only the transmission of the DTL lines. Test 4 detects single bit errors and thus provides a sensitive indicator of noise on the DTL lines.

32. The location entered for Test 4 should be that of the port circuit connected to the suspect DTL lines.

    NOTE

    Equipment locations should be tested one-at-a-time as Test 4 is a service-affecting test.

33. Execute Test 4 and operate large electrical appliances (i.e., arc welders, jet engines, fusion reactors, laser space weapons systems, etc.) and the network peripheral in the vicinity of the DTL lines to see if they influence the noise on the DTL link.

    If ambient electrical noise is the problem, the DTL lines and/or network peripheral may need to be relocated or reoriented.

34. In order to resolve the alarmed entries and turn off the **NETWORK PERIPH EQPT** fault indicator, all failing network peripherals with an alarm status of 2 or 3 (minor or warning) must pass Test 2 or 3.

    Repeat Steps 2 through 34 (as appropriate) for each failing network peripheral with an alarm status of 2 or 3.

35. The **MINOR** or **WARNING** alarm indicator also goes off if no other sources are affecting the alarm indicator.

Port Tester

The port tester (comcode 105138424) verifies the continuity of station wiring (whether analog, hybrid, or digital) at various locations of a System 85 installation. (Refer to Figure 12.)

The port tester can detect signals at:

1. The purple field in the equipment room.
2. The white fields in the closets.
3. The wall jack.

The wall jack is the primary testing point for the port tester because the test from the wall jack verifies the total wire path.

The port tester is used with 110-type hardware and 8-pin modular jacks. The 3-pair plug attached to the port tester's cord tests at the cross-connect points of an installation.

TPA-758100

Figure 5-12. Port Tester

The 8-pin jack, labeled **Wall Jack Test** on the port tester tests all voice ports using a D8W line cord, which is not provided.

WARNING

The port tester will overheat if plugged into an active circuit longer than 20 seconds.

The port tester displays the status of the equipment port leads by lighting the LEDs that correspond to those leads in each type of port tested. Table AK, Port Tester LED Designation/Color Description indicates which leads each LED is connected to.

There is a wiring problem:

1. When the LED indication is an incorrect color.

   For example, the leads may be switched or the leads may be interchanged between pairs.

2. If the LED is not lighted and a signal is expected, there is an open connection between the port and the location of the test.

Table 5-38.

PORT TESTER LED **DESIGNATION/COLOR DESCRIPTION**		
LED **DESIGNATION/** COLOR	**PAIR** TESTED	LEAD DESCRIPTION
T/R	**1**	**Voice pair for analog and hybrid sets.**
W-O	**2**	**Tip lead of first data pair for digital and hybrid sets.**
O-W	**2**	**Ring lead of first data pair digital and hybrid sets.**
W-G	**3**	**Tip lead of second data pair for digital and hybrid sets.**
G-W	**3**	**Ring lead of second data pair for digital and hybrid sets.**
-48/GRD	**4**	**Fourth pair of jack is connected to a -48 V supply.**

For the various types of ports tested, Table AL, LED Indications for Tested Ports lists the correct LED indications for the port tested. (G = Green; R = Red, and a dash (-) = not lighted. If adjunct power is present, the ADJ PWR -48V GND is lighted green.)

Table 5-39.

LED INDICATIONS FOR TESTED PORTS					
PORT	**T-R**	**W-O**	**0-W**	**W-G**	**G-W**
ANALOG	**G**	**-**	**-**	**-**	**-**
GPP	**-**	**G**	**G**	**G**	**G**
MFET	**G**	**G**	**G**	**G**	**G**
MFAT	**-**	**R**	**R**	**R**	**G**

Fault Isolation for Remoted Port Failures

Fault isolation for remoted port failures is divided into two parts.

1. Part one is performed at the customer's premises using the **MAAP** to verify the existence of a failure and to determine the alternate circuit packs (if any) required to correct the trouble.
2. Part two is performed at the remote carrier group and reseats or replaces circuit packs in the remote carrier group using the remote carrier group circuit pack insertion test to correct the trouble.

Part One - Verifying Failure

1. Display the failing circuit with a remote status of 1 (remote port, T1 carrier) or 2 (remote port, fiber) displayed in Field 8 in Test 1 of **PROC 622**.

2. Enter **PROC 622**, Test 2.

NOTE

The alarmed circuit that was displayed in Test 1 of **PROC 622** is the default equipment location displayed in Test 2 of **PROC 622**.

3. When a 74 series terminal is the failing circuit, determine if the 74 series terminal is connected to a personal computer.

NOTE

It may not be possible for periodic or demand maintenance software to detect a defective 74 series terminal when it is connected to a powered-up personal computer that is in the PC mode.

If the 74 series terminal is connected to a personal computer, request the customer to power down the personal computer or place the computer in the non-PC mode (off-line) before testing the 74 series terminal.

4. When a translated peripheral is the failing circuit, determine if the peripheral is connected. When the peripheral is powered by external sources (i.e., commercial power), the power to the peripheral **must** be turned on.

NOTE

Tests may fail with a fault code other than the expected fault code 3 (DTL link idle) failure when the peripheral is disconnected or does not have power on when required.

5. Depress **EXECUTE**.
6. Determine the status of the circuit by checking the display in Field 14.

   If the circuit passes, a 0 is displayed in Field 14. Record the equipment type and equipment location of the circuit tested displayed in Fields 2 through 7.

NOTE

When the circuit was alarmed in Test 1 of **PROC 622** and passes the diagnostic analysis test in Test 2 of **PROC 622**, further analysis of the problem should be performed by running a continuous test of the circuit in Test 3 of **PROC 622** to ensure that the failure is not intermittent.

   Proceed to Step 8.

7. If the circuit fails (indicated by a 1 displayed in Field 14), record the equipment type and equipment location of the failing circuit displayed in Fields 2 through 7.

   Proceed to Step 11.

8. Use **NEXT TEST** to step to Test 3 of **PROC 622**.

NOTE

The circuit that was displayed in Test 2 is the default equipment location displayed in Test 3.

9. Depress **EXECUTE**.

   Allow Test 3 to execute for a period of time (or until a 1 is displayed in Field 14) and depress **STOP**.

   If the circuit passes Test 3 (indicated by a 0 displayed in Field 14), repeat Test 2 to turn off the **NETWORK PERIPH EQPT** fault indicator.

10. If the circuit fails Test 3 (indicated by a 1 displayed in Field 14), record the equipment type and equipment location displayed in Fields 2 through 7.

    Proceed to Step 11.

11. Use **PROC 620**, Test 4 to test the circuit displayed in Fields 3 through 7 of **PROC 622**, Test 2 or Test 3.

    If **PROC 620** passes, replace the peripheral at the remote carrier group associated with the equipment location recorded in Step 6 or Step 7.

12. If **PROC 620** fails, use **PROC 625** to determine the health status of the RCL and RCC.

    If the health status for the RCL or RCC is not good, perform isolation and repair step **Remote Carrier Group (unit type 74) Failures** for RCL or RCC failures in the repair guide section of **PROC 620**.

13. If the health status for both the RCL and RCC is good, replace the circuit pack at the remote carrier group associated with the equipment location recorded in Step 6 or Step 7.

    If the port circuit pack insertion test fails, replace the peripheral associated with the equipment location recorded in Step 6 or Step 7.

14. Dispatch maintenance personnel to the remote carrier group with the required circuit packs and/or peripherals and the equipment location of the failing circuit pack(s) displayed in Fields 2 through 7.

Part Two - Remote Carrier Group Port Circuit Pack Replacement Port circuit pack replacement in the remote carrier group is dependent upon observation of the **RED** and **GREEN** LEDs on the port circuit pack being reseated or replaced. There is **no MAAP** display to determine whether the port circuit pack passes or fails the test.

The remote carrier group port circuit pack insertion test consists of a hardware test.

Indications on the progress and results of the hardware test is provided by lighting LEDs on the port circuit pack inserted.

The port circuit pack recorded in part one for the failing circuit should be reseated prior to being replaced. The port circuit pack should be replaced if the port circuit pack insertion test fails when the port circuit pack is reseated.

The equipment location recorded in part one for the failing circuit is not the true physical location in the remote carrier group of the circuit pack to be reseated or replaced.

The remote carrier group contains a label (refer to Figure 11, page 302) which shows the relationship of the **MAAP** display to the remote carrier group slot number to be replaced for the failing circuit pack.

When replacing a GPP circuit pack, refer to **Port Circuit Pack Insertion** below for the results of the test.

NOTE

When a GPP circuit pack is unseated or replaced in the remote carrier group, wait **at least 30 seconds** before reseating the SN270B or SN271 circuit pack. The auto reset may not take effect because of the circuit pack being horizontally mounted unless the circuit pack is unseated for at least 30 seconds.

Port Circuit Pack Insertion When a port circuit pack is inserted in the remote carrier group, the following occurs.

NOTE

When a GPP circuit pack is tested, all translated peripherals should be connected. When the terminal(s) are powered by external sources (i.e., commercial power), the power to the terminal(s) **must** be turned on.

1. The hardware test on the port circuit pack is performed.

   The **RED** LED on the port circuit pack is lighted, then goes off.

   The **GREEN** LED on the port circuit pack is lighted, then goes off.

2. If the port circuit pack hardware test passes, both LEDs remain off.

   If the port circuit hardware test fails, the **RED** LED is lighted on the port circuit pack.

   NOTE

   No software test is executed for any port circuit packs.

3. If the port circuit pack fails the hardware test indicated by a **RED** LED being lighted, replace the circuit pack and repeat the port circuit pack insertion test.

User Reported Troubles

When user troubles associated with network peripherals are reported and there are no alarms, perform the following steps (as appropriate) for the type of network peripheral reported as the trouble. Repair guidelines for PDM, TDM, or DTDM data modules, and 72 or 74 series terminals are listed below.

PDM, TDM, and DTDM Data Module Repair Strategy: For the following user reported troubles, the following steps are provided.

1. Cannot originate calls.

   Ask the user to run a self test on the data module and 74 series terminal (if DTDM).

   If the self test fails, replace the data module or 74 series terminal.

   If the self test passes, use **PROC 622**, Test 1 to check for errors recorded against the data module or 74 series terminal. Use **PROC 622**, Test 3 to isolate the trouble.

2. Cannot receive calls.

   Ask the user to run a self test on the data module and 74 series terminal (if DTDM).

   If the self test fails, replace the data module or 74 series terminal.

If the self test passes, use **PROC 622**, Test 1 to check for errors recorded against the data module or 74 series terminal. Use **PROC 622**, Test 3 to isolate the trouble.

3. Data call is apparently set up, but no data can be sent or received.

   Ask the user to run the following local tests (Steps 4 through 6) on the data module.

4. Self test - If this test fails, replace the data module.

5. Local loop back - If this test fails, there is a problem between the user's terminal equipment and the data module.

6. Remote loop back or remote loop back and self test combined.

   NOTE

   If the user can perform a remote loop back test using the user's terminal equipment, that is the preferred test.

   Set up a connection to the remote data terminal and operate the remote loop back button.

   NOTE

   For DTL mode 0 and 1 operation, the remote loop back button must be operated before the call is set up.

   Perform a remote loop back test or operate the self test button.

   If the test passes, the problem is in the remote data module or the user's remote terminal equipment.

   If the test fails, the trouble could be in either data module or in any of the circuits between the data modules.

72 and 74 Series Terminal Repair Strategy: For the following user reported troubles, the following steps are provided.

1. No dial tone.

   Use **PROC 622**, Test 1 to check for errors recorded against the terminal and perform **PROC 622**, Test 3 to isolate the trouble.

2. Cannot dial.

   Replace the terminal.

3. Cannot receive calls.

   Use **PROC 622**, Test 1 to check for errors recorded against the terminal and perform **PROC 622**, Test 3 to isolate the trouble.

4. Does not ring.

   Assuming that there are no other indications of an incoming call, ask the user to perform the dial-up test for ringer.

   If the dial-up test does not pass, replace the 72 or 74 series terminal.

   Repeat the dial-up test. If the dial-up test fails again, use **PROC 620**, Test 4 to check the associated port circuit. Replace the port circuit as necessary.

5. Indicator does not light.

   Ask the user to perform the dial-up test for indicator.

   If the dial-up test fails, replace the terminal.

6. Buttons do not work.

   Ask the user to perform the dial-up test for buttons.

   If the dial-up test fails, replace the terminal.

7. Cannot hear.

   Replace the handset or terminal.

8. Cannot be heard.

   Replace the handset or terminal.

74 Series Terminals Connected to a Personal Computer When troubles with 74 series terminals connected to a personal computer are reported by the user, the user should be informed to power down the personal computer.

NOTE

It may not be possible for periodic or demand software maintenance software to detect a defective 74 series terminal when it is connected to a powered-up personal computer.

A personal computer can consist of an AT&T PC6300, AT&T PC7300, IBM personal computer, or equivalent. The personal computer is connected to a DCPI interface card to allow an interface to the switch.

The signaling channels S1 and S2 from a GPP port are connected to the DCPI interface card and then to the 74 series terminal.

Since the DCPI interface card interprets and responds to S channel messages, even if the 74 series terminal is not connected, maintenance of the terminal is impossible from switch software when the personal computer is powered-up.

Request the customer to power down the personal computer before performing or repeating maintenance on the defective 74 series terminal.

The terminal is not tested if the personal computer is powered up and the DCPI interface card is in the PC control mode.

NOTE

If the personal computer is powered down, **PROC 622** displays a fault code of 28 (odd channel of digital set is stuck in looparound) because the 74 series terminal has no S2 connectivity.

A display of fault code 28 indicates the terminal is good. When a fault code other than 28 is displayed, use the appropriate repair procedure for the terminal being tested.

PROC 623 - ANI FAILURES

Purpose

PROC 623 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from an ANI failure.

This maintenance procedure **must** be performed on the customer's premises. The ANI - Data Link Test Set (J59204AJ) must be connected to the switch and test set-up steps performed prior to executing Tests 2 through 4.

PROC 623 is used to:

1. Display ANI trunk circuit failures.
2. Send messages to test an ANI trunk circuit.
3. Turn off the **OTHER FAILS** fault indicator when all ANI trunk circuits pass Test 2.

NOTE

ANI alarmed entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 623** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AM, PROC 623 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

Test Equipment Required

An ANI - Data Link Test Set (J59204AJ) is required to perform Tests 2 through 4 of **PROC 623**.

The ANI test set verifies the 4-digit trunk and station number assignment of the switch equipped with automatic number identification.

Table 5-40.

PROC 623 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-4	Test number.	8 (Contd)		Failure code (Contd):
2		Data message being sent in Tests 2, 3, and 4:		1	No acknowledgement from module control channel in trunk circuit path.
		Line Trunk		2	2-out-of-5 error code.
				3	Always busy.
	0	0123 4567		4	No word shift.
	1	1357 0246		5	No loop current.
	2	2000 3988		6	Wrong channel.
	3	1010 1010		7	Bid error.
3	0-30	Module number.	9	0-99	Failures per hour for all circuits and for individual circuits.
4	0-7	Cabinet number.			
5	0-3	Carrier number.	10	0-60,000	Number of ANI calls attempted.
6	0-3	Slot number.	11	0-99	Load errors.
7	0,1	Circuit number.	12	0-99	Maximum wait interval exceeded.
8		Failure code:			
	0	Pass	13	0-99	Transmission errors.
			14	0-99	Queue overflow errors.

To set up the ANI test set in order to perform Tests 2 through 4, proceed as follows:

1. Position the test set adjacent to the SN244 trunk circuit pack to be tested.
2. At the test set, set the **POWER** switch to the **OFF** position.
3. Connect the furnished test cable to the ANI test set.
4. Connect the 117 V AC test set line cord to a 117 V AC source.
5. At the ANI test set, set the switches as follows:

   ERROR MODE/VERIFY MODE - Set to **ERROR MODE**.

   TRUNK/STATION - Set to **STATION**.

   NORMAL/HOLD - Set to **NORMAL**.

   MODE - Set to **ANI OR SLF-CH**.

   ALARM - Set to **OFF**.

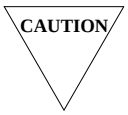
SELF-CHECK - Set to **OFF**.

POWER - Set to **ON**.

6. At the test cable, set the ANI **TEST** switch to **ON**.

Prior to checking any ANI trunk circuit, perform the following steps:

1. At the cross-connect field, disconnect the tip and ring leads associated with the ANI trunk circuit to be tested.



If the ANI trunk circuit being tested is connected to the central office instead of the ANI test set, test messages may be recorded as valid ANI calls.

2. Connect the test cable to the SN244 circuit pack corresponding to the ANI trunk circuit to be tested.
3. Set the **CHANNEL** switch on the test cable as follows:

   Circuit 0 displayed on the **MAAP** - Set **CHANNEL** switch to 9.

   Circuit 1 displayed on the **MAAP** - Set **CHANNEL** switch to 8.

In addition to the display on the **MAAP** indicating whether the trunk circuit being tested passed or failed, the following steps and observations can be performed at the ANI test set.

1. Observe the **TRUNK/STATION MATCH** display on the test set.

   It sequentially displays the trunk or station numbers listed for Field 2 in Table AM, PROC 623 - Field Definitions and Codes.

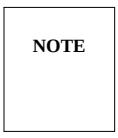
2. When an error is detected, the following data may be observed on the ANI test set:

   ERROR COUNT advances one count.

   The error word(s) on the **TRUNK/STATION MATCH** display is dashed or shown incorrectly.

3. Reverse the **TRUNK/STATION** switch to complete the display of the remaining messages.
4. Set the **NORMAL/HOLD** switch to the **HOLD** position to lock an error into the display register.

   If this is not done before the next message is sent, the new message clears the register.



While the switch is in the **HOLD** position, succeeding messages are not displayed. However, any message with an error advances the error counter.

Operation of Procedure

Overview

PROC 623 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from an ANI trunk circuit failure.

To call in **PROC 623**, perform the following:

1. Depress **PROC NO; 623; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Four tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Sends four messages to test each ANI trunk circuit.
3. Test 3 - Sends a single message to test the ANI trunk circuit.
4. Test 4 - Continuously sends each of four messages alternately to each circuit of a selected ANI trunk circuit pack.

Test 1

Test 1 provides a failure history of ANI trunk circuit failures.

Test 1 can also be used to manually turn off the **OTHER FAILS** fault indicator caused by an ANI failure.

1. Test 1 is the default test when entering **PROC 623** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. A summary of the failure history is displayed.
4. If one or more failures occurred, the following summary is displayed:

   Field 1 - 1.

   Field 9 - Failures per hour.

   Field 10 - ANI attempts (number of ANI calls).

   Field 11 - Load errors.

   Field 12 - Time out errors (maximum wait interval exceeded).

   Field 13 - Transmission errors.

   Field 14 - Queue overflow errors.

5. Depressing **NEXT CIRCUIT** displays the first failing ANI equipment location in Fields 3 through 7 and updates Field 9 (failures per hour).
6. After the first failing circuit is displayed, depressing **NEXT CIRCUIT** repeatedly displays the failures per hour (Field 9) associated with the ANI trunk circuit failure displayed in Fields 3 through 7.

7. After all failures are displayed, depressing **NEXT CIRCUIT** dashes all fields except Field 1.

   Depressing **NEXT CIRCUIT** again causes Test 1 to be displayed from the beginning, starting with the summary.

8. To manually turn off the **OTHER FAILS** fault indicator, assuming no other sources are affecting the **OTHER FAILS** fault indicator after Test 1 is executed at least once, perform the following:

   Depress **CLEAR DATA; EXECUTE**.

NOTE

ANI alarmed entries in PMIDS are marked as resolved.

Test 2

Test 2 automatically sends four test messages to the ANI trunk circuit displayed in Fields 3 through 7.

Test 2 requires the use of the ANI test set to avoid sending test messages to the central office.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. Depress **NEXT CIRCUIT** until the equipment location of the ANI circuit to be tested is displayed in Fields 3 through 7.

3. At the cross-connect field, disconnect the tip (T) and ring (R) leads of the ANI trunk circuit displayed in Fields 3 through 7.

4. Connect the ANI test cable to the SN244 circuit pack associated with the equipment location displayed in Fields 3 through 6.

5. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

   Circuit 0 displayed on the **MAAP** - Set **CHANNEL** switch to 9.

   Circuit 1 displayed on the **MAAP** - Set **CHANNEL** switch to 8.

6. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator is lighted and Field 8 is dashed.

7. After the **WAIT** indicator goes off, the results of the test are displayed in Field 8 (failure code).

   If a 0 is displayed in Field 8, Test 2 passed.

8. When a failure is detected, a failure code is displayed in Field 8.

   Depressing **NEXT UNIT** repeatedly displays additional failure codes associated with the failed circuit.

9. **STOP** can be used to halt the test any time the **WAIT** indicator is lighted.

10. All ANI trunk circuits must be tested and pass Test 2 in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

11. **NEXT CIRCUIT** is used to select the next ANI trunk circuit to be tested.

    The T and R leads from the previously tested circuit should be reconnected at the cross-connect field prior to performing Steps 2 through 10 to test the next ANI trunk circuit.

12. The **OTHER FAILS** fault indicator automatically goes off when the ANI alarm cause, and all other alarm sources affecting the **OTHER FAILS** fault indicator are cleared.

NOTE

ANI alarmed entries in PMIDS are marked as resolved.

Test 3

Test 3 sends a selected single test message to the ANI trunk circuit displayed in Fields 3 through 7.

Test 3 requires the use of the ANI test set to avoid sending test messages to the central office.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. Depress **NEXT CIRCUIT** until the equipment location of the ANI circuit to be tested is displayed in Fields 3 through 7.
3. Depress **NEXT DATA** to select a test data message to be sent.
4. At the cross-connect field, disconnect the T and R leads of the ANI trunk circuit displayed in Fields 3 through 7.
5. Connect the ANI test cable to the SN244 circuit pack associated with the equipment location displayed in Fields 3 through 6.
6. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

   Circuit 0 displayed on the **MAAP** - Set **CHANNEL** switch to 9.

   Circuit 1 displayed on the **MAAP** - Set **CHANNEL** switch to 8.

7. To start Test 3, depress **EXECUTE**.

   The **WAIT** indicator is lighted and Field 8 is dashed.

8. At the conclusion of Test 3, the **WAIT** indicator goes off, and the results of the test are displayed in Field 8 (failure code).

   If a 0 is displayed in Field 8, Test 3 passed.

9. If a failure is detected, the following is displayed:

   Field 1 - 3.

   Field 2 - Data message being sent.

   Fields 3 through 7 - Equipment location of the ANI trunk circuit.

   Field 8 - Failure code associated with the failed ANI trunk circuit.

10. Depressing **NEXT UNIT** repeatedly displays additional failure codes associated with the displayed equipment location and the test data message sent.
11. **STOP** can be used to halt the test any time the **WAIT** indicator is lighted.
12. **NEXT DATA** advances the test data message index in Field 2, and another test pattern can be sent by depressing **EXECUTE**.
13. **NEXT CIRCUIT** is used to select the next ANI trunk circuit to be tested.

    The T and R leads from the previously tested circuit should be reconnected at the cross-connect field prior to performing Steps 2 through 12 to test the next ANI trunk circuit.

14. When Test 3 passes, Test 2 must be repeated for all ANI trunk circuits in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

Test 4

Test 4 sends four messages, first to one circuit on the displayed SN244 circuit pack equipment location, then to the other circuit on the circuit pack.

Test 4 is used to continuously test the ANI trunk circuits suspected of having intermittent failures or to trace wiring problems.

Test 4 requires the use of the ANI test set to avoid sending test messages to the central office.

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.
2. Depress **NEXT CIRCUIT** until the equipment location of the SN244 circuit pack to be tested is displayed in Fields 3 through 6.
3. At the cross-connect field, disconnect the T and R leads of the ANI trunk circuits associated with the SN244 circuit pack displayed in Fields 2 through 6.
4. Connect the ANI test cable to the SN244 circuit pack associated with the equipment location displayed in Fields 3 through 6.
5. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

   Circuit 0 displayed on the **MAAP** - Set **CHANNEL** switch to 9.

   Circuit 1 displayed on the **MAAP** - Set **CHANNEL** switch to 8.
6. To start Test 4, depress **EXECUTE**.
7. The test runs continuously until a failure is detected or **STOP** is depressed.

   NOTE

   The testing interval for the ANI trunk circuits is determined by maintenance personnel performing the test and is ended by depressing **STOP**. This allows maintenance personnel time to trace wiring problems associated with the SN244 circuit pack.

   If a 0 is displayed in Field 8, Test 4 passed.

8. If a failure is detected, the following is displayed:

   Field 1 - 4.

   Fields 3 through 7 - Equipment location of the ANI trunk circuit.

   Field 8 - Failure code associated with the ANI trunk circuit.

   Field 10 - ANI attempts (number of ANI calls attempted).

9. Depressing **NEXT UNIT** repeatedly displays additional failure codes associated with the displayed equipment location.
10. **STOP** can be used to halt the test.
11. **NEXT CIRCUIT** is used to select the next ANI trunk circuit pack (SN244) to be tested.

    The T and R leads from the previously tested circuits should be reconnected at the cross-connect field prior to performing Steps 2 through 10 to test the next ANI trunk circuit pack (SN244).

12. When Test 4 passes, Test 2 must be repeated for all ANI trunk circuits in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

Repair Guide

When an ANI trunk circuit failure is indicated, **PROC 623** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following steps in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and record the failure history.
2. Step to Test 2.
3. Select the ANI trunk circuit to be tested by using **NEXT CIRCUIT**.
4. At the cross-connect field, disconnect the T and R leads of the ANI trunk circuit selected in Step 3.
5. Connect the ANI test set to the trunk circuit pack (SN244) containing the trunk circuit selected for testing.
6. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

   Circuit 0 displayed on the **MAAP** - Set **CHANNEL** switch to 9.

   Circuit 1 displayed on the **MAAP** - Set **CHANNEL** switch to 8.

7. Execute Test 2 and record the results.

   NOTE

   Test 3 may be used as an aid which enables maintenance personnel to send the same message to the same circuit each time **EXECUTE** is depressed, or the test data message pattern can be changed by use of **NEXT DATA**.

8. When failures are recorded, replace circuit pack SN244.

   Repeat Test 2.

9. When Test 2 is repeated after a circuit pack has been removed and a new (or same) circuit pack inserted, the test may fail because the circuit pack is not initialized properly.

   NOTE

   Repeat Test 2 before assuming the corrective action taken has not fixed the problem.

10. If Test 2 fails again, check the failure code displayed in Field 8.

    If failure code 1 is displayed, test TN401 (module control channel) using **PROC 620**, Test 3 Unit type 6.

    If any other failure code is displayed, check the wiring associated with circuit pack SN244.

11. If the test initially passes, or passes after corrective action is performed, connect the T and R leads disconnected in Step 4, and repeat Steps 3 through 9 for all ANI trunk circuits.

12. When intermittent ANI circuit failures or wiring problems are suspected, use Test 4 to continuously test suspect circuits.

13. After all failures are corrected, repeat Test 2 for all ANI trunk circuits in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

PROC 624 - CONTACT INTERFACE TEST

Purpose

PROC 624 is used when a contact interface circuit pack (SN241) is malfunctioning or suspected of being defective.

PROC 624 must be performed by maintenance personnel on the customer's premises as verification of relay operation is performed by monitoring the associated lamp(s).

Any or all relay contacts on a selected contact interface circuit pack can be tested.

After using **PROC 624**, all lamps on the System Status Indicators (SSI) are cleared from any previous state and are not reinitialized until further use.

Field Definitions and Codes

Each field of **PROC 624** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AN, PROC 624 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 5 - Select contact interface circuit pack for testing.
3. Field 6 - Select contact on circuit pack to be tested (Tests 3 and 4 only).

Operation of Procedure

Overview

PROC 624 is used to test a contact interface circuit pack.

To call in **PROC 624**, perform the following:

1. Depress **PROC NO; 624; ENTER**.

2. Test 1 is automatically selected.

   Field 1 displays a 1 and a default contact interface circuit pack is displayed in Fields 2 through 5.

   Field 6 (current contact) displays a 0 and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Table 5-41.

PROC 624 - FIELD DEFINITIONS AND CODES		
FIELD	CODE	DEFINITION
1	1-4	Test number
2	0-30	Module number
3	0-7	Cabinet number
4	0-3	Carrier number
5	0-21	SN241 slot number
6	0-7	Contact currently selected for test
7-14	 0 1	State of each contact: Open Closed
15	 9	Failure code: Message transmission to module processor failed.

Four tests are available:

1. Test 1 - Automatically sequences through all contacts on a contact interface circuit pack, opening and closing each contact exclusively at a 60 Interruptions Per Minute (IPM) rate for 5 seconds.
2. Test 2 - Automatically sequences through all contacts on a contact interface circuit pack.

   Each contact remains closed for the entire 5-second interval of the contact's test.

3. Test 3 - Manual selection of a contact to be tested.

   Each contact selected for testing is tested for any desired interval. The contact opens and closes at a 60 IPM rate.

4. Test 4 - Manual selection of a contact to be tested.

   Each contact selected for testing is tested for any desired interval. The contact remains closed for the duration of the testing interval.

Test 1

Test 1 automatically sequences through all contacts on a contact interface circuit pack, opening and closing each contact on the circuit pack at a 60 IPM rate for 5 seconds.

1. Test 1 is the default test when entering **PROC 624** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. When Test 1 is called in, a default contact interface circuit pack is displayed in Fields 2 through 5.

   The default contact interface circuit pack can be tested or another contact interface circuit pack can be selected for testing.

3. A contact interface circuit pack can be selected for testing in three ways.

   Upon entry to Test 1, Field 2 (module) is flashed, indicating it is an optional entry field. To select another contact interface circuit pack, enter its equipment location in Fields 2 through 5: **(Module number); ENTER; (Cabinet); ENTER**; **(Carrier); ENTER; (Slot); ENTER**.

   By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.

   By using the **CHANGE FIELD** sequence: **CHANGE FIELD; 2; ENTER; (Module number); ENTER**; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

4. To start Test 1, depress **EXECUTE**.

5. A 5-second test is run on each contact (0 through 7) at a 60 IPM rate.

   This is evident by the alternating 0s and 1s in Fields 7 through 14.

   Field 6 displays the current contact on the contact interface circuit pack being tested.

6. Test 1 runs continuously until **STOP** is depressed or until a new test is called in.

   This allows maintenance personnel time to observe the status of the associated lamps.

Test 2

Test 2 automatically sequences through all contacts on a contact interface circuit pack. The contacts remain closed during the testing interval.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. A contact interface circuit pack can be selected for testing in two ways.

   By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.

   By using the **CHANGE FIELD** sequence: **CHANGE FIELD; 2; ENTER; (Module number); ENTER**; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

3. To start Test 2, depress **EXECUTE**.

4. A 5-second test is run on each contact (0 through 7) at a 60 IPM rate.

   The closure of each contact is indicated by 1s in Fields 7 through 14.

   Field 6 displays the current contact on the contact interface circuit pack being tested.

5. Test 2 runs continuously until **STOP** is depressed or until a new test is called in.

   This allows maintenance personnel time to observe the status of the associated lamps.

Test 3

Test 3 individually tests a specific contact on a contact interface circuit pack. The contact opens and closes at a 60 IPM rate for the duration of the testing interval.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. A contact interface circuit pack can be selected for testing in two ways.

   By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.

   By using the **CHANGE FIELD** sequence: **CHANGE FIELD; 2; ENTER; (Module number); ENTER**; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

3. When Test 3 is called in and a contact interface circuit pack is selected for testing, a default contact (0) is displayed in Field 6. The default contact can be tested or another contact can be selected for testing.

4. To select another contact for testing, perform the following:

   CHANGE FIELD; 6; ENTER; **(Contact number to be tested); ENTER**.

5. To start Test 3, depress **EXECUTE**.

6. During the testing interval, alternating 0s and 1s are displayed in the field of the contact selected for testing.

7. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

   This allows maintenance personnel time to observe the status of the associated lamp and to verify existence of intermittent failures.

8. After the first contact is tested, and **STOP** is depressed, **NEXT DATA** can be used to select another contact on the same contact interface circuit pack for testing:

   NEXT DATA (depressed until desired contact is displayed); **EXECUTE**.

9. At this time, the displayed contact selected for testing is tested until **STOP** is depressed or until a new test is called in.

Test 4

Test 4 tests a specific contact on a contact interface circuit pack. The contact selected for testing remains closed for the duration of the testing interval.

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.

2. A contact interface circuit pack can be selected for testing in two ways.

   By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.

   By using the **CHANGE FIELD** sequence: **CHANGE FIELD; 2; ENTER; (Module number); ENTER**; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

3. When Test 4 is called in and a contact interface circuit pack is selected for testing, a default contact (0) is displayed in Field 6. The default contact can be tested or another contact can be selected for testing.

4. To select another contact for testing, perform the following:

   CHANGE FIELD; 6; ENTER; **(Contact number to be tested); ENTER**.

5. To start Test 4, depress **EXECUTE**.

6. During the testing interval, contact closure is indicated by a 1 in the contact field selected for testing.

7. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

   This allows maintenance personnel time to observe the status of the associated lamp and to verify existence of intermittent failures.

8. After the first contact is tested, and **STOP** is depressed, **NEXT DATA** can be used to select another contact on the same contact interface circuit pack for testing:

   NEXT DATA (depressed until desired contact is displayed); **EXECUTE**.

9. At this time, the displayed contact selected for testing is tested until **STOP** is depressed or until a new test is called in.

Repair Guide

When faulty operation of a contact interface circuit pack is indicated, perform the following steps in the order listed.

1. Replace SN241.

2. Rerun Tests 1 and 2.

3. If a failure is still indicated, check the operation of the associated remote equipment.

   Example: SSI.

4. If the associated remote equipment is not in working order, refer the problem to the proper personnel.

5. If the associated remote equipment is in working order, check the wiring between SN241 and the remote equipment.

PROC 625 - SYNCHRONIZATION REFERENCE MONITOR

Purpose

PROC 625 is used to determine the current state of health of synchronization references and all DS-1 or RCG circuit packs.

PROC 625 provides the capability to switch between the synchronization reference sources to support maintenance of the digital network.

PROC 625 also provides the capability to disable or reenable the automatic reference switching performed by the synchronization periodic software and by associated hardware.

PROC 625 is used to:

1. Display the current state of health and status information for each synchronization reference and DS-1 or RCG circuit pack.
2. Display the times and causes of the last eight (maximum) switches that occurred in any synchronization reference.
3. Clear the table of last 8 switches.
4. Clear the misframes count.

5. Reset slip counts for the entire switch.

NOTE

For a Release 2, Version 3 switch, slip counts can only be reset when **tape issue 1.1 or later** is being used.

6. Perform a switch between synchronization references.
7. Prevent automatic reference switching by the synchronization periodic software and associated hardware.

CAUTION

Disabling of the automatic reference switching feature for a prolonged period of time could become service affecting by impairing the recovery mechanism of the switch.

Field Definitions and Codes

Each field of **PROC 625** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AO, PROC 625 - Field Definitions and Codes.

Optional input fields are:

1. Fields 3 through 6 - Select a specific equipment location to be tested or displayed (Test 1 only).
2. Field 8 - Enable a switch of synchronization references or reset the slips count (Test 2 only).

NOTE

For a Release 2, Version 3 switch, slip counts can only be reset when **tape issue 1.1 or later** is being used.

3. Field 9 - Enable or disable automatic reference switching of synchronization references (Test 2 only).

Operation of Procedure

Overview

PROC 625 is used to determine the number and cause of switches (determined by the state of health), the current state of health for synchronization references and DS-1 or RCG circuit packs, to perform a switch of synchronization references, and to disable or reenable automatic reference switching of synchronization references. In addition, misframe counts can be cleared for an individual facility and slip counts can be reset for the entire switch.

NOTE

For a Release 2, Version 3 switch, slip counts can only be reset when **tape issue 1.1 or later** is being used.

To call in **PROC 625**, perform the following:

1. Depress **PROC NO; 625; ENTER**.

Table 5-42.

PROC 625 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1,2	Test number.	8 (Contd)	2*	Reset slip counts.
2	1-9	Facility type:		3-6*	Encodes 3 through 6 indicate why a switch attempt failed.
	1	DS-1.			
	2	Local end of remoted pair. (RCG)		3*	I/O failure.
				4*	Unusable reference.
	3	Remote end of remoted pair. (RCG)		5*	Not administered.
	4-9	Reserved for future use.		6*	Maintenance busied.
3-6		Equipment location of displayed reference, DS-1, or RCG.	9	0-2	Automatic switch enable or disable:
				0	Enable automatic switch of reference.
3	0-30	Module number.			
4	0-7	Cabinet number.		1	Disable software switch of reference.
5	0-3	Carrier number.		2	Disable software and hardware switch of reference.
6	0-21	Slot number.			
7	Dash, 0-2	Reference indication:	10	Dash, 0-9	Health code of displayed circuit:
	Dash	Nonreference DS-1 or RCG.		Dash	Board is healthy.
	0	High accuracy clock.		0	Maintenance busied.
	1	Primary reference.		1	Board processor sanity.
	2	Secondary reference.		2	Unusable reference reported by System Clock Synchronizer (SCS) - reference only.
8	0-6*	Switch enable and status:			
	0	Disable switch of reference.		3	Loss of signal reported by DS-1.
	1	Enable switch of reference.		4	Excessive slips.
				5	Excessive misframes.

Table 5-42. (Contd)

PROC 625 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
10 (Contd)	6**	Network alarm.	17	0-9	Switch cause:
	7	Board health.		0	Craft request.
	8	Major error rate alarm.		1	Board processor sanity.
	9	Minor error rate alarm.		2	Unusable reference reported by SCS.
11	0-999	Number of slips.		3	Loss of signal reported by DS-1.
12	0-99	Number of misframes.		4	Excessive slips.
13	0-8	Index: Index into the switch time and cause table.		5	Excessive misframes.
14-16		Switch time:		6	Network alarm.
14	1-31	Day of month.		7	Board health.
15	0-23	Hour of day.		8	High accuracy clock was placed on-line.
16	0-59	Minute of hour.		9	Cause of the last switch has been cleared.

* = For Tape Issue 1.0, Field 8 encodes are 0 through 5. Encodes 3 through 6 listed above are encodes 2 through 5 for tape issue 1.0. Encodes 2 through 5 of tape issue 1.0 indicate why a switch attempt failed.

** = For Tape Issue 1.0, Field 10 encode 6 is defined as carrier group alarm (loss of frame).

2. Test 1 is automatically selected.

   Fields 1 and 2 display a 1, Fields 3 through 6 display the primary reference, the first DS-1 or RCG circuit pack in the switch.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Displays the health and status of all DS-1 or RCG circuit packs and clears the misframe count.
2. Test 2 - Allows a switch of the synchronization references, displays the time and cause of the last eight switches, clears the switch history, and resets the slip counts.

Test 2 is also used to prevent an automatic switch of references from taking place by disabling the periodic software and/or hardware switch.

Test 1

Test 1 is used to determine the health and status of the equipment location displayed in Fields 3 through 6.

Test 1 can also be used to clear the misframes for an individual facility.

NOTE

Misframes are cleared every hour without maintenance personnel intervention. Misframes should only be cleared as a diagnostic aid when performing maintenance involving misframes.

1. Test 1 is the default test when entering **PROC 625** or is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. When Test 1 is initially called in, the primary reference (if translated) is displayed in Fields 3 through 6. If a primary reference is not translated, Fields 3 through 6 display the first DS-1 or RCG circuit pack in the switch (in lowest equipment number order).
3. A specific reference, DS-1 or RCG circuit pack or the default equipment location can be tested.

   To test the default equipment location displayed in Fields 3 through 5, proceed to Step 5.
4. A specific reference, DS-1 or RCG circuit pack can be selected for testing by depressing **NEXT CIRCUIT** to step through the DS-1 or RCG circuit packs until the DS-1 or RCG circuit pack to be tested is displayed in Fields 3 through 6.

   NOTE

   If a secondary reference is translated, it always follows the primary reference when **NEXT CIRCUIT** is used to step through the circuit packs in the switch.

   Proceed to Step 6.
5. A specific reference, DS-1 or RCG circuit pack can also be selected for testing by using the **CHANGE FIELD** sequence:

   CHANGE FIELD; 3; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER.
6. To start Test 1, depress **EXECUTE**.
7. If the translation records indicate the equipment location entered is not a translated DS-1 or RCG circuit pack, special error code 81 (not a translated a DS-1 board) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.
8. If the equipment location entered is not a physical DS-1 or RCG circuit pack, special error code 82 (not a physical DS-1 board) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.

9. Special error code 80 (I/O failure) may be displayed in the **MAAP** error code field when **EXECUTE** is depressed indicating that Test 1 cannot be performed.

   If special error code 80 is not displayed, proceed to Step 11.

10. When special error code 80 is displayed, repeat Test 1.

    If special error code 80 is not displayed again, proceed to Step 11.

    If special error code 80 is displayed again, perform **PROC 611** to test the common control I/O channels and/or **PROC 620** to test TN380 (module processor) or TN381 (TMS processor).

11. The health and status of the equipment location selected for testing is displayed as follows:

    Field 1 - 1.

    Field 2 - Facility type (1 = DS-1, 2 or 3 = RCG circuit pack).

    Fields 3 through 6 - Equipment location of synchronization reference, DS-1 or RCG circuit pack tested.

    Field 7 - Reference indication (Dash = non-reference, 1 = primary reference, 2 = secondary reference).

    Fields 8 and 9 - Dashed.

    Field 10 - Health code of displayed circuit pack.

    NOTE

    A dash displayed in Field 10 indicates the circuit pack displayed in Fields 3 through 6 is healthy.

    Field 11 - 0 or number of slips.

    NOTE

    Record the number of slips displayed in Field 11.

    Field 12 - 0 or number of misframes.

    Fields 13 through 17 - Dashed.

12. The **CLEAR DATA; EXECUTE** sequence can be used to clear the misframes displayed in Field 12, after **EXECUTE** is used to initiate Test 1.

    NOTE

    Misframes are cleared every hour without maintenance personnel intervention. Misframes should only be cleared as a diagnostic aid when performing maintenance involving misframes.

13. To clear the misframes displayed in Field 12, depress **CLEAR DATA; EXECUTE**.

    Field 12 displays a 0 after **EXECUTE** is depressed.

14. When another reference, DS-1 or RCG circuit pack is to be tested, the **CHANGE FIELD** sequence or **NEXT CIRCUIT** can be used to select the specific reference, DS-1 or RCG circuit pack to be tested.

15. **CHANGE FIELD; 3; ENTER; (Module number); ENTER**; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER**.

16. Depress **NEXT CIRCUIT** to step through the DS-1 or RCG circuit packs until the DS-1 or RCG circuit pack to be tested is displayed in Fields 3 through 6.

NOTE

If a secondary reference is translated, it always follows the primary reference when **NEXT CIRCUIT** is used to step through the circuit packs in the switch.

After all DS-1 or RCG circuit packs are displayed, depressing **NEXT CIRCUIT** dashes Fields 2 through 17.

17. **EXECUTE** must be depressed to test the specific reference, DS-1 or RCG circuit pack selected for testing.

Test 2

Test 2 is used to switch synchronization references when more than one reference is translated.

Test 2 is also used to determine the time and cause when the last eight switches occurred for the synchronization reference(s).

Test 2 can also be used to clear the table of last eight switches (maximum) for the synchronization reference(s) and to reset slip counts.

NOTE

For a Release 2, Version 3 switch, slip counts can only be reset when **tape issue 1.1 or later** is being used.

Test 2 can also be used to reset the slip counts for the entire switch for **tape issue 1.1 or later**.

NOTE

Slip counts are reset every 24 hours without maintenance personnel intervention. It is recommended that slip counts **should not** be reset unless you are diagnosing slip count problems.

The System Clock Synchronizer (SCS) circuit pack (TN463) has six yellow LEDs.

1. LED positions one and two are dedicated to the primary and secondary synchronization reference sources respectively. If either of these LEDs are lighted, it indicates the associated reference is unusable.
2. When lighted, LED positions 14, 15, and 16 indicate which reference is on-line.
3. LED position 14 is for the High Accuracy Clock (HAC), position 15 is for the primary reference, and position 16 is for the secondary reference.
4. LED position 17 is used for duplicated TMS carriers. When lighted, it indicates that the synchronization reference in this TMS carrier is being driven by the on-line reference in the on-line TMS carrier.

To assist in troubleshooting network problems, Test 2 can be used to prevent an automatic reference switch by periodic software and/or hardware from taking place by disabling the automatic reference switch.

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. When Test 2 is initially called in, the following is displayed:

   Field 1 - 2.

   Field 2 - Facility type (dash = SCS, 1 = DS-1, 2 or 3 = RCG).

   Fields 3 through 6 - Equipment location of the on-line reference.

   Field 7 - Reference indication (0 = high accuracy clock, 1 = primary reference, 2 = secondary reference).

   NOTE

   The **YELLOW** LED on TN463 is lighted in position 14, 15, or 16 indicating the type of reference.

   Field 8 - Switch status (0 = disable switch of reference).

   Fields 9 through 12 - Dashed.

   Field 13 - Dash, 0, or number of switches that occurred (maximum of 8) for the reference displayed in Fields 3 through 6.

   Field 14 - Dash or day of month the switch occurred.

   Field 15 - Dash or hour of day the switch occurred.

   Field 16 - Dash or minute of day the switch occurred.

   Field 17 - Dash or switch cause (0 through 9).

   NOTE

   Fields 14 through 16 display the time the latest switch occurred. Field 17 indicates the health of the reference just before it was switched off-line or the software/craft request.

3. Field 8 is blinking, indicating an optional entry field.

   To switch the on-line reference displayed in Fields 3 through 6, proceed to Step 4.

4. To enable the switch of references, Field 8 must be changed to a 1. Either **ENTER** or the **CHANGE FIELD** sequence can be used:

   1, ENTER.

   CHANGE FIELD; 8; ENTER; 1; ENTER.

5. Depress **EXECUTE**.

6. Special error code 80 (I/O failure) may be displayed in the **MAAP** error code field when **EXECUTE** is depressed indicating that Test 2 cannot be performed.

   If special error code 80 is not displayed, proceed to Step 8.

7. When special error code 80 is displayed, repeat Test 2.

   If special error code 80 is not displayed again, proceed to Step 8.

   If special error code 80 is displayed again, perform **PROC 611** to test the common control I/O channels and/or **PROC 620** to test TN380 (module processor) or TN381 (TMS processor).

8. When the switch is successful, the following is displayed:

   Field 1 - 2.

   Field 2 - Facility type (1 = DS-1, 2 or 3 = RCG circuit pack).

   Fields 3 through 6 - Equipment location of the new on-line reference.

   Field 7 - Reference indication (l = primary reference, 2 = secondary reference).

   Field 8 - Switch status (0 = disable switch of reference).

   Field 9 - 0 (if automatic switch of references is allowed).

   Fields 10 through 12 - Dashed.

   Field 13 - Dash, 0, or number of switches that occurred (maximum of 8) for the reference displayed in Fields 3 through 6.

   Field 14 - Dash or day of month the switch occurred.

   Field 15 - Dash or hour of day the switch occurred.

   Field 16 - Dash or minute of day the switch occurred.

   Field 17 - Dash or switch cause (0 through 9).

   NOTE

   Fields 14 through 16 display the time the switch occurred. Field 17 indicates the health of the reference just before it was switched off-line or the software/craft request.

9. After the switch is successful, Fields 3 through 7 are updated with a new on-line equipment location.

   Test 2 always displays the on-line reference.

   NOTE

   After a reference is switched, the system slip count is automatically reset.

10. After a successful reference switch, the automatic recovery mechanism will probably switch back to the original reference.

    If you want the switch reference (that you switched) to stay on-line, perform the steps listed under disabling of the automatic reference switching below to disable the automatic reference switching.

11. The cause and time of the switch is updated in status memory and the yellow LED in position 15 or 16 of TN463 changes when the switch is successful.
12. If the switch failed, Fields 3 through 6 display the original on-line reference, and Field 8 displays an encode indicating the reason the switch failed (3 = I/O failure, 4 = unusable reference, 5 = not administered, and 6 = maintenance busied).

    In addition, Fields 13 through 17 (switch time and cause) remain the same as when Test 2 was first entered.
13. When Field 13 is greater than 1, depressing **NEXT DATA** decrements Field 13 and displays (in Fields 14 through 17) when the next to last switch occurred and the cause of the switch.
14. Depressing **NEXT DATA** repeatedly displays the remaining switches that occurred.

    When the last switch is displayed, depressing **NEXT DATA** again dashes Fields 13 through 17.

    Depressing **NEXT DATA** once more begins the sequence over starting with the latest switch that occurred.
15. The **CLEAR DATA; EXECUTE** sequence can be used to clear the table of last 8 switches before or after **EXECUTE** is used to initiate Test 2.

    NOTE

    Upon entry to Test 2, the table of last 8 switches can be cleared without determining the cause or time of any switch that may have occurred.
16. To clear the table of last 8 switches for the reference(s) before or after **EXECUTE** is used to initiate Test 2, perform the following:

    NOTE

    Fields 13 through 17 must not be dashed. Error code 00 (wrong key) is displayed in the **MAAP** error code field when **CLEAR DATA; EXECUTE** is depressed if Fields 13 through 17 are dashed (indicating no switches have occurred).

    Depress **CLEAR DATA; EXECUTE**.

    Fields 13 through 17 display dashes indicating the table of last 8 switches for the reference(s) is cleared.

The system slip counts can be reset in Test 2 when **tape issue 1.1 or later** is being used.

NOTE

Slip counts are reset every 24 hours without maintenance personnel intervention. It is recommended that slip counts **should not** be reset unless you are diagnosing slip count problems.

To reset the slip counts when **tape issue 1.1 or later** is being used, perform the following:

1. Depress **CHANGE FIELD; 8; ENTER; 2; ENTER**.
2. Depress **EXECUTE**.

   After the slip counts are reset, Field 8 changes to 0.

Automatic reference switching can be disabled while maintenance personnel are working on the digital network and reenabled when the tasks are completed.

When disabled, automatic reference switching by software periodics and the hardware SCS circuit pack (TN463) cannot be performed.

CAUTION

Disabling of the automatic reference switching feature for a prolonged period of time could become service affecting by impairing the recovery mechanism of the switch.

Disabling of the automatic reference switching is performed as follows:

1. Enter Test 2 of **PROC 625**.
2. Determine the type of automatic reference switching to be disabled; i.e., 1 = disable software switch, 2 = disable software and hardware switch.

   NOTE

   If Test 2 of **PROC 625** is exited with a 2 (software and hardware switch disabled) displayed in Field 9, the automatic switch disable is automatically changed to a 1 (software switch disabled). This allows the hardware to switch to the HAC if the reference is lost or unusable. The change from 2 to 1 is not visible to maintenance personnel.

3. To disable the automatic reference switching, Field 9 must be changed to a 1 (software) or 2 (software and hardware). The **CHANGE FIELD** sequence must be used to disable automatic reference switching:

   CHANGE FIELD; 9; ENTER; (1 or 2); ENTER.

4. Depress **EXECUTE**.
5. If Test 2 of **PROC 625** is exited with a 2 (software and hardware switch disabled) displayed in Field 9, the automatic switch disable is automatically changed to a 1 (software switch disabled). This allows the hardware to switch to the HAC if the reference is lost or unusable. The change from 2 to 1 is not visible to maintenance personnel.

   CAUTION

   If **PROC 625** is exited with automatic reference switching disabled 1 (software switch disabled) or 2 (software and hardware switch disabled) displayed in Field 9, a soft switch of references cannot be performed.

6. Prior to exiting **PROC 625** reenable the automatic reference switching feature by performing the **CHANGE FIELD** sequence and depressing **EXECUTE**:

   CHANGE FIELD; 9; ENTER; 0; ENTER; EXECUTE.

PROC 630 - BUSY OUT/RELEASE BUSY OUT

Purpose

PROC 630 is used to determine the maintenance busy out status of terminals, trunks, or tone plants.

Both the total number of busied out circuits and the equipment location of each circuit of the current test type is displayed.

In addition, **PROC 630** provides the capability to busy out or release from busy terminals, trunks, or tone plants.

When all terminals, trunks, and tone plants are released from busy, the **BUSY OUT** indicator on the **MAAP** is turned off.

If the **BUSY OUT** indicator on the **MAAP** is still lighted after all terminals, trunks, and tone plants are released from busy the cause is probably a soft lock of the network or TMS duplication channel.

Use **PROC 621** Test 2 to release the soft lock of the network or TMS duplication channel and the **BUSY OUT** indicator on the **MAAP** should go off.

Field Definitions and Codes

Each field of **PROC 630** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AP, PROC 630 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6, before **EXECUTE** - Select module, cabinet, carrier, slot, and circuit to determine the maintenance busy out status of a particular terminal (Test 1), or trunk (Test 2).

   If more than one circuit of a particular type (terminal or trunk) is busied out, the display defaults to the lowest equipment number of that type busied out upon depressing **EXECUTE**.

3. Fields 4 through 6, before **EXECUTE** - Select carrier, slot, and circuit to determine the maintenance busy out status of a particular terminal (Test 1), or trunk (Test 2).

   If more than one circuit of a particular type (terminal or trunk) is busied out, the display defaults to the lowest equipment number of that type busied out upon depressing **EXECUTE**.

4. Fields 2 through 5, before **EXECUTE** - Select module, cabinet, carrier, and slot to determine the maintenance busy out status of a particular tone plant or auxiliary tone plant (Test 3).

   If more than one tone plant or auxiliary tone plant is busied out, the display defaults to the lowest equipment number busied out upon depressing **EXECUTE**.

5. Fields 4 and 5, before **EXECUTE** - Select carrier and slot to determine the maintenance busy out status of a particular tone plant or auxiliary tone plant (Test 3).

   If more than one tone plant or auxiliary tone plant is busied out, the display defaults to the lowest equipment number busied out upon depressing **EXECUTE**.

6. Fields 2 through 6, after **EXECUTE** - Select module, cabinet, carrier, slot, and circuit of a particular terminal (Test 1) or trunk (Test 2) to determine the maintenance busy out status or to maintenance busy out the displayed circuit.

7. Fields 2 through 5, after **EXECUTE** - Select module, cabinet, carrier, and slot of a particular tone plant or auxiliary tone plant (Test 3) to determine the maintenance busy out status or to maintenance busy out the displayed circuit.

Table 5-43.

PROC 630 - FIELD DEFINITIONS AND CODES		
FIELD	CODE	DEFINITION
1	1-3	Test number
2	0-30	Module number
3	0-7	Cabinet number
4	0-3	Carrier number
5	0-21	Slot number
6	0-7	Circuit number
7	0 1 2	Maintenance busy status: Not busied Demand busied Automatic busied
8	0-999	Number of circuits busied out in the current test
9	1-999	Indicates which circuit, of a group of busied out circuits, is being displayed.

Operation of Procedure

Overview

PROC 630 is used to determine the status of maintenance busy out circuits, and to busy out or release from busy terminals, trunks, or tone plants/auxiliary tone plants.

To call in **PROC 630**, perform the following:

1. Depress **PROC NO; 630; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays busied out terminals and provides the capability to busy out or release from busy terminals.
2. Test 2 - Displays busied out trunks and provides the capability to busy out or release from busy trunks.
3. Test 3 - Displays busied out tone plants (including auxiliary tone plants) and provides the capability to busy out or release from busy tone plants and auxiliary tone plants.

Test 1

Test 1 displays the maintenance busy out status of terminals connected to analog line ports and provides the capability to busy out or release from busy terminals.

NOTE

Use **PROC 632** to determine the busy out status or to busy out terminals connected to digital line ports.

1. Test 1 is the default test when entering **PROC 630**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. Field 8 displays a 0 if no terminals are busied out.
4. When terminals are maintenance busied, the first of the busied out terminals (by lowest equipment number) is displayed as follows:

   Fields 2 through 6 - Busied out terminal equipment location.

   Field 7 - Busy out status (0 = not busied; 1 = demand busied; 2 = automatic busied).

   Field 8 - Total number of busied out terminals.

   Field 9 - 1 (Indicating first busied out terminal).

5. Field 2 flashes indicating an optional entry field.

   Either the terminals busied out can be displayed in order using **NEXT CIRCUIT** or a specific terminal can be selected for display to determine the maintenance busy or **IN USE** status (See Step 8 below).

6. Depressing **NEXT CIRCUIT** repeatedly displays each of the busied out terminals.

   When all busied out terminals are displayed, depressing **NEXT CIRCUIT** dashes the display except for Field 1.

   Depressing **NEXT CIRCUIT** again starts Test 1 over.

7. To change the busy out status of an individual terminal, depress **RLS BUSY OUT** when the terminal is displayed.

   To release all busied out terminals, depress **CLEAR DATA; EXECUTE**.

   NOTE

   CLEAR DATA; EXECUTE can only be used after **EXECUTE** is depressed to initiate Test 1.

8. If the maintenance busy or **IN USE** status of a particular terminal is to be determined, selection can be made, after **EXECUTE** is depressed in Step 2 above, using one of the following methods:

   CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**; **(Circuit); ENTER; NEXT DATA**.

   (Module number); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER; NEXT DATA**.

9. **NEXT DATA** displays the maintenance busy or **IN USE** status of the terminal selected.

   NOTE

   When the **IN USE** indicator on the **MAAP** is lighted, the displayed terminal is active on a connection. Field 7 displays a 0 indicating the terminal is not maintenance busy. The **IN USE** indicator is turned on with the operation of **NEXT DATA** and remains lighted until the displayed terminal becomes idle or **BUSY OUT** is depressed.

10. After selecting a terminal for display to determine the maintenance busy or **IN USE** status by using the **CHANGE FIELD** sequence, or by entering the equipment location, depressing **NEXT CIRCUIT** displays the first busied out terminal as if **EXECUTE** had been depressed.

    The fields and contents displayed are the same as when Test 1 is first executed.

11. To busy out a terminal:

    Execute Test 1.

12. If any terminals are busied out, use **NEXT CIRCUIT** to determine if the terminal is already busied out.

13. If no terminals are busied out, or the terminal to be busied out is not displayed by use of **NEXT CIRCUIT**, refer to Step 8 above to select the terminal to be busied out.

14. Depress **NEXT DATA** to determine if the terminal is in-use.

    NEXT DATA must be used before **BUSY OUT** can be used.

15. The **IN USE** indicator on the **MAAP** lights if the terminal is in-use.

CAUTION

Do not busy out a terminal that is not idle unless absolutely necessary. Operation of BUSY OUT busies a terminal that is in use and terminates the connection.

16. Depress **BUSY OUT**.

Test 2

Test 2 displays the maintenance busy status of trunks and provides the capability to busy out or release from busy trunks.

1. Test 2 is selected by **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress **EXECUTE**.
3. Field 8 displays a 0 if no trunks are busied out.
4. When trunks are maintenance busied, the first of the busied out trunks is displayed as follows:

   Fields 2 through 6 - Busied out trunk equipment location.

   Field 7 - Busy out status (0 = not busied; 1 = demand busied; 2 = automatic busied).

   Field 8 - Total number of busied out trunks.

   Field 9 - 1 (Indicating first busied out trunk).

5. Field 2 flashes indicating an optional entry field.

   Either the trunks busied out can be displayed in order using **NEXT CIRCUIT** or a specific trunk can be selected for display to determine the maintenance busy or **IN USE** status (See Step 8 below).

6. Depressing **NEXT CIRCUIT** repeatedly displays each of the busied out trunks.

   When all busied out trunks are displayed, depressing **NEXT CIRCUIT** dashes the display except for Field 1.

   Depressing **NEXT CIRCUIT** again starts Test 2 over.

7. To change the busy out status of an individual trunk, depress **RLS BUSY OUT** when the trunk is displayed.
8. To release all busied out trunks, depress **CLEAR DATA; EXECUTE**.

NOTE

CLEAR DATA; EXECUTE can only be used after **EXECUTE** is depressed to initiate Test 2.

9. If the maintenance busy or **IN USE** status of a particular trunk is to be determined, selection can be made, after **EXECUTE** is depressed in Step 2 above, using one of the following methods.

CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**; **(Circuit); ENTER; NEXT DATA**.

(Module number); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER; NEXT DATA**.

10. **NEXT DATA** displays the maintenance busy or **IN USE** status of the trunk selected.

NOTE

When the **IN USE** indicator on the **MAAP** is lighted, the displayed trunk is active on a connection. Field 7 displays a 0 indicating the trunk is not maintenance busy. The **IN USE** indicator is turned on with the operation of **NEXT DATA** and remains lighted until the displayed trunk becomes idle or **BUSY OUT** is depressed.

11. After selecting a trunk for display to determine the maintenance busy or **IN USE** status by using the **CHANGE FIELD** sequence, or by entering the equipment location, depressing **NEXT CIRCUIT** displays the first busied out trunk as if **EXECUTE** had been depressed.

    The fields and contents displayed are the same as when Test 2 is first executed.

12. To busy out a trunk:

    Execute Test 2.

13. If any trunks are busied out, use **NEXT CIRCUIT** to determine if the trunk is already busied out.

14. If no trunks are busied out, or the trunk to be busied out is not displayed by use of **NEXT CIRCUIT**, refer to Step 8 above to select the trunk to be busied out.

15. Depress **NEXT DATA** to determine if the trunk is in-use.

    NEXT DATA must be used before **BUSY OUT** can be used.

16. The **IN USE** indicator on the **MAAP** lights if the trunk is in-use.

CAUTION

Do not busy out a trunk that is not idle unless absolutely necessary. Operation of BUSY OUT busies a trunk that is in use and terminates the connection.

17. Depress **BUSY OUT**.

Test 3

Test 3 displays the maintenance busy out status of tone plants and auxiliary tone plants. Test 3 also provides the capability to busy out or release from busy tone plants and auxiliary tone plants.

1. Test 3 is selected by **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. To start Test 3, depress **EXECUTE**.

3. Field 8 displays a 0 if no tone plants or auxiliary tone plants are busied out.

4. When tone plants or auxiliary tone plants are maintenance busied, the first of the busied out tone plants or auxiliary tone plants is displayed as follows:

   Fields 2 through 5 - Busied out tone plant or auxiliary tone plant equipment location.

   Field 7 - Busy out status (0 = not busied; 1 = demand busied; 2 = automatic busied).

   Field 8 - Total number of busied out tone plants and auxiliary tone plants.

   Field 9 - l (Indicating first busied out tone plant or auxiliary tone plant).

5. Field 2 flashes indicating an optional entry field.

   Either the tone plants/auxiliary tone plants can be displayed in order using **NEXT CIRCUIT** or a specific tone plant/auxiliary tone plant can be selected for display to determine the maintenance busy status (See Step 9 below).

6. Depressing **NEXT CIRCUIT** repeatedly displays each of the busied out tone plants/auxiliary tone plants.

7. When all busied out tone plants/auxiliary tone plants are displayed, depressing **NEXT CIRCUIT** dashes the display except for Field 1.

   Depressing **NEXT CIRCUIT** again starts Test 3 over.

8. To change the busy out status of an individual tone plant/auxiliary tone plant, depress **RLS BUSY OUT** when the tone plant/auxiliary tone plant is displayed.

9. To release all busied out tone plants/auxiliary tone plants, depress **CLEAR DATA; EXECUTE**.

   NOTE

   CLEAR DATA; EXECUTE can only be used after **EXECUTE** is depressed to initiate Test 3.

10. If the maintenance busy status of a particular tone plant/auxiliary tone plant is to be determined, selection can be made, after **EXECUTE** is depressed in Step 2 above, using one of the following methods:

    CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**; **NEXT DATA**.

    (Module number); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; NEXT DATA**.

    NOTE

    To select a tone plant or auxiliary tone plant for display or to busy out a tone plant or auxiliary tone plant, Field 6 (circuit) is not a required entry.

11. **NEXT DATA** displays the maintenance busy status of the tone plant/auxiliary tone plant selected.

    When **NEXT DATA** is depressed, the **IN USE** indicator on the **MAAP** is **not** lighted.

12. After selecting a tone plant/auxiliary tone plant for display to determine the maintenance busy status by using the **CHANGE FIELD** sequence, or by entering the equipment location, depressing **NEXT CIRCUIT** displays the first busied out tone plant/auxiliary tone plant as if **EXECUTE** had been depressed.

    The fields and contents displayed are the same as when Test 3 is first executed.

13. To busy out a tone plant/auxiliary tone plant:

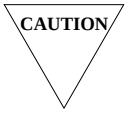
    Execute Test 3.

14. If any tone plants/auxiliary tone plants are busied out, use **NEXT CIRCUIT** to determine if the tone plant/auxiliary tone plant is already busied out.

15. If no tone plants/auxiliary tone plants are busied out, or the tone plant/auxiliary tone plant to be busied out is not displayed by use of **NEXT CIRCUIT**, refer to Step 8 above to select the tone plant/auxiliary tone plant to be busied out.

    NEXT DATA must be used before **BUSY OUT** can be used.

16. When **NEXT DATA** is depressed, the **IN USE** indicator on the **MAAP** is **not** lighted.



When a tone plant or auxiliary tone plant is busied out, some capability of generating tones is removed from the system. All tone plants or all auxiliary tone plants should not be busied out at the same time.

17. Depress **BUSY OUT**.

PROC 631 - TRUNK GROUP BUSY OUT

Purpose

PROC 631 is used to determine the maintenance busy out status of individual trunks in a trunk group or the maintenance busy out status of an entire trunk group.

PROC 631 displays the total number of maintenance busied out trunks and the equipment location of each trunk of the current trunk group and its busied out status.

PROC 631 is used to maintenance busy out or release busy out all trunks in a trunk group or to step through the trunks in a trunk group and selectively busy out or release busy out individual trunks.

Field Definitions and Codes

Each field of **PROC 631** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AQ, PROC 631 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Field 2 - Select trunk group number to determine the maintenance busy status of a particular trunk group (Test 1 only).
3. Fields 8 through 12 - Select individual trunk equipment location to determine the maintenance busy status of a particular trunk (Test 2 only).

Operation of Procedure

Overview

PROC 631 is used to determine the maintenance busy out status of trunk groups or individual trunks in a trunk group, and to busy out or release from busy an entire trunk group or individual trunks within a trunk group.

Table 5-44.

PROC 631 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-2	Test number.	8	0-30	Module number.
2	17-255	Trunk group number.	9	0-7	Cabinet number.
3	1-9	First digit of dial access code.	10	0-3	Carrier number.
			11	0-21	Slot number.
	11,12	Encode 11 equals touch-tone*; 12 equals touch-tone#.	12	0-3	Circuit number.
			13		Maintenance busy status:
4	0-9	Second digit of dial access code.		0	Not busied out.
5	0-9	Third digit of dial access code.		1	Demand busied.
6	0-255	Number of trunks in trunk group.		2	Automatic busied.
7	0-255	Number of trunks busied out in the trunk group.	14	0-255	Position of the trunk within the trunk group.

To call in **PROC 631**, perform the following:

1. Depress **PROC NO; 631; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 2 displays the smallest trunk group number, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Displays the busy out status of an entire trunk group and provides the capability to busy out or release from busy an entire trunk group.
2. Test 2 - Displays the busy out status of individual trunks within a trunk group and provides the capability to busy out or release from busy an individual trunk within a trunk group.

Test 1

Test 1 is used to busy out or release from busy an entire trunk group.

1. Test 1 is the default test when entering **PROC 631**, or is selected by using **NEXT TEST**.
2. When Test 1 is selected, the smallest trunk group number in the switch is flashed in Field 2, indicating an optional entry field.

3. Either the trunk group displayed may be used or another trunk group may be selected.

   To use the trunk group displayed, **ENTER** is depressed, causing Field 2 to stop flashing.

4. Selection of another trunk group can be accomplished by one of the following three methods (Refer to Steps 5 through 7).

5. **(Trunk group number); ENTER**.

6. **CHANGE FIELD; 2; ENTER; (Trunk group number); ENTER**.

7. Depressing **NEXT UNIT** to sequence through all the trunk groups in the switch until the trunk group to be tested is displayed in Field 2.

   When all trunk group numbers are displayed, depressing **NEXT UNIT** dashes Fields 2 through 14. Depressing **NEXT UNIT** once more displays the smallest trunk group number again, starting the sequence over.

8. To start Test 1, select the trunk group to be displayed, and depress **EXECUTE**.

9. Trunk group information is displayed as follows:

   Field 2 - Trunk group number.

   Fields 3 through 5 - Dashed or dial access code of first trunk in the trunk group.

   Field 6 - Number of trunks in the trunk group.

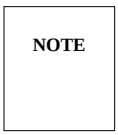
   Field 7 - Number of trunks busied out in the trunk group.

   Fields 8 through 12 - Equipment location of the first trunk in the trunk group.

   Field 13 - Maintenance busy status of the first trunk. (0 = not busied; 1 = demand busied; 2 = automatic busied.)

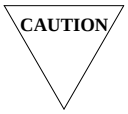
   Field 14 - Trunk position in the trunk group.

10. Depressing **BUSY OUT** or **RLS BUSY OUT** changes the status of the selected trunk group.



Special error code 80 may be displayed in the **MAAP** error code field and is defined as follows: More than 255 trunks are in the trunk group. **PROC 631** will not busy out or release from busy more than 255 trunks. Use **PROC 630** (Busy Out/Release Busy Out) or **PROC 632** (Carrier Busy) to busy out or release from busy the rest of the trunks.

11. To release the entire trunk group from maintenance busy, depress **RLS BUSY OUT**.



Depressing BUSY OUT can drop customer calls in the entire trunk group.

12. To busy out an entire trunk group, depress **BUSY OUT**.

Test 2

Test 2 is used to busy out or release from busy individual trunks within a trunk group.

Test 2 can also be used to search for the trunk group number of a trunk circuit.

1. Test 2 is selected by use of **NEXT TEST**.
2. When Test 2 is entered, either the equipment location of the first trunk in the last trunk group selected in Test 1 is displayed in Fields 8 through 12 or Field 8 is blanked and Fields 9 through 12 are dashed.
3. When an equipment location is displayed, Field 8 is flashed, indicating an optional entry.

   Either the trunk displayed can be used or another trunk can be selected.
4. Selection of another trunk can be accomplished in two ways (Refer to Steps 5 and 6).
5. Depressing **NEXT CIRCUIT** to sequence through all the trunks in the trunk group displayed until the trunk to be tested is displayed in Fields 8 through 12.

   When all the trunks in the trunk group are displayed, depressing **NEXT CIRCUIT** again dashes Fields 8 through 12. Depressing **NEXT CIRCUIT** once more starts the sequence over with the first trunk in the trunk group.
6. When Field 8 is flashing, the equipment location of another trunk can be entered in Fields 8 through 12 as follows:

   (Module number); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**.
7. When Field 8 is blanked, the decimal point in the field is flashed to indicate a mandatory entry. The equipment location of a trunk must be entered in Fields 8 through 12 as follows:

   (Module number); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**.

   NOTE

   When Field 8 is blanked, the **CHANGE FIELD** sequence cannot be used.
8. To start Test 2, select the trunk to be displayed, and depress **EXECUTE**.
9. Trunk information is displayed as follows:

   Field 2 - Trunk group number for the equipment location.

   Fields 3 through 5 - Dial access code (if any) for the trunk equipment location.

   Fields 8 through 12 - Equipment location of the trunk.

   Field 13 - Maintenance busy status of the first trunk. (0 = not busied; 1 = demand busied; 2 = automatic busied.)

   Field 14 - Position of the trunk in the trunk group.
10. Depressing **BUSY OUT** or **RLS BUSY OUT** changes the status of the selected trunk.

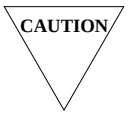
    NOTE

    Special error code 80 may be displayed in the **MAAP** error code field and is defined as follows: More than 255 trunks in the group. Use **PROC 630** or **PROC 632** to busy out or release busy out the trunk.
11. Trunks that are omitted (when more than 255 trunks are in a trunk group) are those with the higher internal trunk numbers.

12. If an equipment location of a trunk that is omitted is entered in Test 2, the first trunk of that trunk group will be displayed upon depressing **EXECUTE**.

    This indicates that **PROC 630** or **PROC 632** must be used to busy out or release busy the trunk entered.

13. To release the trunk from maintenance busy, depress **RLS BUSY OUT**.



Depressing BUSY OUT can drop a customer's call.

14. To busy out the trunk, depress **BUSY OUT**.

To search for the trunk group number of a trunk circuit, perform the following:

1. Enter the equipment location of the trunk circuit in Fields 8 through 12.
2. Depress **EXECUTE**.
3. Information for the trunk circuit being searched is displayed as follows:

   Field 2 - Trunk group number for the equipment location.

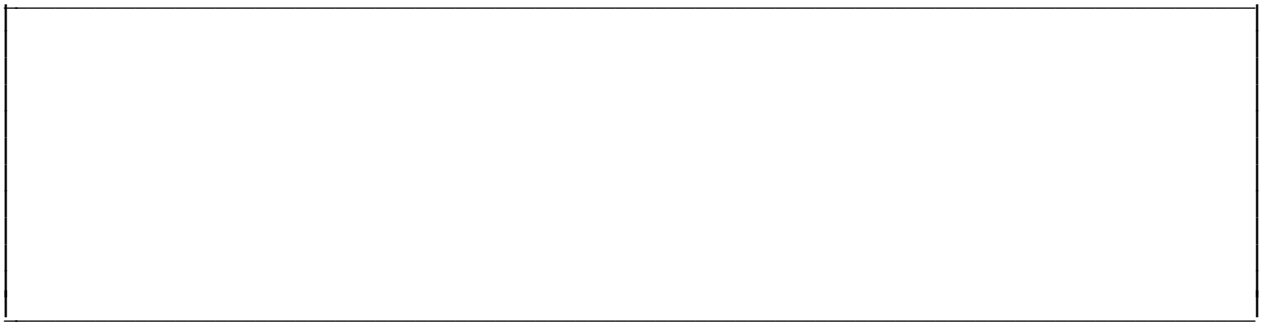
   Fields 3 through 5 - Dial access code (if any) for the trunk equipment location.

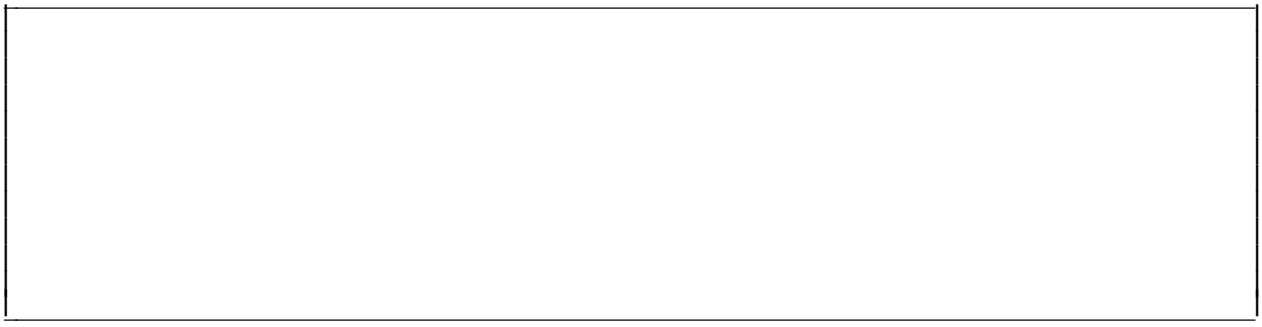
   Fields 8 through 12 - Equipment location of the trunk.

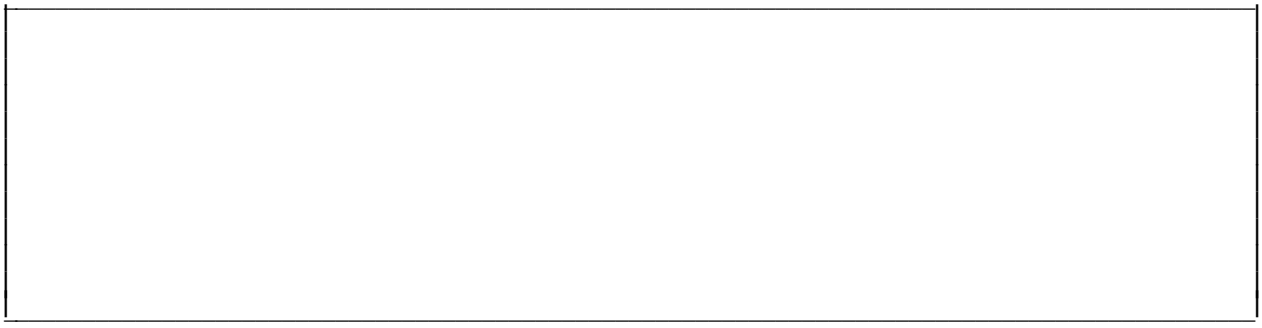
   Field 13 - Maintenance busy status of the trunk. (0 = not busied; 1 = demand busied; 2 = automatic busied.)

   Field 14 - Position of the trunk in the trunk group.

PROC 632 - CARRIER BUSY







Purpose

PROC 632 is used to determine the maintenance busy out status of carriers. Both the total number of busied out circuits in a carrier and the total number of carriers with busied out circuits are displayed.

PROC 632 finds carriers that are completely or partially busied out and displays information pertinent to the carriers.

In addition, **PROC 632** provides the capability to busy out or release from busy a complete carrier or circuits within a carrier.

The maintenance busy status of tone plants and/or auxiliary tone plants cannot be changed using this procedure. **PROC 630 must** be used to change the maintenance busy status of tone plants and/or auxiliary tone plants.

Test 3 of **PROC 632** can also be used to determine the type of task which maintenance busied the circuit displayed in Fields 2 through 6.

Field Definitions and Codes

Each field of **PROC 632** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AR, PROC 632 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 4 - Select a specific carrier in a cabinet of a module to determine the maintenance busy out status or to busy out or release from busy the specific carrier (Test 2 only).
3. Fields 2 through 6 - Select a specific circuit within a carrier to determine the maintenance busy out status or to busy out or release from busy the specific circuit (Test 3 only).

Operation of Procedure

Overview

PROC 632 is used to determine the status of maintenance busied out carriers, or maintenance busied out circuits within carriers, and to busy out carriers or circuits within carriers.

To call in **PROC 632**, perform the following:

1. Depress **PROC NO; 632; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Table 5-45.

PROC 632 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	8 (Contd)	5	Auxiliary tone plant maintenance periodic task.
2	0-30	Module number.			
3	0-7	Cabinet number.		6	Auxiliary trunk maintenance periodic task.
4	0-3	Carrier number.			
5	0-21	Slot number.		7	Circuit select (port maintenance test controller) periodic task.
6	0-7	Circuit number.			
7	1-3	Carrier type:		8	CO trunk maintenance periodic task.
	1	Normal port carrier.		9	Modem pool call processing periodic task.
	2	DS-1/MFAT carrier.			
	3	Other.		10	Data linkage audit task.
8	0-2	Maintenance busy status: (Test 1 and Test 2):		11	Data port maintenance time available task.
	0	Not busied out.		12	DID trunk maintenance periodic task.
	1	Busied out.		13	Digital service (DS-1) maintenance periodic task.
	2	Partially busied carrier.			
8	1-647	Maintenance busied by (Test 3):		14	EIA port maintenance time available task.
	1	Abbreviated dial tone periodic test.		15	Hyperactive terminal maintenance periodic test.
	2	Automatic transmission measurement system periodic task.		16	Facility test circuit maintenance periodic task.
	3	Attendant conference maintenance time available task.		17	GPP maintenance time available task.
	4	Abbreviated touch-tone periodic test.		18	Line circuit maintenance time available task.

Table 5-45. (Contd)

PROC 632 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
8 (Contd)	19	MLP maintenance time available task.	8 (Contd)	202	Auxiliary tone plant maintenance demand task.
	20	Modem pool facility maintenance periodic task.		203	Auxiliary trunk maintenance demand task.
	21	Modem pool maintenance scheduler periodic task.		204	Circuit select (port maintenance) demand task.
	22	Operational error processing periodic task.		205	CO trunk maintenance demand task.
	23	Status memory audits task.		206	Data port maintenance demand task.
	24	Tie trunk maintenance periodic task.		207	DID trunk maintenance demand task.
	25	Tone detector maintenance time available task.		208	Digital service (DS-1) maintenance demand task.
	26	Call progress tone maintenance periodic task.		209	EIA port maintenance demand task.
	27	Touch-tone sender receiver periodic task.		210	Facility test circuit maintenance demand task.
	28	Dedicated switch connection demand task.		211	GPP port maintenance demand task.
	200	Automatic transmission measurement system demand task.		212	Line circuit maintenance demand task.
	201	Attendant conference maintenance demand task.		213	MLP port maintenance demand task.

Table 5-45. (Contd)

PROC 632 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
8 (Contd)	214	Modem pooling facility maintenance demand task.	8	631	Procedure 631 demand task.
	215	Terminal maintenance demand task.		632	Procedure 632 demand task.
	216	Tie trunk maintenance demand task.		640	Procedure 640 demand task.
	217	Tone detector maintenance demand task.		646	Procedure 646 demand task.
	218	Call progress tone plant maintenance demand task.		647	Procedure 647 demand task.
	219	Touch-tone sender receiver maintenance demand task.	9	0-30	Total modules in system.
	220	Trunk verification by station maintenance demand task.	10	1-8	Total cabinets in module.
	620	Procedure 620 demand task.	11	1-4	Total carriers in cabinet.
	622	Procedure 622 demand task.	12	1-154	Total circuits in carrier.
	623	Procedure 623 demand task.	13	1-154	Total circuits busied out in carrier.
	630	Procedure 630 demand task.	14	1-700	Running total of carriers with busy circuits found in Test 1 (Test 1 only).
				16-72	Unit type of port circuit displayed in Fields 2 through 6 (Test 3 only).

Three tests are available:

1. Test 1 - Searches for and displays completely or partially busied out carriers.
2. Test 2 - Provides the capability to busy out or release from busy a complete carrier.
3. Test 3 - Provides the capability to busy out or release from busy individual circuits within a carrier.

Test 1

Test 1 is used to find a carrier that is completely or partially busied out. The carrier can then be released from busy out, or if partially busied out can be completely busied out.

Test 1 is useful for returning a cabinet to service after a total cabinet outage.

1. Test 1 is the default test when entering **PROC 632**, or is selected by using **NEXT TEST**.
2. When Test 1 is initially called in, all fields are dashed except for a 1 in the test number field.
3. To start Test 1, depress **EXECUTE**.

   A search for a carrier that is busied out or partially busied out is started.
4. The display on the **MAAP** is continually updated while the test is executing until a carrier that is busied out or partially busied out is found (if any).
5. If no carriers are found which are completely or partially busied out, the **MAAP** displays a 1 in Field 1, a 0 in Field 14, and dashes in all other fields.
6. When a carrier is found that is completely busied out or partially busied out, the following information is displayed:

   Field 1 - 1.

   Fields 2 through 4 - Equipment location of carrier.

   Fields 5 and 6 - Dashed.

   Field 7 - Carrier type.

   Field 8 - Maintenance busy status of carrier. (0 = not busied out; 1 = busied out; 2 = partially busied out carrier.)

   Field 9 - Total modules in switch.

   Field 10 - Total cabinets in displayed module.

   Field 11 - Total carriers in displayed cabinet.

   Field 12 - Total circuits in displayed carrier.

   Field 13 - Total circuits busied out in displayed carrier.

   Field 14 - 1 (Indicating first carrier found with busied out circuits.)
7. Depressing **RLS BUSY OUT** releases from busy out the displayed carrier.

   RLS BUSY OUT releases all busied out circuits in a carrier or those circuits that are busied out in a partially busied out carrier.

8. Field 8 (maintenance busy status) displays a 0, Field 13 (total circuits busied out) displays a 0, and Field 14 changes from 1 to 0 when **RLS BUSY OUT** is depressed.

CAUTION

If a trunk or terminal that is up on a connection is busied out, the connection is dropped.

9. If the displayed carrier is partially busied out, depressing **BUSY OUT** busies out the rest of the circuits in the carrier.

NOTE

BUSY OUT can not be used to maintenance busy out a carrier in Test 1 unless the carrier is partially busied out, i.e., only carriers that are busied out or partially busied out are displayed in Test 1.

10. Fields 8 and 13 are updated to show that all circuits are busied out when **BUSY OUT** is depressed to busy out the rest of the circuits in a partially busied out carrier.
11. Depressing **EXECUTE** again with the **WAIT** indicator not lighted restarts the test and the search.

    The count of total carriers with busy circuits (Field 14) begins over when the test is restarted (i.e., 0 until a carrier is found (if any), then a 1 is displayed if a carrier is found).
12. Depressing **NEXT UNIT** after a busied out carrier is displayed finds the next carrier that is busied out or partially busied out.

    Field 14 is incremented if a busied out or partially busied out carrier is found.
13. When the last completely or partially busied out carrier in the system is displayed, depressing **NEXT UNIT** dashes all fields except the test number and total carriers with busy circuits fields (Fields 1 and 14).

NOTE

After the entire switch is searched for busy carriers and the display is dashed, depressing **BUSY OUT** or **RLS BUSY OUT** causes error code 10 to be displayed.

14. Depressing **NEXT UNIT** again causes Test 1 to be executed, starting the sequence over.

    The count of the total carriers with busy circuits (Field 14) starts over when the test is restarted (i.e., 0 until a carrier is found (if any), then a 1 is displayed if a carrier is found).

Test 2

Test 2 is used to busy out an entire carrier or release from busy a completely or partially busied out carrier.

Test 2 is useful for busying out a carrier or all carriers in a cabinet when making a repair that affects the entire carrier or cabinet.

1. Test 2 is selected by **NEXT TEST**.
2. When Test 2 is called in, a default carrier may be displayed in Fields 2 through 4.

   A completely or partially busied out carrier last displayed in Test 1 (if any) is the default carrier for Test 2.
3. Field 2 is flashed, indicating an optional entry field.

4. To execute Test 2, an equipment location must be entered in Fields 2 through 4.
5. Either the default carrier displayed can be tested or another carrier can be selected by entering its location in Fields 2 through 4, or by depressing **NEXT UNIT**.

   (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER.

   Proceed to Step 7.
6. Depressing **NEXT UNIT** searches for and tests the next equipped carrier without depressing **EXECUTE**.

   Proceed to Step 8.
7. To start Test 2, depress **EXECUTE**.
8. The status of the selected carrier is displayed as follows:

   Field 1 - 2.

   Fields 2 through 4 - Equipment location of carrier.

   Fields 5 and 6 - Dashed.

   Field 7 - Carrier type.

   Field 8 - Maintenance busy status of carrier. (0 = not busied out; 1 = busied out; 2 = partially busied out carrier.)

   Field 9 - Total modules in switch.

   Field 10 - Total cabinets in displayed module.

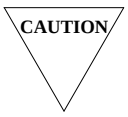
   Field 11 - Total carriers in displayed cabinet.

   Field 12 - Total circuits in displayed carrier.

   Field 13 - Total circuits busied out in displayed carrier.

   Field 14 - Dashed.
9. Depressing **RLS BUSY OUT** releases from busy the entire carrier displayed (all circuits in the carrier).

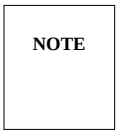
   Field 8 (maintenance busy status) displays a 0 and Field 13 (total circuits busied out) displays a 0 when **RLS BUSY OUT** is depressed.



If a trunk or terminal that is up on a connection is busied out, the connection is dropped.

10. Depressing **BUSY OUT** busies out the entire displayed carrier (all circuits in the carrier).

    Fields 8 and 13 are updated to show that all circuits are busied out.
11. Depressing **NEXT UNIT** finds the next equipped carrier in the switch and updates the display accordingly.
12. When the last carrier in the switch is displayed, depressing **NEXT UNIT** dashes all fields except the test number and total carriers with busy circuits fields (Fields 1 and 14).



After the display is dashed, depressing **BUSY OUT** or **RLS BUSY OUT** causes error code 10 to be displayed.

13. Depressing **NEXT UNIT** again causes Test 2 to be executed, starting the sequence over with the first equipped carrier.

Test 3

Test 3 is used to busy out or release from busy an individual circuit within a carrier.

Test 3 also displays in Field 8 (maintenance busy status) the type of task which maintenance busied the circuit displayed in Fields 2 through 6.

1. Test 3 is selected by **NEXT TEST**.
2. When Test 3 is called in, a default carrier may be displayed in Fields 2 through 4.

   A completely or partially busied out carrier last displayed in Test 1 or 2 (if any) is the default carrier for Test 3.

   The first busied out circuit within the carrier is displayed in Fields 5 and 6. Fields 7 and 8 display the carrier type and maintenance busy status of the circuit.
3. Field 2 is flashed, indicating an optional entry field.
4. To execute Test 3, an equipment location must be entered in Fields 2 through 6.
5. Either the default circuit displayed can be tested or another circuit can be selected by entering its equipment location in Fields 2 through 6, or by depressing **NEXT UNIT**.

   (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; **(Slot); ENTER; (Circuit); ENTER**.

   Proceed to Step 9.
6. Depressing **NEXT UNIT** searches for and finds the first busied out circuit in the next equipped carrier without depressing **EXECUTE**.

   Proceed to Step 10.
7. Depressing **NEXT FAULT** searches for the next busied out circuit in the carrier displayed or next equipped carrier without depressing **EXECUTE**.

   Proceed to Step 10.
8. Depressing **NEXT CIRCUIT** advances to the next equipped circuit in the carrier displayed or the next equipped carrier without depressing **EXECUTE**.

   Proceed to Step 10.
9. To start Test 3, depress **EXECUTE**.
10. The status of the selected circuit is displayed as follows:

    Field 1 - 3.

    Fields 2 through 6 - Equipment location of circuit.

    Field 7 - Carrier type.

Field 8 - Maintenance busied by type of task.

NOTE

Refer to Table AR, PROC 632 - Field Definitions and Codes for the definition of the encode displayed in Field 8 to determine the type of task that busied out the circuit displayed in Fields 2 through 6.

Field 9 - Total modules in switch.

Field 10 - Total cabinets in displayed module.

Field 11 - Total carriers in displayed cabinet.

Field 12 - Total circuits in displayed carrier.

Field 13 - Total circuits busied out in displayed carrier.

Field 14 - Unit type of port circuit.

NOTE

Refer to Table AS, PROC 632 - Definition of Port Circuit Unit Types for the definition of the encode displayed in Field 14.

11. Depressing **RLS BUSY OUT** releases from busy the displayed circuit location.

CAUTION

If a trunk or terminal that is up on a connection is busied out, the connection is dropped.

12. Depressing **BUSY OUT** busies out the displayed circuit location.
13. If Field 14 equals unit type 27 (GPP), **NEXT DATA** can be used to display the odd port peripheral busied out status.

    If Fields 8 and 14 are dashed, there is no odd port peripheral for the unit type 27 equipment location displayed in Fields 2 through 6.
14. If unit type 48 (odd port peripheral) is displayed in Field 14, the maintenance busied by type of task is displayed in Field 8.

    Depressing **NEXT DATA** again dashes Fields 8 and 14.
15. Depressing **NEXT CIRCUIT** advances to the next equipped circuit in the carrier displayed or the next equipped carrier and updates the **MAAP** display with its status.
16. Depressing **NEXT UNIT** advances the test to the next equipped circuit in the next equipped carrier and updates the **MAAP** display with its status.
17. Depressing **NEXT FAULT** finds the next busied out circuit in the carrier displayed or next equipped carrier and updates the **MAAP** with its status.
18. When the last circuit in the last carrier in the switch is displayed, depressing **NEXT CIRCUIT, NEXT UNIT** or **NEXT FAULT** once more dashes all fields except Field 1 (test number).

NOTE

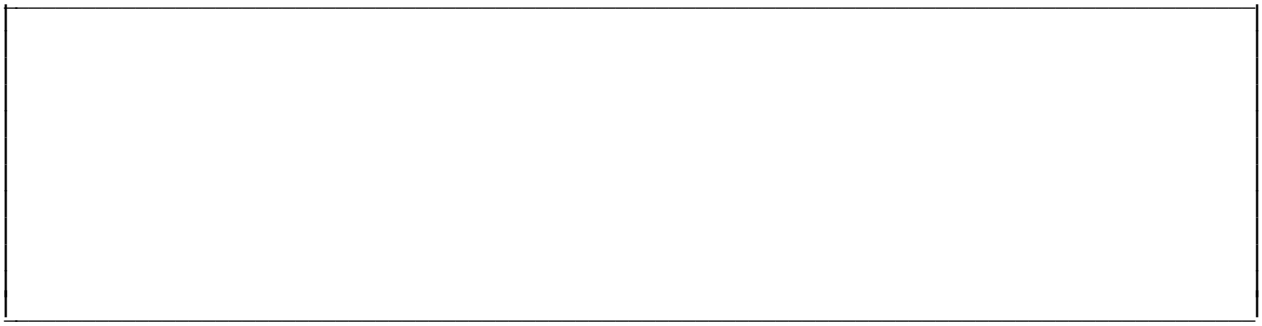
After the display is dashed, depressing **BUSY OUT** or **RLS BUSY OUT** causes error code 10 to be displayed.

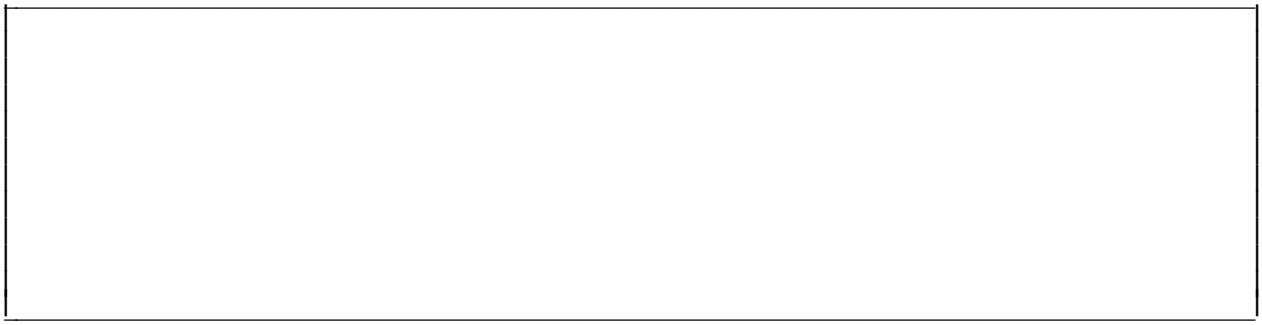
19. Depressing **NEXT CIRCUIT, NEXT UNIT** or **NEXT FAULT** again causes the first equipped carrier and the first busied out circuit in that carrier to be found and displayed.

Table 5-46.

PROC 632 - DEFINITION OF PORT CIRCUIT UNIT TYPES	
UNIT TYPE	PORT CIRCUIT DEFINITION
16	**Tone plant**
24	**Touch-tone sender**
25	**Touch-tone receiver**
27	**General purpose port (GPP)**
28	**72 series (MFET) port**
29	**Line circuit**
31	**Auxiliary tone plant**
32	**Central office (CO) trunk**
33	**Direct inward dialing (DID) trunk**
34	**Tie trunk/data port**
35	**Digital trunk**
44	**Attendant console interface**
45	**Auxiliary trunk**
46	**Attendant conference**
62	**Analog/digital facility test**
66	**Tone detector 2**
69	**Multifunctional analog terminal (MFAT)**
72	**EIA**

PROC 640 - TRUNK FAILURES





Purpose

PROC 640 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a trunk failure.

PROC 640 does not perform any trunk tests.

PROC 640 is used to:

1. Display the trunk failures detected during call processing.
2. Monitor trunk activity.

   The data displayed requires extensive call processing knowledge for interpretation.

Field Definitions and Codes

Each field of **PROC 640** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AT, PROC 640 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6 - Select equipment location of trunk to be monitored (Test 2 only).

Table 5-47.

PROC 640 - FIELD DEFINITIONS AND CODES		
FIELD	**CODE**	**DEFINITION**
1	1-2	Test number.
2	0-30	Module number.
3	0-7	Cabinet number.
4	0-3	Carrier number.
5	0-21	Slot number.
6	0-3	Number of circuit assigned to trunk
7		First digit of dial access code:
	1-9	1-9
	11	*
	12	#
8	0-9	Second digit of dial access code.
9	1-9	Third digit of dial access code.
10		Maintenance busy status:
	0	Not busied out.
	1	Busied out.
11		Failure code:
	1	Trunk signaling sequence failure.
	2	Call processing failure.
	3	Queue audit failure.
	4	Trunk falsely active failure.
	5	Trunk now in quarantine (T_LIMBO).
	6	Failure caused alarm.
	7	Sequence initialization.
	8	Universal trunk time-out.
12	0-6	Number of failures.
13	1-6	Failure index for individual failures.
14		Trunk data type:
	1	Trunk signaling sequence failure (Test 1).
	2	Data when failure occurred (Test 1).
	3	Dynamic trunk data (Test 2).
	4	Frozen (dynamic) trunk data (Test 2).

Table 5-47. (Contd)

PROC 640 - FIELD DEFINITIONS AND CODES		
FIELD	CODE	DEFINITION
15	0-7 8	Trunk data index (used for trunk data types 2-4). Failing stimulus (Test 1, type 2); 10-MS counter (Test 2).
16	0- 17777	Trunk data code.
		Data type 1: When trunk data type is a 1, the trunk data code is the trunk signaling sequence and sequence step at the time the failure occurred. (The low 2 octal characters are the sequence step and the next octal characters are the sequence number.)
		Data type 2-4, Index 0-6: When trunk data types 2-4 are selected, this trunk data code corresponds to the layout of one word of trunk table 0-6, selected by the index displayed in Field 15.
		Data type 2-4, Index 7: When trunk data Index 7 is selected, the trunk data code corresponds to the following scan status encodes (counting digit positions from left to right in Field 16): Digit Position — Contents 1, 2 — Dial mask (0-17)* 3, 4 — Last Look (0-17)* 5, 6 — Demand scan (0-17)* *0-3 for most trunks
		Data type 2-4, Index 8: The stimulus from call processing at the time the failure was detected by a trunk signaling sequence, or a call processing routine. The trunk data for Index 8 will be 0 for isolated failure codes 3 or 4 (corresponding to audit failures).
17	0-9	Prior code index. Used only for trunk data type 4. When STOP is operated to freeze dynamic data (going from data type 3 to data type 4), 0 is displayed. The newest trunk data is displayed in Field 16 when the prior code index is 0. Larger prior code indexes correspond to older data.

Operation of Procedure

Overview

PROC 640 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a trunk failure.

To call in **PROC 640**, perform the following:

1. Depress **PROC NO; 640; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Monitors trunk activity.

Test 1

Test 1 provides a failure history of trunk failures (in groups of six) recorded by the on-line maintenance software.

Test 1 can also be used to resolve the cause of the alarmed trunk circuits, one at a time.

1. Test 1 is the default test when entering **PROC 640**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. A summary of the failure history is displayed in groups of six.
4. If no failures occurred, Field 1 displays a 1, Field 12 displays a 0, and all other fields are dashed.
5. If one or more failures occurred, the following is displayed:

   Field 1 - 1.

   Fields 2 through 6 - Equipment location of failing trunk circuit.

   Fields 7 through 9 - Trunk dial access code of displayed trunk circuit.

   Field 10 - Maintenance busy status of displayed trunk circuit.

   Field 11 - Lowest failure code for displayed trunk circuit.

   Field 12 - Number of failures (first group).

   Field 13 - Failure index.

   Field 14 - Trunk data type (1, 2, or dashed).

Field 15 - Trunk data index (dashed if Field 14 is dashed).

Field 16 - Trunk data code (dashed if Field 14 is dashed).

Field 17 - Dashed.

6. Depressing **NEXT UNIT** repeatedly displays the remaining failure codes (if any) associated with the displayed trunk circuit.

   Depressing **NEXT UNIT** after all failure codes are displayed dashes Field 11.

   Depressing **NEXT UNIT** once more displays the lowest failure code again.

7. Depressing **NEXT DATA** advances through trunk table data and scan status that were recorded when the trunk circuit failed.

   NOTE

   The trunk data displayed in Field 16 when trunk data type 2 is displayed in Field 14 requires extensive call processing documentation for interpretation.

8. When trunk data type 2 is displayed in Field 14, indices displayed in Field 15 ranging from 0 to 6 correspond to octal encode trunk table data from TRKTBL0 through TRKTBL6.

9. An index of 7 displayed in Field 15 corresponds to scan status for the trunk circuit at time of failure.

10. The scan status is determined by counting digit positions from left to right in Field 16:

    Digit positions 1 and 2 = Dial mask (0-17) contents.

    Digit positions 3 and 4 = Last look (0-17) contents.

    Digit positions 5 and 6 = Demand scan (0-17) contents.

    NOTE

    Zero (0) through 3 is displayed for most trunks.

11. The stimulus from call processing at the time the failure was detected by a trunk signaling sequence or a call processing routine corresponds to an index of 8.

    The trunk data for index 8 is 0 for isolated failure codes 3 or 4 (corresponding to audit failures).

12. Depressing **NEXT CIRCUIT** repeatedly displays the failure histories (maximum of six) of the remaining failed circuits in the first group.

    Depressing **NEXT CIRCUIT** after all failure histories in the group are displayed (indicated by Fields 12 and 13 being equal) dashes the display.

13. When Field 12 (number of failures) equals six, depressing **NEXT FAULT** freezes the failure histories in groups of six and causes the first failed circuit within the next group to be displayed.

    Depressing **NEXT CIRCUIT** steps through the remainder of the failing circuits within the new group.

14. **NEXT FAULT** can be used to step to the next group of six failures when the preceding group contained at least six failures.

15. Depressing **NEXT FAULT** when the preceding group had less then six failures, or when no other failures are recorded by the failure history dashes the display.

16. Depressing **NEXT CIRCUIT** or **NEXT FAULT** after all failures are displayed (maximum of 60) causes Test 1 to be executed, starting the sequence over with an updated failure history.

CAUTION

Busying out a trunk when the trunk is in use disrupts service by disconnecting the call.

17. Once a trunk location is displayed, **BUSY OUT** and **RLS BUSY OUT** can be used to change the maintenance busy status (Field 10) of the trunk circuit.
18. All trunks busied out during testing should be released from the busied out condition using **RLS BUSY OUT** before leaving **PROC 640**.

NOTE

Field 10 should be used to determine whether the trunks being tested are released from busy out as the **BUSY OUT** indicator on the **MAAP** turns off only when all circuits interfacing with the **MAAP** are no longer busied out.

19. To turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator) after Test 1 is executed at least once, perform the following for each trunk circuit recorded as failing:

    Display the failing circuit in Fields 2 through 6.

    Depress **CLEAR DATA; EXECUTE**.

NOTE

Trunk circuit alarmed entries are marked as resolved in PMIDS.

20. The **OTHER FAILS** fault indicator automatically goes off (indicating the trunk alarm cause is resolved) when the following conditions are met:

    All trunk circuit failures are cleared.

    All other sources affecting the **OTHER FAILS** fault indicator are cleared.

Test 2

Test 2 monitors trunk data for a selected trunk circuit equipment location.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is called in, a default trunk circuit (last trunk circuit displayed in Test 1) is displayed in Fields 2 through 6, or Fields 2 through 6 are dashed.

   Either the default trunk circuit can be tested or another trunk circuit can be selected for testing.

3. The module field of the trunk circuit equipment location (Field 2) is flashed when Test 2 is initially called in, indicating it is an optional entry field.
4. To select another trunk circuit for testing, enter its equipment location in Fields 2 through 6:

   (Trunk circuit module); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**.

5. To start Test 2, after selecting a trunk circuit to be tested, depress **EXECUTE**.

6. While Test 2 is executing, the following information is displayed:

   Field 1 - 2.

   Fields 2 through 6 - Equipment location of the trunk circuit being tested.

   Fields 7 through 9 - Trunk dial access code of trunk circuit being tested.

   Field 10 - Maintenance busy status of trunk circuit being tested.

   Fields 11 through 13 - Dashes.

   Field 14 - Trunk data type (initial value = 3).

   Field 15 - Trunk data index (initial value = 0).

   Field 16 - Trunk data code (changing).

   Field 17 - Prior code index (if applicable).

7. Prior code data is only saved when Test 2 is executing in the dynamic type 3 display mode. When the trunk data selected for display changes, all related trunk data are recorded for later display.

8. The maximum recording rate is approximately one sample per 30 milliseconds (ms). The dynamic type 3 display of the selected trunk data code is updated at a much slower rate.

9. Frozen changes may hold information which was never displayed.

10. Depressing **STOP** causes the trunk data type 3 (dynamic) in Field 10 to change to 4 (frozen data).

    When **STOP** is depressed all trunk data are recorded and frozen.

11. **NEXT DATA** can be used to display related frozen trunk data that was recorded at the same time the monitored trunk data change was recorded.

    Depressing **NEXT DATA** advances the trunk data index (Field 15) for either dynamic data type 3 or frozen data type 4 (both in Field 14).

    Depressing **NEXT DATA** continuously advances the trunk data index from 0 through 8 and back to 0.

12. Depressing **NEXT UNIT** controls the display of the prior data index in Field 17, and is restricted to the display of frozen data type 4 (Field 14).

13. If **NEXT UNIT** is depressed once, and at least one change in the dynamic data was recorded, a 1 is displayed in Field 17.

    This indicates that the trunk data code in Field 16 corresponds to the contents of the dynamic display field just before it changed to the value displayed when **STOP** was depressed.

14. Depressing **NEXT UNIT** continuously increments the prior code index in Field 17 and shows corresponding older trunk data codes in Field 16.

    Depressing **NEXT UNIT** after the oldest prior data is displayed dashes Fields 16 and 17.

    Depressing **NEXT UNIT** again displays the newest frozen data.

15. When type 4 frozen data is displayed, **NEXT UNIT** is depressed to display older trunk data as indicated by a prior index being displayed in Field 17.

Other data items that were recorded while in the dynamic data mode (type 3), can be displayed by repeatedly depressing **NEXT DATA**.

The displayed data corresponds to the definition defined in Table AT, PROC 640 - Field Definitions and Codes.

16. The relative timing between two prior data code indexes can be obtained from the two values of the 10-ms octal counter displayed (when trunk data index displayed in Field 15 = 8).

    Convert this octal difference to decimal and multiply by 10 to obtain the difference in milliseconds.

17. When in the dynamic mode (type 3), all trunk data is recorded when the selected data changes.

18. **PROC 640** checks for a change about every 30 ms. Therefore, time difference accuracy is about 30 ms.

19. A change in less than 30 ms may not be detected.

    Heavy traffic can further degrade the accuracy of these time differences.

CAUTION

Busying out a trunk when the trunk is in use disrupts service by disconnecting the call.

20. Once a trunk location is displayed, **BUSY OUT** and **RLS BUSY OUT** can be used to change the maintenance busy status (Field 10) of the trunk circuit.

21. All trunks busied out during testing should be released from the busied out condition using **RLS BUSY OUT** before leaving **PROC 640**.

NOTE

Field 10 should be used to determine whether the trunks being tested are released from busy out as the **BUSY OUT** indicator on the **MAAP** turns off only when all circuits interfacing with the **MAAP** are no longer busied out.

22. To select another trunk circuit for testing, after the first trunk circuit is tested, use the **CHANGE FIELD** sequence:

    CHANGE FIELD; 2; ENTER; (Trunk circuit module); ENTER; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**; **(Circuit); ENTER**.

23. **EXECUTE** must be depressed to test the trunk circuit selected for testing.

Repair Guide

Overview

When a trunk failure is indicated, **PROC 640** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following repair procedure.

This repair procedure is divided into two general cases:

1. Trunks in a nonidle state (T_LIMBO) which are in quarantine - failure code 5 displayed in Field 11.

2. Trunks not in T_LIMBO - no failure code 5 displayed in Field 11.

General

1. Execute Test 1 to display all trunk failures.
2. Use **NEXT UNIT** to display all of the failure codes for the first failed trunk selected for repair.
3. If the dial access code displayed in Fields 7 through 9 is dashed, use **PROC 100** to determine restrictions on the trunk for making test calls.

   The dial access code displayed in Fields 7 through 9 may be an attendant access code that cannot be dialed from a terminal.

Description of Trunks in T_LIMBO

1. Most trunk failures are trunks that are locked in T_LIMBO by invalid conditions on the tip and ring.
2. One example is a ground on the tip of an SN230 ground start trunk.

   When this failure exists, the switch quarantines the trunk from use by call processing by placing it in the T_LIMBO state.
3. Periodic attempts are made to order the T_LIMBO trunk back to its idle state.

   The T_LIMBO state (Failure code 5 displayed in Field 11) of a displayed failed trunk in Test 1 is checked each time **EXECUTE** is operated, or when **NEXT CIRCUIT** displays the first failed trunk.
4. When a trunk has been in T_LIMBO for more than 15 consecutive minutes, failure code 6 is displayed.
5. Failure codes 5 and 6 = Trunk failure is the cause for the **OTHER FAILS** fault indicator being turn on, and trunk is in T_LIMBO.
6. Failure code 5 but not 6 = Trunk is in T_LIMBO, but not long enough to set the **OTHER FAILS** fault indicator.
7. Failure code 6 but not 5 = Trunk was in T_LIMBO for more than 15 consecutive minutes and is the cause for turning on the **OTHER FAILS** fault indicator, but became idle and is now in service for call processing.

Trunk Signaling Sequence Failures

1. The Trunk Signaling Sequence Failures Table is used to decode the failure data displayed by Test 1.
2. This table is organized by increasing sequence number shown in octal in column 2.
3. If a trunk signaling sequence failure exit exists, this failure exit step is listed.

   If the sequence has no failure exit, no step is listed.

4. The data displayed in Field 16 for a trunk signaling sequence failure is used to match the octal encode in column 1 of the table.

   This line in the table defines the failure, or refers to another line that defines the failure.

5. A trunk signaling sequence failure is specified by the following display:

   Field 1 - 1.

   Field 14 - Trunk data type.

   Field 16 - Trunk data code = Sequence failure number; step used to find the entry in Table AU, PROC 640 - Trunk Signaling Sequence Failures.

6. The range of octal encodes that appear in trunk table 2 (TRKTBL2) for this sequence number are shown in column 4.

   The highest character (when set to 1) specifies that a trunk signaling sequence is active. The low 4 octal characters contain the packed sequence number and step.

7. The name of the sequence that controlled signaling for the trunk at the time of failure appears in column 5.

   The full descriptive title for this name appears in Table AV, PROC 640 - Trunk Signaling Sequences.

Test Calls

1. Test calls when using this maintenance procedure are defined as any way you can make the call to exercise the trunk signaling sequences for the trunk under test.
2. Use **PROC 100**, and other trunk translation procedures, to determine any trunk restrictions that may interfere with making test calls.
3. All of the trunk signaling sequences for a trunk type should be exercised (where valid) to ensure complete testing of a trunk when using test calls.
4. **PROC 642** can be used to make outgoing test calls, but other methods must be used to check the trunk for incoming calls.

   When **PROC 642** is being used, **PROC 640** cannot monitor the call, but can only be used later to display a possible failure stimulated by **PROC 642**.

5. Use the trunk verification feature to help select the trunk being tested from many in the trunk group. Make calls to exercise as many trunk sequences for the trunk as possible.
6. **PROC 177** can be used to relate the trunk equipment location to the trunk number used by trunk verification.

Isolation and Repair Steps Isolation and repair steps for trunk failures are detailed in:

1. Failure Code 5 - Trunk is now in T_LIMBO.
2. No Failure Code 5 - Trunk not in T_LIMBO.
3. Failure Codes 1 through 7.

Table 5-48.

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE		TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS		SUSPECTED FAILURE
	NUMBER	STEP					OK	FAIL	
(1) GSTKS—Ground Start Trunk (SN230)									
103	1	3		SZGST1	Invalid Scan Data	101	1	17	SN230 if scan = 2 or 3 CO if scan = 0
107	1	7	100021 through 100030	SZGST1	4-second time-out before loop current.	101, 103	2	17	CO or SN230 if scan = 0 SN230 if scan = 2
203	2	3	100041 through 100046	GSINSZ	1 minute time out	203, 0	2	17	Ground on tip if scan = 1 SN230 if scan = 3
405	4	5	100101 through 100106	ANSGST	2-second time-out before loop current.	101, 102	2	17	CO if scan = 0 SN230 if scan = 1, 2, or 3
506	5	6	100121 through 100131	DISGST	128-second time-out before idle.	0	0	17	Ground on ring if scan = 1 CO if scan = 2 or 3
607	6	7		DISGS2	128-second time-out before idle	0	0	17	SN230 if scan = 1, CO if scan = 1 or 3
(2) GSTKP—Ground Start Trunk with Party Test (SN230)									
1103	11	3		SZGSP1	Same as 103				
1107	11	7	100221 through 100238	SZGSP1	4-second time-out before any scan change.	102	1	17	CO or SN230 if scan = 0 SN230 if scan = 3
1114	11	14	100221 through 100238	SZGSP1	125 ms time-out before loop current	102	1	17	CO if scan = 0 SN230 if scan = 2 Same as 1107
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(2) GSTKP—Ground Start Trunk with Party Test (SN230) (Contd)									
1203	12	3	100241 through 100246	GSINSZ	Same as 2.				
1304	13	4	100261 through 100265	GSTONH	Same as 3.				
1403	14	3	100301 through 100306	ANSGST	Same as 4.				
1507	15	7	100321 through 100331	DISGST	Same as 5.				
	17		100361 through 100367	ABDNCL	Same as 7.				
(3) DITKS—Direct Inward Dialing (DID) Trunk (SN232)									
2204	22	4	100441 through 100451	DIDWSS	1-second time-out before DID incoming seize.	303	2	17	CO if scan = 2 SN232 if scan = 0 or 1
	23		100461 through 100465	DIDCOD		0			SN232 if scan = 2 or 3
2403	24	3	100501 through 100504	DIDANS	1-second time-out before DID talk state.	303	2	17	CO if scan = 2 SN232 if scan = 0 or 1
2504	25	4	100521 through 100530	DIDPDX	126-second time-out before idle.	0	1	17	CO if scan = 2 SN232 if scan = 0 or 1
	26		100541 through 100547	DIDMDD		0			SN232 if scan = 1 or 3
(4) TITKS—Tie Trunk (SN233)									
3102	31	2	100621 through 100623	TIEOGS	1-second time-out before switch off-hook.	202	2	17	Far end if scan = 3 SN233 if scan = 0 or 1
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(4) TITKS—Tie Trunk (SN233) (Contd)									
3202	32	2	100641 through 100643	TIEINC	300 ms time-out before distant end off-hook.	101	1	17	Far end if scan = 0 SN233 if scan = 2 or 3
	33		100661 through 100665	TIEDOH					
	34		100701 through 100707	TIEANS	1-second time-out before switch off-hook.	202	2	17	Far end if scan = 3 SN233 if scan = 0 or 1
3503	35	3	100721 through 100724	TIELDS	30-second time-out before switch on-hook.	0	3	17	SN233 if scan = 2 or 3 Far end if scan = 1
	36		100000						SN233
	36		100741 through 100743	TIEDAN		202,303			
	37		100761 through 100766	TIEMDD		0			
(5) CCSATK—CCSA Incoming Wink Start Trunk (SN233)									
4102	41	2	101021 through 101023	TIEOGS	Same as 31.				
4204	42	4	101041 through 101051	CCSAIN	300 ms time-out before both ends off-hook.	303	2	17	Far end if scan = 2 SN233 if scan = 0 or 1
	43		101061 through 101065	TIEDOH	Same as 33.				
4406	44	6	101101 through 101107	TIEANS	Same as 34.				
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(5) CCSATK—CCSA Incoming Wink Start Trunk (SN233) Contd)									
4503	45	3	101121 through 101124	TIELDS	Same as 35				
	46		101141 through 101143	TIEDAN	Same as 36.				
	47		101161 through 101166	TIEMDD	Same as 37.				
(6) ANICT—Automatic Number Identification (ANI) Trunk (SN242)									
5106	51	6	101221 through 101227	ANI_CO	175 ms time-out before idle.	0	0	17	Central office SN242
5206	52	6	101241 through 101247	ANI_CS	175 ms time-out before idle.	0	0	17	CCSA office SN242
	53		101261 through 101262	ANI2DY		101-CO, 202-CCSA			
	54								
	55								
	56								
	57								
Sequence numbers 61-67 are the same as 51-57.									
(7) SPGTK—Auxiliary Trunk (SN231)									
7102	71	2	101621 through 101623	RLSGSL	4-second time-out before sleeve grounds detected.	202	2	17	Far end SN231
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(7) SPGTK—Auxiliary Trunk (SN231) (Contd)									
7202	72	2	101641 through 101643	SZAUXT	4-second time-out before sleeve grounds detected.	202	2	17	Far end SN231
	75		101721 through 101723	RLSAUX		0			
(8) CCSATKD—CCSA Trunk (SN233)									
10102	101	2	102021 through 102023	TIEOGS	Same as 31.				
10202	102	2	102041 through 102043	TIEINC	Same as 32.				
	103		102061 through 102065	TIEDOH	Same as 33.				
10406	104	6	102101 through 102107	TIEANS	Same as 34.				
10503	105	3	102121 through 102124	TIELDS	Same as 35.				
	106		102141 through 102143	TIEDAN	Same as 36.				
	107		102161 through 102166	TIEMDD	Same as 37.				
(9) CCSASH—CCSA Delay Dial Outgoing Trunk (SN233)									
11102	111	2	102221 through 102227	CCSDDO	1-second time-out before any scan change (especially switch off-hook).	20X X=don’t care	ANY	17	SN233
11202	112	2	102241 through 102243	TIEINC	Same as 32.				
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(9) CCSASH—CCSA Delay Dial Outgoing Trunk (SN233) (Contd)									
	113		102261 through 102265	TIEDOH	Same as 33.				
11406	114	6	102301 through 102307	TIEANS	Same as 34.				
11503	115	3	102321 through 102324	TIELDS	Same as 35.				
	116		102341 through 102343	TIEDAN	Same as 36.				
	117		102361 through 102366	TIEMDD	Same as 37.				
(10) MSCQ—Main Satellite (Unused Sequence Group) (SN233)									
Sequence numbers 121-130 are unused.									
(11) CCSADO2—CCSA Delay Dial Outgoing, Incoming Wink Start Trunk (SN233)									
13102	131	2	102621 through 102627	CCSDDO	Same as 111.				
13204	132	4	102641 through 102651	CCSAIN	Same as 42.				
	133		102661 through 102665	TIEDOH	Same as 33.				
13406	134	6	102701 through 102707	TIEANS	Same as 34.				
13503	135	3	102721 through 102724	TIELDS	Same as 35.				
	136		102741 through 102743	TIEDAN	Same as 36.				
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(11) CCSADO2—CCSA Delay Dial Outgoing, Incoming Wink Start Trunk (SN233) (Contd)									
	137		102761 through 102766	TIEMDD	Same as 37.				
(12) TIEDDWW—Tie Wink or Delay Dial Outgoing, Delay Dial Incoming Trunk (SN233)									
14012	141	2	103021 through 103027	TIEWDO	1-second time-out before any scan change (especially switch off-hook).	20X X=don't care	ANY	17	SN233
14106	141	6	103021 through 103027	TIEWDO	1-second time-out before distant end on-hook.	202	0	17	Far end if scan = 3 SN233 if scan = 0 or 1
14204	142	4	103041 through 103051	CCSAIN	Same as 42.				
	143		103061 through 103065	TIEDOH	Same as 33.				
14406	144	6	103101 through 103107	TIEANS	Same as 34.				
14503	145	3	103121 through 103124	TIELDS	Same as 35.				
	146		103141 through 103143	TIEDAN	Same as 36.				
	147		103161 through 103167	TIEMDD	Same as 37.				
(13) TIETTM—Tie Wink or Delay Dial Outgoing Trunk (SN233)									
15102	151	2	103221 through 103227	TIEWDO	Same as 141, Step 2.				
*See Octal Sequence column for ''same as'' number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(13) TIETTM—Tie Wink or Delay Dial Outgoing Trunk (SN233) (Contd)									
15106	151	6	103221 through 103227	TIEWDO	Same as 141, Step 6.				
15202	152	2	103241 through 103243	TIEINC	Same as 32.				
	153		103261 through 103265	TIEDOH	Same as 33.				
15406	154	6	103301 through 103307	TIEANS	Same as 34.				
15503	155	3	103321 through 103324	TIELDS	Same as 35.				
	156		103341 through 103343	TIEDAN	Same as 36.				
	157		103361 through 103367	TIEMDD	Same as 37.				
(14) DLTNDET—Dial Tone Detector (SN250)									
Sequence numbers 161-170 are unused.									
(15) RLTSODR—Release Link Trunk (SN233)									
17102	171	2	103621 through 103627	RLTOGS	1-second time-out before switch off-hook.	202	0	17	SN233 if scan = 0 or 1 Far end if scan = 3
	172		103641 through 103654	RLTOG2		3			
17302	173	2	103661 through 103667	RLTDOH	1-second time-out before switch on-hook.	0	3	17	SN233 if scan = 2 or 3 Far end if scan = 1
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(15) RLTSODR—Release Link Trunk (SN233) (Contd)									
17306	173	6	103661 through 103667	RLTDOH	1-second time-out before distant end on-hook.	0	3	17	Far end if scan = 1 SN233 if scan = 2 or 3
17504	175	4	103721 through 103730	RLTDSC	30-second time-out before both ends on-hook.	0	3	17	Far end if scan = 1 SN233 if scan = 2 or 3
	176		103741 through 103743	RLTFLH		202,203			
17702	177	2	103761 through 103770	RLTOGR	1-second time-out before switch off-hook.	202	0	17	SN233 if scan = 0 or 1 Far end if scan = 3
(16) INCRLTSQ—Incoming Release Link Trunk (SN233)									
20202	202	2	104041 through 104043	TIEINC	Same as 32.				
	203		104061 through 104065	TIEDOH	Same as 33.				
20406	204	6	104101 through 104107	TIEANS	Same as 34.				
20503	205	3	104121 through 104124	TIELDS	Same as 35.				
	206		104141 through 104147	IRLFLH					
(17) MSIS—Main Satellite Outgoing Trunk (SN233)									
21102	211	2	104221 through 104223	TIEOGS	Same as 31.				
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(17) MSIS—Main Satellite Outgoing Trunk (SN233) (Contd)									
	213		104261 through 104277	MSFLSH		0			
21406	214	6	104301 through 104307	TIEANS	Same as 34.				
21504	215	4	104321 through 104330	RLTDSC	Same as 175.				
	216		104341 through 104343	TIEDAN	Same as 36.				
	217		104361 through 104366	TIEMDD	Same as 37.				
	220		104401 through 104403	RLTFLH	Same as 176.				
	221		104421 through 104432	MSGFLH		303			
Sequence numbers 222-230 are unused.									
(18) MSWS—Main Satellite Wink Start Outgoing and Incoming Trunk (SN233)									
23102	231	2	104621 through 104627	MSWSOT		202			
23204	232	4	104641 through 104651	CCSAIN	Same as 42.				
	233		104661 through 104677	MSFLSH	Same as 213.				
23406	234	6	104701 through 104707	TIEANS	Same as 34.				
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(18) MSWS—Main Satellite Wink Start Outgoing and Incoming Trunk (SN233) (Contd)									
23504	235	4	104721 through 104730	RLTDSC	Same as 175.				
	236		104741 through 104743	TIEDAN	Same as 36.				
	237		104761 through 104766	TIEMDD	Same as 37.				
	240		105001 through 105003	RLTFLH	Same as 176.				
	241		105021 through 105032	MSGFLH	Same as 221.				
Sequence numbers 242-250 are unused.									
(19) MSDD—Main Satellite Delay Dial Outgoing Trunk (SN233)									
25102	251	2	105221 through 105227	CCSDDO	Same as 111.				
25202	252	2	105241 through 105243	TIEINC	Same as 32.				
	253		105261 through 105277	MSFLSH	Same as 213.				
25406	254	6	105301 through 105307	TIEANS	Same as 34.				
25504	255	4	105321 through 105330	RLTDSC	Same as 175.				
	256		105341 through 105343	TIEDAN	Same as 36.				
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-48. (Contd)

PROC 640—TRUNK SIGNALING SEQUENCE FAILURES									
TEST 1 OCTAL ENCODE	OCTAL SEQUENCE NUMBER	OCTAL SEQUENCE STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SUCCESS SCAN DATA	STIMULUS OK	STIMULUS FAIL	SUSPECTED FAILURE
(19) MSDD—Main Satellite Delay Dial Outgoing Trunk (SN233) (Contd)									
	257		105361 through 105366	TIEMDD	Same as 37.				
	260		105401 through 105403	RLTFLH	Same as 176.				
	261		105421 through 105432	MSGFLH	Same as 221.				
Sequence numbers 262-310 are unused.									
*See Octal Sequence column for ‘‘same as’’ number.									

Table 5-49.

PROC 640 - TRUNK SIGNALING SEQUENCES		
NUMBER	ABBREVIATION	DEFINITION
1	ABDNCL	Abandon Call Search
2	ANI_CO	ANI for CO
3	ANI_CS	ANI for CCSA
4	ANI2DY	ANI Second Dial Tone Relay
5	ANSGST	Answer Ground Start
6	CCSAIN	CCSA Wink Start Inseize
7	CCSDDO	CCSA Delay Dial Outseize
8	DIDANS	DID Call Answer
9	DIDCOD	DID CO Disconnect
10	DIDMDD	DID Mutilated Dialing Disconnect
11	DIDPDX	DID Local Disconnect
12	DIDWSS	DID Wink Start Inseize
13	DISGST	Disconnect Local Ground Start
14	GSINSZ	Ground Start Inseize
15	GSTONH	Ground Start CO Disconnect
16	IRLFLH	Incoming Release Link Trunk Flash
17	MSFLSH	Main-Satellite Flash
18	MSGFLH	Main-Satellite local flash
19	MSWSOT	Main-Satellite Wink Start Outgoing
20	RLSAUX	Release Auxiliary Trunk
21	RLSGSL	Seize Auxiliary Trunk Without Grounding Sleeve
22	RLTDOH	RLT Distant On-Hook
23	RLTDSC	RLT Local Disconnect
24	RLTFLH	RLT Initial Flash Timing
25	RLTOGR	RLT Outseize With Ring Control
26	RLTOGS	RLT Outseize
27	RLTOG2	RLT Outseize With Ring Control, Wink
28	SZAUXT	Seize Auxiliary Trunk
29	SZGSP1	Seize Ground Start Outgoing With Party Test
30	SZGST1	Seize Ground Start Outgoing
31	TIEANS	CCSA or Tie Local Answer, Delay Dial
32	TIEDAN	CCSA or Tie Distant Answer Timing
33	TIEDOH	CCSA or Tie Distant Disconnect
34	TIEINC	CCSA or Tie Incoming Seize, Delay Dial
35	TIELDS	CCSA or Tie Local Disconnect
36	TIEMDD	CCSA or Tie Mutilated Dial Disconnect
37	TIEOGS	CCSA or Tie Outgoing Seize
38	TIEWDO	CCSA or Tie Outgoing Seize, Delay Dial, Wink

Failure Code 5 - Trunk is Now in T_LIMBO

1. Using Test 1, select the first failed trunk circuit displaying failure code 5.
2. Depress **NEXT DATA** to record the scan data displayed in Field 16 for data type 2 and data index 7 displayed in Fields 14 and 15.
3. Scan data and indications for trunk type SN232 and SN233 are as follows:

   Scan data 1 = Distant end off-hook, switch idle.

   Scan data 2 = Distant end idle, switch off-hook.

   Scan data 3 = Distant end off-hook, switch off-hook.
4. Scan data and indications for trunk type SN231 are as follows:

   Scan data 1 = Reverse loop current (ground on ring) or ground on CO lead.

   Scan data 2 = Ground on AL1. Also, ground on S with SSL switch closed and Ground Sleeve Lead (GSL) relay idle.

   Scan data 3 = Both 1 and 2 above.
5. To check scan data for SN230, the current PMI must be examined in TRKTBL1 via the index in Field 15.
6. The PMI, scan data, and indications for SN230 are:

   PMI = TRUNK_IDLE:

   Scan data 0 = CO idle.

   Scan data 1 = Ground on tip.

   Scan data 3 = Ground on ring.

   PMI = All talk and cut through states:

   Scan data 0 = CO on-hook.

   Scan data 1 = CO off-hook, reverse.

   Scan data 2 = CO off-hook, normal.

   PMI = DIAL_CO:

   Scan data 0 = Valid break.

   Scan data 1 = Make.

   Scan data 2 = Make.
7. The idle state is 0 for all of the above circuit packs.

   NOTE

   An idle state is not expected for a trunk in T_LIMBO.
8. Off-hook for SN232 and SN233 is either seizure to initiate a call or answer to indicate a call is established.
9. Depress **NEXT TEST** to select Test 2.

   The failed trunk equipment location last displayed by Test 1 will be carried over as a default equipment location for further testing in Test 2.

10. Depress **EXECUTE** and then **NEXT DATA** to display data index 7 in Field 15 so that current scan data (sampled every 30 ms) is being observed.
11. At the cross-connect field, open the signaling leads.

NOTE

The tip and ring are signaling leads for SN230 and SN232. E & M leads on SN233 and sleeves on SN231 are used for signaling.

12. If the scan goes to 0 in the low 2 characters of Field 16, the problem is most likely on the signaling leads external to the circuit pack toward the distant end.
13. If the scan does not change, replace the circuit pack.

    The scan should be 0 when the circuit pack is removed.
14. If opening the signaling leads at the switch removed the problem, reconnecting the signaling leads at the switch and removing the signaling leads at the distant end may further isolate the problem between distant end switching and the wiring between locations.

No Failure Code 5 - Trunk Not in T_LIMBO

1. Using Test 1, select the first failed trunk circuit not displaying failure code 5.
2. Depress **NEXT DATA** and record all trunk data.

   The most useful data is provided in Field 16 when a trunk signaling sequence failed. This encode is displayed as a default if a sequence failure was detected, indicated by data type 1.
3. Depress **NEXT TEST** to select Test 2.

   The trunk last displayed in Test 1 will appear as a default circuit for further testing.
4. Depress **EXECUTE** and then **NEXT DATA** (until 2 is displayed in Field 15) so that TRKTBL2 changes can be observed in Field 16.
5. Trunk table 2 contains trunk signaling sequence control information including the sequence number and sequence step.
6. Make tests calls as described in **Repair Guide Overview**.
7. The data displayed in Field 16 from TRKTBL2 (selected by 2 in Field 15) can be used to look up the sequence name in Table AU, PROC 640 - Trunk Signaling Sequencing Failures.

   The position of this sequence in the related group of sequences (for example: GSINSZ is the third sequence in the GSTKS group) indicates the type of trunk signaling.
8. The following listing shows the positions of sequence in related groups of sequences, i.e., sequence position equals type of signaling at the switch:

   Sequence position 1 = Outseize (includes distant answer).

   Sequence position 2 = Inseize.

   Sequence position 3 = Distant disconnect.

   Sequence position 4 = Answer.

   Sequence position 5 = Local disconnect.

Sequence position 6 = Special sequences for DID mutilated dialing disconnect, TIE distant answer, and flash signaling (DIDMDD, TIEDAN, RLTFLH, and IRLFLH).

Sequence position 7 = Special sequences for abandon call search, TIE mutilated dialing disconnect, mutilated dialing disconnect, and RLT outgoing seize from a CAS branch PBX (ABDNCL, TIEMDD, RLTOGR).

Sequence position 8 = Special RLT flash sequence (RLTFLH).

Sequence position 9 = Special main-satellite flash sequence.

9. After the sequence is identified, the sequence steps recorded by Test 2 can be displayed (after **STOP** is depressed to freeze the data) by using **NEXT UNIT** to observe up to nine prior changes in the selected data.

10. By using **NEXT DATA** to select scan data (7 displayed in Field 15), the combined DIAL MASK, LAST LOOK, and DEMAND SCAN data corresponding to each change in TRKTBL2 (trunk table 2) can be displayed.

11. The relative time between changes can be computed by recording the corresponding 10-ms counter data (selected with 8 displayed in Field 15).

    Table AW, PROC 640 - Example of Data Recorded in Test 2, provides an example of data recorded for the GSINSZ sequence.

Table 5-50.

PROC 640
EXAMPLE OF DATA RECORDED IN TEST 2 BY MONITORING TRKTBL2
FOR AN SZGST1 SEQUENCE CALLING VIA NO. 5 ESS CO

	DATA FROM FIELD 16				COMPUTED TIME		
		''7'' IN FIELD 15			''8'' IN FIELD 15		
PRIOR CODE INDEX (FIELD 17)	''2'' IN FIELD 15 TRKTBL 2	DIAL MASK	LAST LOOK	SCAN	10 MS OCTAL	COUNTER OCTAL DIFFERENCE	MILLISECOND DIFFERENCE
5 (oldest)	0	—	—	0	51473	—	—
4	100022	—	—	0	55621	4126	23,340 (1)
3	100023	—	—	0	55627	6	60 (2)
2	25	—	2	02	55650	21	170 (3)
1	100027	—	2	02	55653	3	30 (4)
0 (newest)	0	—	1	01	55661	6	60 (5)

(1) Time between test EXECUTE and start of sequence.
(2) Waited for 50-ms time-out after ground start.
(3) CO responded with ground on tip.
(4) Enabled loop current detector and waited 25 ms.
(5) Loop current detected; sequence is done.

12. Compare the data recorded (as in the example depicted in Table AW, PROC 640 - Example of Data Recorded in Test 2) with the detailed trunk signaling sequence descriptions, found in the software manual, to determine if a malfunction was detected.
13. If the failure corresponds to a specific sequence number and step in Table AU, PROC 640 - Trunk Signaling Sequence Failures, the failure cause may be determined by the information given under **Suspected Failure**.

Failure Codes 1 Through 8

Failure Code 1

1. Failure code 1 displayed in Field 11 provides the most specific information because it identifies the trunk signaling sequence and sequence step that failed.
2. When making test calls to verify this failure, focus on the specific sequence.
3. For example, ANSGST is the Answer Ground Start Sequence (the fourth sequence in the ground start trunks family of sequences).

   If this sequence failed, testing should focus on answering an incoming call.

Failure Code 2

1. Failure code 2 indicates that a trunk was not idle and not involved in an active call when the failure occurred.
2. For example, if the tip of a ground start trunk that is 1-way outgoing is grounded, this invalid incoming seize is detected by call processing and failure code 2 is generated.
3. Furthermore, this trunk is put in T_LIMBO as long as the invalid ground is present to also generate failure code 5.

Failure Code 3

1. Failure code 3 occurs when a trunk is not correctly placed in an idle queue.
2. This failure generally points to a software problem or a translation table inconsistency.

Failure Code 4

1. Failure code 4 indicates that status memory audits have detected this trunk as being falsely active.
2. The status memory audit runs every 20 minutes or slower as traffic increases, so if a trunk with this failure is cleared from the failure history table, it can take up to 20 minutes or longer for this failure to re-occur.
3. An example of this failure is a grounded tip (TP1) for an SN233 tie trunk.

Failure Code 5

1. Failure code 5 indicates that the trunk is presently in T_LIMBO and is not available for call processing.
2. Repair guides for this condition are described in isolation and repair step **Failure Code 5 - Trunk is now in T_LIMBO**.

Failure Code 6

1. Failure code 6 means this trunk was in T_LIMBO long enough to set the **OTHER FAILS** fault indicator.
2. Repair guides for this condition are described in isolation and repair step **No Failure Code 5 - Trunk not in T_LIMBO**.

Failure Code 7

1. Failure code 7 indicates that a trunk signaling sequence could not be started for this trunk.
2. Software or translation problems would generally cause this failure.

Failure Code 8

1. Failure code 8 indicates that an outgoing trunk seizure with universal signaling failed due to a sequence time out.
2. The time out occurred before a start dial signal was detected (i.e., dial tone, delay dial, or wink).

PROC 642 - TERMINAL-TO-TRUNK TEST CALL

Purpose

PROC 642 is used to test trunks by means of terminal-to-trunk test calls using the test line and terminal equipment.

PROC 642 is normally used when a user reported trouble concerning terminal-to-trunk calls is not detected by **PROC 600** (Alarm Causes/Error Log) and **PROC 620** (Network Procedure).

The user reported trouble may be intermittent in nature and **PROC 642** can isolate the potential trouble to a particular trunk circuit with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 642** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AX, PROC 642 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6 - Change test line equipment location.
3. Fields 7 through 11 - Select trunk equipment location to be tested (Test 2 only).
4. Fields 12 through 14 - Select trunk dial access code (Test 1 only).
5. Field 15 - Select trunk group to be tested (Test 3 only).

Test Equipment Required

A telephone set with 2 W1AP test cords and a 249A adapter, or a 1013 hand test set and a 249A adapter is required to place terminal-to-trunk test calls from the test line.

Table 5-51.

PROC 642 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	16 (Contd)		All 2-way CCSA/APLT CO trunks:
2	0-30	Test line module number.		12	Delay dial in (wink start or delay dial) and dial tone out.
3	0-7	Test line cabinet number.		13	Wink start in (wink start or delay dial) and dial tone out.
4	0-3	Test line carrier number.		14	Delay dial in/dial tone out.
5	0-21	Test line slot number.		15	Wink start in/dial tone out.
6	0-7	Test line circuit number.			Regular CO trunks:
7	0-30	Trunk module number.		17	1-way outgoing DOD, dial tone, and ground start.
8	0-7	Trunk cabinet number.		18	1-way out DOD with party test, dial tone, and ground start.
9	0-3	Trunk carrier number.		19	2-way automatic in/ DOD dial tone and ground start.
10	0-21	Trunk slot number.		20	2-way automatic in/ dial tone and ground start out with party test.
11	0-3	Trunk circuit number.			Foreign exchange CO trunks:
12		First digit of trunk dial access code:		22	1-way outgoing DOD, dial tone, and ground start.
	1-9	1-9.			
	11	Touch-tone *.			
	12	Touch-tone #.			
13	0-9	Second digit of trunk dial access code.			
14	0-9	Third digit of trunk dial access code.			
15	11-256	Trunk group number.			
16	12-45	Trunk type.			

Table 5-51. (Contd)

PROC 642 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
16 (Contd)		Foreign exchange CO trunks (Contd):	16 (Contd)	38	2-way automatic in/ dial tone out.
	23	1-way out DOD with party test, dial tone, and ground start.		39	2-way automatic in/ automatic out.
	24	2-way automatic in/ DOD, dial tone, and ground start.		44	2-way dial tone or delay dial in/dial tone out.
	25	2-way automatic in/ dial tone and ground start out with party test.		45	2-way/dial tone or delay dial in/automatic out.
		WATS CO trunks:	17	0-9	State of trunk test call:
	27	1-way outgoing DOD or toll terminal access for TSPS, ground start, and dial tone.		0	Test line or specific trunk not idle.
	28	1-way out DOD with party test, ground start, and dial tone.		1	Test line on-hook and trunk idle.
		Tie trunks:		2	Dial tone through dial completion.
	33	1-way automatic out.		3	CO response (dial tone or busy).
	34	1-way dial tone out.		4	Wrong access code or time-out.
	36	2-way dial in/dial tone out.		5	End of group test.
	37	2-way dial tone in/ automatic out.		6	Call dropped.
				7	No receiver or no time slot available.
				8	No trunk available.
				9	Trunk seized incoming.

APLT - Advanced private line termination.
CCSA - Common control switching arrangement.
CO - Central office.
DOD - Direct outward dialing.
TSPS - Traffic service position system.
WATS - Wide area telecommunication service.

Operation of Procedure

Overview

PROC 642 is used to make a terminal-to-trunk test call.

To call in **PROC 642**, perform the following:

1. Depress **PROC NO; 642; ENTER**.

   Test 1 is automatically selected.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Tests all trunks.
2. Test 2 - Tests a specific trunk.
3. Test 3 - Tests all trunks in a specific trunk group.

Test 1

Test 1 enables maintenance personnel to test all trunks in a trunk group for the trunk dial access code specified in Fields 12 through 14.

1. Test 1 is the default test when entering **PROC 642**, or is selected by using **NEXT TEST**.
2. When Test 1 is initially called in, a default test line equipment location, after first being administered through **PROC 000** (Line Translation - Single Line), is displayed in Fields 2 through 6.
3. This test line can be used or another test line can be selected.

   NOTE

   The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line Translation - Single Line).

4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.
5. To select another test line, enter its equipment location in Fields 2 through 6:

   (Test line module); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**.

   NOTE

   If Field 2 alone is changed, a new default test line equipment location is displayed in Fields 2 through 6.

6. A trunk dial access code must be entered in Fields 12 through 14 by one of the following two methods (Steps 7 or 8).

7. If a new test line is entered, Field 12 is blanked and the decimal point in that field flashed. This indicates a mandatory entry field. The trunk dial access code is entered in Fields 12 through 14 as follows:

   (First digit); ENTER; (Second digit - if required); ENTER; **(Third digit - if required); ENTER**.

8. If the displayed test line is to be used (not changed to a new test line), a trunk dial access code is entered by using the **CHANGE FIELD** sequence:

   CHANGE FIELD; 12; ENTER; (First digit); ENTER; **(Second digit - if required); ENTER**; **(Third digit - if required); ENTER**.

9. Prior to starting Test 1, connect the telephone set or hand test set to the test line.

10. To start Test 1, depress **EXECUTE**.

    EXECUTE must be used before going off-hook and dialing from the test line. **EXECUTE** must be depressed before each test call is placed even when repetitive calls are attempted through the same trunk.

11. If the test line is on-hook and available, the following is displayed:

    Field 1 - 1.

    Fields 2 through 6 - Test line equipment location.

    Fields 7 through 11 - Equipment location of the lowest numbered trunk in the trunk group.

    Fields 12 through 14 - Trunk dial access code.

    Field 15 - Trunk group number.

    Field 16 - Trunk type.

    Field 17 - State of the test.

12. If the test line is on-hook and available, and if the selected trunk is available, a 1 is displayed in Field 17.

    If either the test line or the trunk is busy, a 0 is displayed in Field 17, and Test 1 should be repeated by depressing **EXECUTE** or another trunk selected for testing.

13. When the telephone or hand test set connected to the test line is taken off-hook, and the trunk dial access code displayed in Fields 12 through 14 is dialed, Field 17 changes to a 2.

14. If Field 17 does not change to a 2 at this time, the trunk under test has been seized by an incoming Central Office (CO), Foreign Exchange (FX), or Wide Area Telecommunications Service (WATS) call. (Field 17 should display 9.)

    Wait until the trunk is idle and repeat Test 1, or select another trunk to be tested.

15. Field 17 displays a 2 during the dial access code dialing phase and changes to 3 at various times depending on several factors, e.g., touch-tone or rotary test line, SMDR, trunk type, etc.

16. The minimum change time from a display of 2 to 3 in Field 17, after the trunk dial access code is dialed, is 1 second.

    The maximum change time after the last digit is dialed to complete the call is about 10 seconds.

17. If the terminal-to-trunk test fails, a 4, 6, 7, or 8 is displayed in Field 17.
18. When 7 or 8 is displayed, repeat Test 1.
19. If 4 is displayed, check the dial access code in Fields 12 through 14 to determine if the correct dial access code was entered. If the correct dial access code was entered and dialed, the trunk circuit is failing.
20. If 6 is displayed, the trunk circuit is failing.

NOTE

If an intercept tone is received when making the test call, check the class of service of the test line and either change it to the least restricted class of service, or enter an unrestricted test line in Fields 2 through 6.

21. A trunk is considered to be tested successfully after **EXECUTE** is depressed, the call progresses to state 2 and either terminates by going on-hook or completes the testing sequence.

    The tested trunk is then removed from the untested trunk list.
22. Test 1 should be performed for all trunks assigned to the trunk dial access code and trunk group displayed in Fields 12 through 15.
23. If another trunk equipment location in the trunk group is to be selected for testing, **NEXT CIRCUIT** and **NEXT UNIT** can be used as follows:

    NEXT CIRCUIT sequences to the next untested trunk equipment location in the module.

    NEXT UNIT sequences to the first untested trunk equipment location in the next module.
24. Sequencing beyond the end of the list of trunks in the trunk group buffer, by using **NEXT CIRCUIT** and **NEXT UNIT**, causes trunk equipment location Fields 7 through 11 to be dashed.
25. If all the trunks in the buffer are tested beyond state 1, depressing **NEXT CIRCUIT** or **NEXT UNIT** causes one more search for untested trunks.
26. If no untested trunks are found, a 5 is displayed in Field 17 to indicate that all trunks with the displayed dial access code and trunk group number are tested.
27. If any trunks in the trunk group buffer are not tested, and the trunk equipment location fields are dashed, depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the lowest untested trunk, from the trunk group buffer, in Fields 7 through 11.

If the number of trunks in the trunk group exceeds the size of the trunk group buffer (63), an error code of 80 (only testing 63 trunks at a time) is displayed in the **MAAP** error code field to indicate that the sorted group of trunks is not complete. Testing should be continued until all additional trunks are tested.

If the size of a trunk group exceeds the capacity of the trunk group buffer, the buffer is loaded again with the untested trunks when all of the first group of trunks in the buffer are tested. These trunks are then sorted in ascending order.

When **NEXT CIRCUIT** or **NEXT UNIT** is depressed to search for the first untested trunk exceeding the capacity of the buffer, special error code 80 is displayed again in the **MAAP** error code field. This code indicates that the trunk group is exceptionally large and the next group of untested trunks is loaded in the buffer for testing.

The next set of trunks in the trunk group can now be tested, noting that state 5 (displayed in Field 17) is displayed only when all trunks in the trunk group are tested.

Test 2

Test 2 enables maintenance personnel to test a specific trunk by means of making a terminal-to-trunk test call.

1. Test 2 is selected by use of **NEXT TEST**.
2. When Test 2 is called in, Field 7 is blanked and the decimal point in that field is flashed, indicating a mandatory entry field.
3. The equipment location of the trunk to be tested is entered in Fields 7 through 11 as follows:

   (Trunk module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; **(Slot); ENTER; (Circuit); ENTER**.
4. Prior to starting Test 2, connect a telephone set or hand test set to the test line.
5. To start Test 2, depress **EXECUTE**.

   EXECUTE must be used before going off-hook and dialing from the test line. **EXECUTE** must be depressed before each test call is placed even when repetitive calls are attempted through the same trunk.

6. If the test line is on-hook and available, the following is displayed:

   Field 1 - 2.

   Fields 2 through 6 - Test line equipment location.

   Fields 7 through 11 - Equipment location of the trunk selected for testing.

   Fields 12 through 14 - Trunk dial access code.

   Field 15 - Trunk group number.

   Field 16 - Trunk type.

   Field 17 - State of the test.
7. If the test line is on-hook and available, and if the selected trunk is available, a 1 is displayed in Field 17.
8. If either the test line or the trunk is busy, a 0 is displayed in Field 17, and Test 2 should be repeated by depressing **EXECUTE** or another trunk selected for testing.
9. When the telephone or hand test set connected to the test line is taken off-hook, and the trunk dial access code displayed in Fields 12 through 14 is dialed, Field 17 changes to a 2.
10. If Field 17 does not change to a 2 at this time, the trunk under test has been seized by an incoming CO, FX, or WATS call. (Field 17 should display 9.)

    Wait until the trunk is idle and repeat Test 2, or select another trunk to be tested.
11. Field 17 displays a 2 during the dial access code dialing phase and changes to 3 at various times depending on several factors, e.g., touch-tone or rotary test line, SMDR, trunk type, etc.

12. The minimum change time from a display of 2 to 3 in Field 17, after the trunk dial access code is dialed, is 1 second.

    The maximum change time after the last digit is dialed to complete the call is about 10 seconds.

13. If the terminal-to-trunk test fails, a 4, 6, 7, or 8 is displayed in Field 17.

14. When 7 or 8 is displayed, repeat Test 2.

15. If 4 is displayed, check the dial access code in Fields 12 through 14 to determine if the correct dial access code was dialed. If the correct dial access code was dialed, the trunk circuit is failing.

16. If 6 is displayed, the trunk circuit is failing.

NOTE

If an intercept tone is received when making the test call, check the class of service of the test line and either change it to the least restricted class of service, or enter an unrestricted test line in Fields 2 through 6.

17. A trunk is considered to be tested successfully after **EXECUTE** is depressed, the call progresses to state 2 and either terminates by going on-hook or completes the testing sequence.

Test 3

Test 3 enables maintenance personnel to test all trunks in a specific trunk group by means of making terminal-to-trunk test calls.

1. Test 3 is selected by use of **NEXT TEST**.

2. When Test 3 is called in, Field 15 is blanked and the decimal point in that field is flashed, indicating a mandatory entry field.

3. The number of the trunk group to be tested is entered in Field 15 as follows:

   (Trunk group number); ENTER.

4. Prior to starting Test 3, connect a telephone set or hand test set to the test line.

5. To start Test 3, depress **EXECUTE**.

   EXECUTE must be used before going off-hook and dialing from the test line. **EXECUTE** must be depressed before each test call is placed even when repetitive calls are attempted through the same trunk.

6. If the test line is on-hook and available, the following is displayed:

   Field 1 - 3.

   Fields 2 through 6 - Test line equipment location.

   Fields 7 through 11 - Equipment location of the lowest numbered trunk in the trunk group.

   Fields 12 through 14 - Trunk dial access code.

   Field 15 - Trunk group number.

Field 16 - Trunk type.

Field 17 - State of the test.

7. If the test line is on-hook and available, and if the selected trunk is available, a 1 is displayed in Field 17.
8. If either the test line or the trunk is busy, a 0 is displayed in Field 17, and Test 3 should be repeated by depressing **EXECUTE** or another trunk selected for testing.
9. When the telephone or hand test set connected to the test line is taken off-hook, and the trunk dial access code displayed in Fields 12 through 14 is dialed, Field 17 changes to a 2.
10. If Field 17 does not change to a 2 at this time, the trunk under test has been seized by an incoming CO, FX, or WATS call. (Field 17 should display 9.)

    Wait until the trunk is idle and repeat Test 3, or select another trunk to be tested.
11. Field 17 displays a 2 during the dial access code dialing phase and changes to 3 at various times depending on several factors, e.g.: touch-tone or rotary test line, SMDR, trunk type, etc.
12. The minimum change time from a display of 2 to 3 in Field 17, after the trunk dial access code is dialed, is 1 second.

    The maximum change time after the last digit is dialed to complete the call is about 10 seconds.
13. If the terminal-to-trunk test fails, a 4, 6, 7, or 8 is displayed in Field 17.
14. When 7 or 8 is displayed, repeat Test 3.
15. If 4 is displayed, check the dial access code in Fields 12 through 14 to determine if the correct dial access code was dialed. If the correct dial access code was dialed, the trunk circuit is failing.
16. If 6 is displayed, the trunk circuit is failing.

NOTE

If an intercept tone is received when making the test call, check the class of service of the test line and either change it to the least restricted class of service, or enter an unrestricted test line in Fields 2 through 6.

17. A trunk is considered to be tested successfully after **EXECUTE** is depressed, the call progresses to state 2 and either terminates by going on-hook or completes the testing sequence.
18. After the first trunk is tested, another trunk in the trunk group can be selected for testing by using **NEXT CIRCUIT** or **NEXT UNIT** as follows:

    Depressing **NEXT CIRCUIT** sequences to the next untested trunk equipment location in the module.

    Depressing **NEXT UNIT** sequences to the first untested trunk equipment location in the next module.
19. Repeat Steps 5 through 18 until all trunks in the trunk group selected for testing are tested which is indicated by a 5 in Field 17.

Repair Guide

When a terminal-to-trunk call is reported by the user as a trouble, and **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure) has not detected a trunk failure associated with the user's problem, the following steps should be performed by maintenance personnel, in the order listed, to isolate and replace the failing circuit pack.

1. Determine from the user reported trouble if a particular dial access code or trunk group is the potential cause of the trouble.
2. For dial access codes, perform the following:

   Execute Test 1 for all trunks associated with the dial access code, or until a failure is detected. (See Step 4 below.)

   Based on the test results of Test 1, use Test 2 to further test failing circuits. (See Step 4 below.)
3. For trunk groups, perform the following:

   Execute Test 3 for all trunks in the specified trunk group, or until a failure is detected. (See Step 4 below.)

   Based on the results of Test 3, use Test 2 to further test failing circuits. (See Step 4 below.)
4. To test a trunk, proceed as follows:

   At the test line, install a 249A adapter and telephone set or hand test set.

   Depress **EXECUTE**.

   Go off-hook and dial the displayed trunk dial access code.

   Dial the appropriate number of digits to complete the call.

   If a single trunk fails (Field 17 equals 6), replace the associated circuit pack.
5. Repeat Test 2.

   If the test fails again, use **PROC 620**, to further isolate the problem.

   If **PROC 620** cannot correct the problem, check the wiring associated with the replaced circuit pack.

A test call stuck at state 2 indicates a possible failure for CO, FX, and WATS trunks.

A test call can also be stuck at state 2 for valid CCSA/APLT and TIE trunks.

1. Listen to the test call to determine whether it is completed successfully.
2. If the call cannot be completed, replace the associated circuit pack.
3. Repeat Test 2.

If the test fails again, use **PROC 620**, to further isolate the problem.

If **PROC 620** cannot correct the problem, check the wiring associated with the replaced circuit pack.

PROC 643 - TERMINAL-TO-TONE TEST CALL

Purpose

PROC 643 provides the capability to transmit the eight tones contained on circuit pack SN250 to a test line to allow maintenance personnel to listen to each tone to determine if problems with attenuation or improper interruption rates exist.

PROC 643 is normally used when a user reported trouble concerning tone failures is not detected by **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure).

The user reported trouble may be intermittent in nature and **PROC 643** can isolate the potential trouble to a particular tone plant with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 643** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AY, PROC 643 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6 - Change test line equipment location.
3. Fields 7 through 10 - Select tone plant equipment location to be tested.
4. Fields 11 through 18 - Select tone to be transmitted (Test 2 only).

Test Equipment Required

A telephone set with 2 W1AP test cords and a 249A adapter or a 1013 type hand test set with a 249A adapter is required to listen to the transmitted tones at the test line.

Table 5-52.

PROC 643 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1,2	Test number.	11-18	0,1	0 = Tone is not to be transmitted. 1 = Tone is to be transmitted. Flashing 1 = Tone is active (being transmitted).
2	0-30	Test line module number.			
3	0-7	Test line cabinet number.			
4	0-3	Test line carrier number.			
5	0-21	Test line slot number.	11	0,1	Busy tone.
6	0-7	Test line circuit number.	12	0,1	Reorder tone.
7	0-30	Tone plant module number.	13	0,1	Audible alert tone.
8	0-7	Tone plant cabinet number.	14	0,1	Special audible alert tone.
9	0-3	Tone plant carrier number.	15	0,1	Dial tone.
10	0-21	Tone plant slot number.	16	0,1	Recall tone.
			17	0,1	Miscellaneous tone.
			18	0,1	Intercept tone.

Operation of Procedure

Overview

PROC 643 is used to listen to the tones transmitted to the test line.

To call in **PROC 643**, perform the following:

1. Depress **PROC NO; 643; ENTER**.

   Test 1 is automatically selected.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Sequentially transmits busy, reorder, audible alert, special audible alert, dial, recall, miscellaneous, and interrupt tones.
2. Test 2 - Allows any of the above tones to be selected and transmitted independently of the other tones.

Test 1

Test 1 enables maintenance personnel to sequentially transmit busy, reorder, audible alert, special audible alert, dial, recall, miscellaneous, and intercept tones from a specific tone plant over a test line.

1. Test 1 is the default test when entering **PROC 643** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. When Test 1 is initially called in, a default test line equipment location is displayed in Fields 2 through 6, and the first tone plant equipment location is displayed in Fields 7 through 10.

3. The first tone plant can be used for testing or another tone plant can be selected for testing.

   NOTE

   The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line Translation - Single Line).

4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.

5. To select another test line, enter its equipment location in Fields 2 through 6:

   (Test line module); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**.

   NOTE

   The test line must be in service and not busied out. If only Field 2 is changed, a default test line for the new module is provided.

6. To select both another test line and tone plant, enter their equipment locations in Fields 2 through 10:

   (Test line module); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER; (Tone plant module)**; **ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

7. To select another tone plant without selecting a new test line, use the **CHANGE FIELD** sequence to enter the new tone plant equipment location:

   CHANGE FIELD; 7; ENTER; (Tone plant module); ENTER; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

8. Depressing **NEXT CIRCUIT** repeatedly increments through all the tone plants in the switch.

   Depressing **NEXT UNIT** increments to the first tone plant in the next module (and **NEXT CIRCUIT** steps through the tone plants within the selected module).

9. When Test 1 is called in, Fields 11 through 18 all contain 1s.

   The 1s indicate that the tone associated with each field is selected for transmission during Test 1.

10. Prior to starting Test 1, connect the telephone set or hand test set to the test line.

11. To start Test 1, depress **EXECUTE**.

    The transmission of the first tone (busy) is initiated when **EXECUTE** is depressed.

12. As the tone is transmitted, either a 0 or 1 is flashed in the associated field (Field 11).

    A 0 indicates that the tone is not being transmitted; a 1 indicates that the tone is being transmitted.

13. When the telephone or hand test set connected to the test line is taken off-hook, maintenance personnel can listen to the tone being transmitted.

    Maintenance personnel can determine if the tone is being transmitted or if other problems exist, such as attenuation, improper interruption rates, or if the proper tone is heard without interference from other tones.

14. Depressing **NEXT DATA** initiates transmission of the next tone in sequence.

    Depressing **NEXT DATA** repeatedly sequences through the transmission of all the tones associated with Fields 11 through 18.

    Depressing **NEXT DATA** during transmission of the last tone (intercept) sequences back to the first tone (busy), which is again transmitted.

15. Test 1 is stopped by depressing **NEXT TEST** or **RESET**.

Test 2

Test 2 enables maintenance personnel to transmit selected tones from a specific tone plant over a test line.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is called in, the default test line and tone plant equipment locations from Test 1 are displayed in Fields 2 through 10.

   Either the default tone plant can be tested or another tone plant can be selected for testing.

3. To select another tone plant for testing use the **CHANGE FIELD** sequence or **NEXT CIRCUIT** and/or **NEXT UNIT**:

   CHANGE FIELD; 7; ENTER; (Tone plant module); ENTER; **(Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

   Depressing **NEXT CIRCUIT** increments through all the tone plants in the switch.

   Depressing **NEXT UNIT** increments to the first tone plant in the next module while **NEXT CIRCUIT** steps through the tone plants within the selected module.

4. When Test 2 is called in, Fields 11 through 18 all contain 0s.

   The 0s indicate that the tone associated with each field is not selected for transmission during Test 2.

5. The 0 in Field 11 is flashed, indicating an optional entry field.

6. To select the tone associated with Field 11 (busy) for transmission, a 1 must be entered in the field:

   1; ENTER.

7. To leave the tone not selected for transmission, **ENTER** can be depressed to increment to the next field.

8. Each tone that is to be transmitted during Test 2 must be selected by entering a 1 in the associated field.

   The order in which the tones are selected to be tested (corresponding field set to 1) is the order that the tones are transmitted.

9. Prior to starting Test 2, connect the telephone set or hand test set to the test line.

10. To start Test 2, depress **EXECUTE**.

    NOTE

    Depressing **EXECUTE** with no tones selected for transmission (Fields 11 through 18 all contain 0s), causes special error code 80 (no tone selected for transmission) to be displayed in the **MAAP** error code field.

11. The first field selected containing a 1 is flashed when **EXECUTE** is depressed, indicating that the associated tone is being transmitted.

12. Maintenance personnel can monitor the transmission of the tone selected by going off-hook at the test line.

13. Depressing **NEXT DATA** sequences to the next field containing a 1 and begins transmitting the associated tone.

    Repeated use of **NEXT DATA** sequences through all the selected tones, transmitting them, and back to the first tone selected which is again transmitted.

14. Test 2 is stopped by depressing **NEXT TEST** or **RESET**.

Repair Guide

When tone failures are reported by the user as a trouble, and **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure) has not detected a tone plant failure, the following steps should be performed by maintenance personnel in the order listed to isolate and replace the failing circuit pack.

1. At the test line, install a 249A adapter and a telephone set or hand test set.

2. Execute Test 1 for the first tone plant displayed upon entering **PROC 643** and listen to each tone by going off-hook at the test line.

3. If the tone plant passes, execute Test 1 for all tone plants in the switch, using **NEXT CIRCUIT** and/or **NEXT UNIT** to select the next tone plant for testing.

4. If no tone plants indicate a failure, check the wiring between the terminal equipment experiencing the trouble and the associated connections to the switch.

5. If a tone plant fails, determine which tones are defective, and execute Test 2 to inhibit the transmission of the fault-free tones to verify the status of the tones suspected of being defective by listening to the selected tones at the test line.

6. Replace SN250 and repeat Test 1.

7. If the tone plant continues to fail after replacing SN250, use **PROC 620**, Test 4 (unit type 16) to further isolate the exact cause of the problem.

8. If the tone plant still fails after further diagnosis by **PROC 620**, check the wiring associated with the defective tones isolated in Step 5.

PROC 644 - TERMINAL-TO-AUXILIARY TONE TEST CALL

Purpose

PROC 644 provides the capability to transmit the six tones contained on circuit pack SN253 to a test line to allow maintenance personnel to listen to each tone to determine if attenuation or improper interruption rate problems exist.

NOTE

Field 15 (preemption tone) and Field 16 (precedence audible alert tone) are tested only when circuit pack **SN253C** is installed.

PROC 644 is normally used when a user reported trouble concerning auxiliary tone failures is not detected by **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure).

The user reported trouble may be intermittent in nature and **PROC 644** can isolate the potential problem to a particular auxiliary tone plant with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 644** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AZ, PROC 644 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6 - Change test line equipment location.
3. Fields 7 through 10 - Select auxiliary tone plant equipment location to be tested.
4. Fields 11 through 16 - Select tone to be transmitted (Test 2 only).

NOTE

Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be selected when circuit pack **SN253C** is installed.

Table 5-53.

PROC 644 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1,2	Test number.	11-16	0,1	0 = Tone is not to be transmitted. 1 = Tone is to be transmitted. Flashing 1 = Tone is active (being transmitted).
2	0-30	Test line module number.			
3	0-7	Test line cabinet number.			
4	0-3	Test line carrier number.			
5	0-21	Test line slot number.			
6	0-7	Test line circuit number.	11	0,1	Immediate audible alert tone.
7	0-30	Auxiliary tone plant module number.	12	0,1	Zip tone.
8	0-7	Auxiliary tone plant cabinet number.	13	0,1	Remote hold tone.
			14	0,1	Data answer tone.
9	0-3	Auxiliary tone plant carrier number.	15	0,1	Preemption tone.
10	0-21	Auxiliary tone plant slot number.	16	0,1	Precedence audible alert tone.

Test Equipment Required

A telephone set with 2 W1AP test cords and a 249A adapter or a 1013 type hand test set with a 249A adapter is required to listen to the transmitted tones at the test line.

Operation of Procedure

Overview

PROC 644 is used to listen to the auxiliary tones transmitted to the test line.

To call in **PROC 644**, perform the following:

1. Depress **PROC NO; 644; ENTER**.

   Test 1 is automatically selected.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Sequentially transmits immediate audible alert, zip, remote hold, data answer, preemption, and precedence audible alert tones.

   NOTE

   Preemption tone and precedence audible alert tone is transmitted only when circuit pack **SN253C** is installed.

2. Test 2 - Allows any of the above tones to be selected and transmitted independently of the other tones.

Test 1

Test 1 enables maintenance personnel to sequentially transmit immediate audible alert, zip, remote hold, data answer, preemption, and precedence audible alert tones from a specific auxiliary tone plant over a test line.

NOTE

Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be tested when circuit pack **SN253C** is installed.

1. Test 1 is the default test when entering **PROC 644**, or is selected by using **NEXT TEST**, or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. When Test 1 is initially called in, a default test line equipment location is displayed in Fields 2 through 6, and the first auxiliary tone plant equipment location is displayed in Fields 7 through 10.

3. The first auxiliary tone plant can be tested or another auxiliary tone plant can be selected for testing.

   NOTE

   The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line Translation - Single Line).

4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.

5. To select another test line, enter its equipment location in Fields 2 through 6:

   (Test line module); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**.

   NOTE

   The test line must be in service and not busied out. If only Field 2 is changed, a default test line for the new module is provided.

6. To select both another test line and auxiliary tone plant, enter their equipment locations in Fields 2 through 10:

   (Test line module); ENTER; (Cabinet); ENTER; (Carrier); **ENTER; (Slot); ENTER; (Circuit); ENTER**; **(Auxiliary tone plant module); ENTER; (Cabinet); ENTER**; **(Carrier); ENTER; (Slot); ENTER**.

7. To select another auxiliary tone plant without selecting a new test line, use the **CHANGE FIELD** sequence to enter the new auxiliary tone plant equipment location:

   CHANGE FIELD; 7; ENTER; (Auxiliary tone plant module); **ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

8. Depressing **NEXT CIRCUIT** repeatedly increments through all the auxiliary tone plants in the switch.
9. Depressing **NEXT UNIT** increments to the first auxiliary tone plant in the next module (and **NEXT CIRCUIT** steps through the auxiliary tone plants within the selected module).
10. When Test 1 is called in, Fields 11 through 16 all contain 1s.

    The 1s indicate that the tone associated with each field is selected for transmission during Test 1.

11. Prior to starting Test 1, connect the telephone set or hand test set to the test line.
12. To start Test 1, depress **EXECUTE**.

    Transmission of the first tone (immediate audible alert) is initiated when **EXECUTE** is depressed.

13. As the tone is transmitted, either a 0 or 1 is flashed in the associated field (Field 11).

    A 0 indicates that the tone is not being transmitted; a 1 indicates that the tone is being transmitted.

14. When the telephone or hand test set connected to the test line is taken off-hook, maintenance personnel can listen to the tone being transmitted.
15. Maintenance personnel can determine if the tone is being transmitted or if other problems exist, such as attenuation, improper interruption rates, or if the proper tone is heard without interference from other tones.
16. Depressing **NEXT DATA** initiates transmission of the next tone in sequence.

    Depressing **NEXT DATA** repeatedly sequences through the transmission of all the tones associated with Fields 11 through 16.

    NOTE

    Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be tested when circuit pack **SN253C** is installed.

17. Depressing **NEXT DATA** during transmission of the last tone (either data answer tone or precedence audible alert tone) sequences back to the first tone (immediate audible alert), which is again transmitted.
18. Test 1 is stopped by depressing **NEXT TEST** or **RESET**.

Test 2

Test 2 enables maintenance personnel to transmit selected tones from a specific auxiliary tone plant over a test line.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is called in, the default test line and auxiliary tone plant equipment locations from Test 1 are displayed in Fields 2 through 10.
3. Either the default auxiliary tone plant can be tested or another auxiliary tone plant can be selected for testing.
4. To select another tone plant for testing use the **CHANGE FIELD** sequence or **NEXT CIRCUIT** and/or **NEXT UNIT**:

   CHANGE FIELD; 7; ENTER; (Auxiliary tone plant module); **ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER**.

   Depressing **NEXT CIRCUIT** increments through all the auxiliary tone plants in the switch.

   Depressing **NEXT UNIT** increments to the first auxiliary tone plant in the next module (and **NEXT CIRCUIT** steps through the auxiliary tone plants within the selected module).
5. When Test 2 is called in, Fields 11 through 16 all contain 0s.

   The 0s indicate that the tone associated with each field is not selected for transmission during Test 2.
6. The 0 in Field 11 is flashed, indicating an optional entry field.
7. To select the tone associated with Field 11 (immediate audible alert) for transmission, a 1 must be entered in the field:

   1; ENTER.
8. To leave the tone not selected for transmission, **ENTER** can be depressed to increment to the next field.
9. Each tone that is to be transmitted during Test 2 must be selected by entering a 1 in the associated field.

   NOTE

   Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be selected for transmission when circuit pack **SN253C** is installed.

10. Prior to starting Test 2, connect the telephone set or hand test set to the test line.
11. To start Test 2, depress **EXECUTE**.

    NOTE

    Depressing **EXECUTE** with no tones selected for transmission (Fields 11 through 16 all contain 0s), causes special error code 80 (no tone selected for transmission) to be displayed in the **MAAP** error code field.

12. The first field selected containing a 1 is flashed when **EXECUTE** is depressed, indicating that the associated tone is being transmitted.
13. Maintenance personnel can monitor the transmission of the tone selected by going off-hook at the test line.
14. Depressing **NEXT DATA** sequences to the next field containing a 1 and begins transmitting the associated tone.

    Repeated use of **NEXT DATA** sequences through all the selected tones, transmitting them, and then back to the first tone selected which is again transmitted.
15. Test 2 is stopped by depressing **NEXT TEST** or **RESET**.

Repair Guide

When auxiliary tone failures are reported by the user as a trouble, and **PROC 600** (Alarm Causes/Error Log) or **PROC 620** (Network Procedure) has not detected an auxiliary tone plant failure, the following steps should be performed in the order listed, to isolate and replace the failing circuit pack.

1. At the test line, install a 249A adapter and a telephone set or hand test set.
2. Execute Test 1 for the first auxiliary tone plant displayed upon entering **PROC 644**, and listen to each tone by going off-hook at the test line.

NOTE

Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can not be transmitted if circuit pack **SN253C** is not installed.

3. If the auxiliary tone plant passes, execute Test 1 for all auxiliary tone plants in the switch, using **NEXT CIRCUIT** and/or **NEXT UNIT** to select the next auxiliary tone plant for testing.
4. If no auxiliary tone plants indicate a failure, check the wiring between the terminal equipment experiencing the trouble and the associated connections to the switch.
5. If an auxiliary tone plant fails, determine which tones are defective, and execute Test 2 to inhibit the transmission of the fault-free tones to verify the status of the tones suspected of being defective by listening to the selected tones at the test line.

NOTE

Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can not be transmitted if circuit pack **SN253C** is not installed.

6. Replace SN253 and repeat Test 1.
7. If the auxiliary tone plant continues to fail after replacing SN253, use **PROC 620**, Test 4 (unit type 31) to further isolate the exact cause of the problem.
8. If the auxiliary tone plant still fails after further diagnosis by **PROC 620**, check the wiring associated with the defective tones isolated in Step 5.

PROC 646 - MODEM POOLING AND FACILITY TESTING

Purpose

PROC 646 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from an Analog/Digital Facility Test Circuit (ADFTC) failure, a modem pool member (MPM) failure, and/or a digital facility failure.

PROC 646 is used to:

1. Test ADFTC circuits.
2. Perform a detection test on MPMs and digital facilities.
3. Perform a diagnostic test on MPM and digital facilities.
4. Automatically turn off the fault indicator when all ADFTC circuits, MPMs, and/or digital facilities that caused an alarm to be raised are tested as good.

NOTE

Alarmed ADFTC circuits, MPM circuits, and/or digital facility circuits in PMIDS are marked as resolved.

Maintenance tests are performed on ADFTC circuits, MPMs, and data modules, EIA ports, and digital facilities that are translated as trunks.

The ADFTC (circuit pack SN261) is used in testing MPMs, data modules, EIA ports, and digital facilities.

An MPM consists of an enhanced Trunk Data Module (TDM/2) connected to a General Purpose Port (GPP) circuit pack (SN270 or SN271) and an analog modem connected to a data port trunk circuit (SN243).

An MPM is a conversion resource which allows System 85 outside users to communicate through the analog network with off/on premises facilities.

The Processor Data Module (PDM) and Trunk Data Module (TDM and TDM/2) are data modules.

The EIA port (circuit pack SN238) with a Limited Distance Modem (LDM) functions similar to a GPP port and a data module.

Digital facilities include Public Switched Digital Connectivity (PSDC), Digital Data Service (DDS), private line data facilities, and host computer access that connect to a data module or EIA port which are translated as trunks.

A Modem Pool Group (MPG) is a trunk group of MPMs all with similar data transmission characteristics.

Field Definitions and Codes

Each field of **PROC 646** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BA, PROC 646 - Field Definitions and Codes.

Optional input fields are:

1. Field 2 - Select type of test to be performed.
2. Fields 3 through 5 - Select trunk group and member number to be tested (Tests 2 and 3 only).
3. Field 6 - Select equipment location type to be tested (Tests 2 and 3 only).
4. Fields 7 through 11 - Select equipment location of the ADFTC, MPM, or digital facility to be tested.
5. Field 12 - Select length (time in minutes) of test to be performed (Tests 2 and 3 only).
6. Field 14 - Select data rate required to perform the test (Tests 2 and 3 only).

NOTE

Fields 12 and 14 are multiple use fields; however, for optional inputs they are used for test length and data rate.

Operation of Procedure

Overview

PROC 646 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from an ADFTC failure, MPM failure, and/or digital facility failure.

Table 5-54.

PROC 646 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	3-5		Circuit location:
2		Test types.	3	18-999	Trunk group number.
	0-3	Test 1 test types:	4	1-99	Member A.
	0	All ADFTC self-tests.	5	1-99	Member B.
	1	One-port ADFTC self-test.	6	0-4	Equipment location type:
	2	Two-port normal ADFTC self-test.		0	ADFTC.
	3	Two-port reverse ADFTC self-test.		1	Member A GPP port.
	0-8	Test 2 test types.		2	Member A data port.
	0	All tests or host access.		3	Member B GPP port.
	1	All originating tests.		4	Member B data port.
	2	All terminating tests.	7-11		Equipment location:
	3	Two-port originating normal test.	7	0-30	Module number.
	4	Two-port originating reverse test.	8	0-7	Cabinet number.
	5	Two-port terminating normal test.	9	0-3	Carrier number.
	6	Two-port terminating reverse test.	10	00-03, 05-08, 13-16, 18-21	Slot number.
	7	One-port originating test.	11	0-3	Circuit number.
	8	One-port terminating test.	12		Test length/number of circuits failed.
	0-8	Test 3 test types:		1-4	Test length.
	0	All tests.		1-99	Number of circuits failed.
	1	All EIA remote loopback tests.			
	2	Data module remote loopback tests.			
	3	EIA local loopback tests.			
	4	EIA remote loopback originating tests.			
	5	EIA remote loopback terminating tests.			

Table 5-54. (Contd)

PROC 646 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
13	0-6	Data type:	14 (Contd)		Data rates (Contd):
	1	Specific fault code.		48	4800 bps.
	2	Bit error rate.		96	9600 bps.
	3	Block error rate.		192	19.2 Kbps.
	4	Number of circuits tested.		560	56 Kbps.
				640	64 Kbps.
	5	Resource maintenance busy.			Data: The type of information displayed in Field 14 after test execution depends on which encode is displayed in Field 13: 13= 14= 1 Specific fault code. 2 Bit error rate. 3 Block error rate. 4 Number of circuits tested.
	6	Resource non-maintenance busy.			
14		Data rate/data.			
	3-640	Data rates:		0-1431	
	3	300 bps.		[1]	
	12	1200 bps.		[1]	
	24	2400 bps.		1-9999	

[1] The first 2 digits in Field 14 are the bit or block error rate; the second 2 digits in Field 14 are the number of bits or blocks sent. Zeroes (0's) displayed in Field 14 indicate no bits or blocks were sent. Blanks displayed in the first 2 digits indicate a zero error rate.

To obtain the bit or block error rate, multiply the first digit (left most side) by 10 raised to the negative power of the second digit.

To obtain the number of bits or blocks sent, multiply the third digit by 10 raised to the positive power of the fourth digit.

Example: Field 14 = 3586.

Bit or block error rate = 3 x 10 to the negative 5th.

Bits or blocks sent = 8 x 10 to the positive 6th.

To call in **PROC 646**, perform the following:

1. Depress **PROC NO; 646; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 2 is blanked and blinking, Field 6 displays a 0 and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Tests ADFTC circuits.
2. Test 2 - Performs detection tests on MPMs and digital facilities.
3. Test 3 - Performs diagnostic tests on MPMs and digital facilities.

Test 1

Test 1 runs a detection test on ADFTC circuit(s). Self tests are performed on ADFTC circuit(s) as determined by the test type specified in Field 2.

ADFTC self tests consist of the following test types:

1. Test type 0 - All ADFTC self tests which includes a one port, two port normal, and two port reverse detection test.
2. Test type 1 - ADFTC one port self test: A connection is made between the ADFTC and itself (port 1 to port 1) through the switch and a detection test is run.
3. Test type 2 - ADFTC two port normal test: A connection is made between the ADFTC and itself (port 1 to port 2) through the switch and a detection test is run.
4. Test type 3 - ADFTC two port reverse test: A connection is made between the ADFTC and itself (port 1 to port 2) through the switch and a detection test is run.

ADFTC circuits can be selected for testing on a single circuit basis or a range of ADFTC circuits.

If a circuit is tested with a test type of 0 (all ADFTC self tests) and no failure occurs, any alarm on that circuit is automatically resolved in PMIDS.

Test 1 Data Entry

1. Test 1 is the default test when entering **PROC 646** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. When Test 1 is initially called in, Fields 7 through 11 (equipment location) are dashed, or a default equipment location may be displayed in Fields 7 through 11. Field 13 may display a default maintenance busy status and Field 14 (data) may display a specific fault code.
3. The default equipment location can be the last ADFTC equipment location displayed in Test 2 or 3 of **PROC 646** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

4. Field 2 (test type) is blanked and blinking, indicating a mandatory entry.
5. Fields 3 through 5 (circuit fields) are dashed during Test 1 execution and Field 6 (type) defaults to 0 (ADFTC).
6. To select the type of test to be run on ADFTC circuit(s), enter the test type number in Field 2 and depress **ENTER**.

   Tests that can be run on ADFTC circuits are: 0 = All ADFTC self tests; 1 = one port ADFTC self test; 2 = two port normal ADFTC self test; 3 = two port reverse ADFTC self test.
7. After the test type (Field 2) is entered, the module number field (Field 7) is blinking indicating that a module number may be entered.
8. All ADFTC circuits, a range of ADFTC circuits, a specific ADFTC circuit, or the default equipment location can be tested.
9. Selection of a range of ADFTC circuits to be tested depends on whether or not a default equipment location is displayed. If a default equipment location is displayed, the **CHANGE FIELD** sequence **must** be used. If no default equipment location is displayed, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the range of ADFTC circuits to be tested.
10. To select all ADFTC circuits in the switch for testing, Fields 7 through 11 must be dashed.

    If no default equipment location is displayed, depress **ENTER**.

    If a default equipment location is displayed, depress **CHANGE FIELD; 7; ENTER; ENTER**.

    Test 1 starts with the first module, first cabinet and carrier and runs until all ADFTC circuits in the switch are tested.

    Proceed to Step 1 of Test 1 Execution.
11. To select all ADFTC circuits in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Module number to be tested); ENTER.

    CHANGE FIELD; 7; ENTER; **(Module number to be tested); ENTER**.

    Test 1 starts with the first ADFTC circuit in the module selected and runs until all ADFTC circuits in the module are tested.

    Proceed to Step 1 of Test 1 Execution.
12. To select all ADFTC circuits in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Module number of cabinet to be tested); **ENTER; (Cabinet number to be tested); ENTER**.

    CHANGE FIELD; 7; ENTER; **(Module number of cabinet to be tested); ENTER**; **(Cabinet number to be tested); ENTER**.

    Test 1 starts with the first ADFTC circuit in the cabinet selected and runs until all ADFTC circuits in the cabinet are tested.

    Proceed to Step 1 of Test 1 Execution.

13. To select all ADFTC circuits in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Module number of carrier to be tested); ENTER; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    CHANGE FIELD; 7; ENTER; **(Module number of carrier to be tested); ENTER**; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    Test 1 starts with the first ADFTC circuit in the carrier selected and runs until all ADFTC circuits in the carrier are tested.

    Proceed to Step 1 of Test 1 Execution.

14. To select the ADFTC circuit in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    (Module number of slot to be tested); ENTER; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    CHANGE FIELD; 7; ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); **ENTER; (Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    Test 1 tests circuit 1 of the ADFTC in the slot selected.

    Proceed to Step 1 of Test 1 Execution.

15. To select a specific ADFTC circuit for testing, perform one of the following depending on whether or not a default equipment location is displayed:

    NOTE

    Port 0 (circuit number 0) cannot be tested in **PROC 646** but can be tested in **PROC 620**.

    (Module number of ADFTC circuit to be tested); **ENTER; (Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number 1); ENTER**.

    CHANGE FIELD; 7; ENTER; (Module number of ADFTC circuit to be tested); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number 1); ENTER**.

    Field 13 (data type) displays the maintenance busy status of the specific ADFTC circuit selected for testing.

    NOTE

    Special error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed if the correct equipment location is not entered in Fields 7 through 11.

    Proceed to Step 1 of Test 1 Execution.

16. A specific ADFTC circuit can also be selected for testing by use of **NEXT CIRCUIT**.

Depress **NEXT CIRCUIT** until the port equipment location of the ADFTC circuit to be tested is displayed in Fields 7 through 11.

NOTE

The **WAIT** indicator lights while a circuit is searched for. The delay is about 30 seconds per module.

Proceed to Step 1 of Test 1 Execution.

17. To test the default equipment location displayed in Fields 7 through 11, proceed to Step 1 of Test 1 Execution.

Test 1 Execution

1. To start Test 1 after selecting the test type and ADFTC circuit(s) to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. If test type 0 was selected, Field 2 changes to a 1 to indicate that test type 1 is currently being executed.

   If any other test type was selected, Field 2 does not change.

3. When testing encounters an ADFTC circuit in use by the periodic test, the periodic test is stopped and the ADFTC circuit is tested.

4. **STOP** can be depressed to halt Test 1 at any time.

5. If Test 1 is stopped before one complete testing pass through a single ADFTC circuit or a range of ADFTC circuits is made, special error code 95 (wait for test to stop) is displayed in the **MAAP** error code field.

NOTE

One complete testing pass equals all test types selected for a single circuit are tested, or in a range of circuits all test types selected for each circuit in a range of circuits are tested.

6. After the current test is completed, special error code 82 (test of range not completed) is displayed in the **MAAP** error code field indicating that one complete pass through the ADFTC circuit or range of ADFTC circuits was not completed.

7. The port equipment location of the last ADFTC circuit tested is displayed in Fields 7 through 11, the total number of circuits tested is displayed in Field 14 (if all test types of a circuit are tested), and the total number of failures (if any) is displayed in Field 12.

8. If any failures are displayed in Field 12, test result information can be stepped through as described in Step 10 below when Test 1 is halted using **STOP** even though the ADFTC circuit or the entire range of ADFTC circuits is not tested.

9. To restart the test when Test 1 is halted by use of **STOP** before a single ADFTC circuit or range of ADFTC circuits are tested at least once, **EXECUTE** is depressed and Test 1 starts at the port equipment location and specific test following the last port equipment location and specific test fully tested.

NOTE

When Test 1 is continued from where it was stopped, any test results gathered to that point are retained.

10. Test 1 operation and display of test results is different when a specific ADFTC circuit or default equipment location is tested and when a range of ADFTC circuits are tested.

    For test operation and display of test results for a default equipment location or a specific ADFTC circuit, proceed to Step 1 of Test 1 Result Display for a Single Circuit.

    For test operation and display of test results for a range of ADFTC circuits, proceed to Step 1 of Test 1 Result Display for a Range of Circuits.

Test 1 Result Display for a Single Circuit

1. When Test 1 is completed for a default equipment location or a specific ADFTC circuit, the **WAIT** indicator goes off and the following is displayed:

   Field 1 - 1.

   Field 2 - Original test type selected for testing ADFTC circuit.

   Fields 3 through 5 - Dashed.

   Field 6 - 0.

   Fields 7 through 11 - Port equipment location of ADFTC circuit tested.

   Field 12 - 0 (indicating no failures were found for the ADFTC circuit tested) or 1 (indicating the ADFTC circuit failed the test).

   Field 13 - Data type of 4 (indicating that Field 14 indicates the number of circuits tested).

   Field 14 - 0 (if **STOP** was depressed indicating all tests are not completed) or 1 (indicating 1 ADFTC circuit tested).

2. Depressing **NEXT CIRCUIT** changes the display in the data type and data fields (Fields 13 and 14).

   Field 13 displays a 1 indicating that the data in Field 14 is a specific fault code.

3. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

   Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

   NOTE

   Refer to Table BA, PROC 646 - Field Definitions and Codes, to determine how to interpret bit, block error rates and bits/blocks sent.

4. Depressing **NEXT FAULT** repeatedly advances through each test type selected for testing displaying specific fault code (if any), bit error rate/bits sent, and block error rate/blocks sent for each test type.

   After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

   Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

5. When another specific ADFTC circuit is to be tested, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific ADFTC circuit to be tested.

   CHANGE FIELD; 2; ENTER; (Test type desired); ENTER; **(Module number of ADFTC circuit to be tested); ENTER**; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number 1); ENTER**.

6. **EXECUTE** must be depressed to test the specific ADFTC circuit selected for testing.

Test 1 Result Display for a Range of Circuits

1. When a range of ADFTC circuits is being tested, the **WAIT** indicator is lighted and the following fields are incremented as a circuit is tested:

   Field 2 is updated with the test type currently being executed (i.e., 1, 2, and 3) if test type 0 (all ADFTC tests) was selected.

   Fields 7 through 11 - Port equipment location of the current ADFTC circuit being tested.

   Field 14 - Bit error rate/bits sent (updated every 10 seconds).

2. When testing is completed for an ADFTC circuit, the bit error rate/bits sent, block error rate/blocks sent, any specific fault code and the port equipment location are stored in DMIDS.

3. When a range of ADFTC circuits has completed testing, the **WAIT** indicator goes off.

   Field 2 displays the original test type and Fields 7 through 11 display the original equipment range selected.

   Field 12 displays the number of failures (if any).

   Field 13 - 4 (indicating that Field 14 displays the number of ADFTC circuits tested).

   Field 14 - Number of ADFTC circuits tested.

4. **All failures with a specific fault code are displayed first followed by passing circuits with a specific fault code of 0**.

   Bit and block error rates are displayed for failing and passing circuits.

   When multiple tests (more than one test type) are performed on ADFTC circuits, a specific fault code (if any) and bit/block error rates are displayed for all test types executed for each ADFTC circuit tested.

5. Depressing **NEXT CIRCUIT** displays the first ADFTC circuit tested as follows:

   Field 1 - 1.

   Field 2 - Test type for the displayed ADFTC circuit.

   Fields 3 through 5 - Dashed.

   Field 6 - 0 (default ADFTC equipment type).

   Fields 7 through 11 - Equipment location of the displayed ADFTC circuit.

   Field 12 - 0 or number of circuits failed.

   Field 13 - 1 (indicating that Field 14 displays a specific fault code).

   Field 14 - 0 or specific fault code.

6. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

   Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

   NOTE

   Refer to Table BA, PROC 646 - Field Definitions and Codes, to determine how to interpret bit and block error rates.

7. Depressing **NEXT FAULT** repeatedly advances through each test type selected for testing displaying specific fault code (if any), bit error rate/bits sent, and block error rate/blocks sent for each test type.

   After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

   Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining tested ADFTC circuits with a 1 displayed in Field 13 and a specific fault code displayed in Field 14.

   Depressing **NEXT FAULT** displays the bit error rate/bits sent and block error rate/blocks sent.

   Depressing **NEXT FAULT** repeatedly advances through each test type selected for the displayed ADFTC circuit, displaying specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

9. When all ADFTC circuits are displayed, depressing **NEXT CIRCUIT** dashes Fields 2 through 14.

   Depressing **NEXT CIRCUIT** once more starts the sequence over with the first failure or tested ADFTC circuit.

10. If a circuit is tested with a test type of 0 (all tests) and no failure occurs, any alarm on that circuit is automatically resolved in PMIDS.

11. To select another range of ADFTC circuits to test, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific range of ADFTC circuits to be tested as follows:

    CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

    Refer to Steps 10 through 13 of Test 1 Data Entry above to select a range of ADFTC circuits to test in a module, cabinet, carrier, or slot.

12. **EXECUTE** must be depressed to test the range of ADFTC circuits selected for testing.

13. Test 1 automatically turns off the **OTHER FAILS** fault indicator when all ADFTC circuits that raised an alarm pass Test 1 assuming no MPM, digital facilities, or other alarm sources affecting the **OTHER FAILS** fault indicator are active.

    NOTE

    ADFTC alarmed circuit entries in PMIDS are marked as resolved.

Test 2

Test 2 runs detection tests on modem pool members (MPMs) and digital facilities as determined by the test type specified in Field 2.

Detection tests consist of half duplex tests and full duplex tests. (Refer to Figure 13 - Modem Pooling and Facility Test Configurations.)

1. The half duplex test is run only on MPMs. It is run four times, from both the originating and terminating modes and in both the forward and reverse direction. The half duplex test requires the use of two MPMs. Connections are made from ports 1 and 2 of the ADFTC to the GPP of each MPM and between each MPM's data (analog) port.
2. The full duplex test is run on digital facilities assigned as trunks, and for diagnostic purposes on full duplex MPMs and the TDM/2 on half duplex MPMs. The full duplex test can put MPMs in either originating or terminating modes. Only one connection is necessary except when testing a full duplex MPM. It is made between port 1 of the ADFTC and the GPP of the data module to be tested. An additional connection must be made, when testing a full duplex MPM, between its data port and the data port of a known **good** MPM.

Types of detection tests for MPMs and digital facilities consist of all tests (test type 0 - includes test types 3 through 8); all originating tests (test type 1 - includes test types 3, 4, and 7); all terminating tests (test type 2 - includes test types 5, 6, and 8); two port originating normal test (test type 3); two port originating reverse test (test type 4); two port terminating normal test (test type 5); two port terminating reverse test (test type 6); one port originating test (test type 7); and one port terminating test (test type 8).

Each type of test is not applicable to all types of modem pool members or digital facilities. Types of modems available with modem pool members tested consist of 103J, 113C, 113D, 202S, 201C, 208B, and 212A.

Types of tests that can be run in Test 2 for modem pool members and digital facilities are:

1. Modem pool members that are both originating and terminating (all modems except 113C and 113D) - All tests except one port test (test types 0 through 6).
2. Originating only modem (i.e., 113C) - All tests (test type 0) all originating tests (test type 1), and one port originating test (test type 7).
3. Terminating only modem (i.e., 113D) - All tests (test type 0), all terminating tests (test type 2), and one port terminating test (test type 8).
4. Digital facilities and host access - All tests (test type 0).

Several different test types may be run on one modem pooling circuit (or circuit pair).

1. Some test types might fail while other test types pass.
2. Failing test types are displayed first while passing test types are displayed after all failing test types are displayed.
3. When a modem pooling circuit (or circuit pair) test fails, a specific fault code is displayed. A specific fault code of 0 is displayed for passing tests.
4. Bit and block error rates are displayed for both failing and passing circuits (or failing and passing test types) for further diagnosis (if required).

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Figure 5-13. Modem Pooling and Facility Test Configurations

Characteristics (i.e., modem type, loop back control, etc.) of digital trunks used in modem pooling are provided in **PROC 100**, Words 1 and 2.

PROC 100, Word 2 can also be used to disable the digital facility testing of a particular modem pooling trunk group.

MPMs and digital facilities can be selected for testing on a single circuit basis or a range of MPMs or digital facilities (i.e., trunk group number; trunk group number and member A; trunk group number and member B (MPM only); or no entries).

If a circuit or circuit pair is tested with a test type of 0 (all tests) and no failure occurs, any alarm on that circuit or circuit pair is automatically resolved in PMIDS.

Test 2 Data Entry

1. Test 2 is selected by use of **NEXT TEST**.

NOTE

Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. When Test 2 is initially called in, Fields 3 through 11 (trunk group member number and equipment location) are dashed, or a default equipment location may be displayed in Fields 7 through 11. Field 13 may display a default maintenance busy status and Field 14 (data) may display a default specific fault code.
3. The default equipment location can be the last equipment location or trunk group and member number displayed in Test 3 of **PROC 646** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a GPP or data port which is part of an MPM or digital facility and is still displayed in **PROC 620** when it is passed.
5. Field 2 (test type) is blanked and blinking, indicating a mandatory entry.
6. Types of tests that can be run in Test 2 for modem pool members and digital facilities are:

   Originating and terminating modem pool members (all modems except 113C and 113D) - All tests except one port test (test types 0 through 6).

   113C modem - All tests (test type 0), all originating tests (test type 1), and one port originating test (test type 7).

   113D modem - All tests (test type 0), all terminating tests (test type 2), and one port terminating test (test type 8).

   Digital facilities and host access - All tests (test type 0).
7. To select the type of test to be run on MPMs or digital facilities to be tested, enter the test type number in Field 2 and depress **ENTER**.

   NOTE

   When a default equipment location is displayed, the maintenance busy status is displayed in Field 13 (data type) when the test type is entered.

8. After the test type (Field 2) is entered, the trunk group number field (Field 3) is blinking indicating that a trunk group number of the MPM or digital facility to be tested may be entered.
9. If an equipment location was carried over from Test 3 and it is an MPM or digital facility, its trunk group and member number are displayed in Fields 3 through 5 (as appropriate) and the equipment location is displayed in Fields 7 through 11.
10. A range of MPMs or digital facilities, a specific MPM or digital facility, or the default equipment location can be tested.

    If a default equipment location is to be tested, proceed to Step 11.

    If a range of MPMs or digital facilities, a specific MPM, or a specific digital facility is to be tested, proceed to Step 12.
11. To test the default equipment location, determine if the ADFTC to be used for testing is to be specified before testing.

    If the ADFTC is to be specified, record the default equipment location (Fields 3 through 5, and 7 through 11 as appropriate) and proceed to Step 13.

    If the ADFTC is not to be specified, proceed to Step 45.

12. If a specific ADFTC is to be used for testing, it **must** be selected at this time.

    To select a specific ADFTC to be used for testing, proceed to Step 13.

    If a specific ADFTC is not to be used for testing, proceed to Step 15.

13. The ADFTC to be used for testing can be specified by entering the complete equipment location and the correct type in Fields 6 through 11 as follows:

    CHANGE FIELD; 6; ENTER; 0; ENTER; (Module number of ADFTC); ENTER; (Cabinet number of ADFTC); ENTER; **(Carrier number of ADFTC); ENTER; (Slot number of ADFTC); ENTER; (Circuit number of ADFTC); ENTER**.

    NOTE

    If the ADFTC is incompletely specified (all fields not entered), special error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Field 7 (module) blinks.

    Proceed to Step 14.

14. If a default equipment location is being tested, enter the default equipment location (recorded in Step 11 above) in Fields 3 through 5, and 7 through 11 (as appropriate) using the **CHANGE FIELD** sequence and proceed to Step 45.

    If a range of MPMs or digital facilities, a specific MPM or a specific digital facility is to be tested, proceed to Step 15.

15. MPMs or digital facilities can be selected for testing by one of two methods; i.e., by circuit (Fields 3 through 5) or by type and equipment location (Fields 6 through 11).

    To select MPMs or digital facilities for testing using the circuit method, proceed to Step 16.

    To select MPMs or digital facilities for testing using the type and equipment location, proceed to Step 35.

16. If no entries are specified in Fields 3 through 5 or 7 through 11, Test 2 is run on all trunk groups corresponding to the test type entered in Field 2.

17. If only the trunk group number is specified in Field 3, Test 2 is run on all members of the trunk group.

18. If the trunk group number and member A are specified in Fields 3 and 4, Test 2 is run only on member A using any available member B.

19. If the trunk group number and member B are specified in Fields 3 and 5, Test 2 is run on all member As of the trunk group using the member B specified.

20. If the trunk group number and members A and B are specified in Fields 3 through 5, Test 2 is run only on that circuit pair.

21. Selection of a range of MPMs or digital facilities to be tested depends on whether or not a default equipment location is displayed or if a specific ADFTC is selected for testing.

    If a default equipment location is displayed or if a specific ADFTC is selected for testing, the **CHANGE FIELD** sequence **must** be used.

    If no default equipment location is displayed or no specific ADFTC is selected for testing, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the range of MPMs or digital facilities to be tested.

22. To select all trunk groups corresponding to the test type entered in Field 2 for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    ENTER.

    CHANGE FIELD; 3; ENTER; ENTER.

    NOTE

    Fields 3 through 11 are dashed.

    Test 2 starts with the first MPM or digital facility (in equipment location order not trunk group sequence) corresponding to the test type entered in Field 2 and runs until all MPMs and/or digital facilities are tested.

    NOTE

    If a modem pooling trunk group is disabled by **PROC 100**, Word 2 (Field 18 equals 0), the MPMs or digital facilities associated with the disabled trunk group are not tested.

    Proceed to Step 47.

23. To select all MPMs or digital facilities in a trunk group for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    (Trunk group number to be tested); ENTER.

    CHANGE FIELD; 3; ENTER; (Trunk group number to be tested); ENTER.

    NOTE

    Special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) may be displayed in the **MAAP** error code field when the trunk group number is entered in Field 3. If you are sure that the trunk group number that you entered is a modem pooling trunk group and you wish to test the trunk group, proceed to Step 52.

    Test 2 starts with the first MPM or digital facility in the trunk group selected (in equipment location order not trunk group sequence) and runs until all MPMs or digital facilities in the trunk group are tested.

    Proceed to Step 47.

24. **NEXT UNIT** is also used to select a trunk group for testing. Depress **NEXT UNIT** until the trunk group number to be tested is displayed in Field 3. All other fields are dashed.

    NOTE

    If a modem pooling trunk group is disabled by **PROC 100**, Word 2 (Field 18 equals 0), the trunk group will not be displayed by depressing **NEXT UNIT**.

    Test 2 starts with the first MPM or digital facility in the trunk group selected (in equipment location order not trunk group sequence) and runs until all MPMs or digital facilities in the trunk group are tested.

    Proceed to Step 47.

25. To test a single member A with any member B, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    NOTE

    If the trunk group number is a digital facility or MPG with one way modems, the member B field **must** be dashed.

    (Trunk group number of member B to be tested); **ENTER; (Member A); ENTER**.

    CHANGE FIELD; 3; ENTER; (Trunk group number of member B to be tested); ENTER; (Member A); ENTER.

    NOTE

    Special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) may be displayed in the **MAAP** error code field when the trunk group number is entered in Field 3. If you are sure that the trunk group number that you entered is a modem pooling trunk group and you wish to test a single member A with any member B for the trunk group number entered, proceed to Step 52.

    Test 2 tests the member A specified with any member B.

    Proceed to Step 47.

26. To select all member As in a trunk group for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    NOTE

    If the trunk group number is a digital facility or MPG with one way modems, the member B field **must** be dashed since it is not required for testing member As. If the trunk group is not a digital facility or a modem pool with one way members and member B was dashed, member Bs are also selected for testing.

    (Trunk group number of member A to be tested); **ENTER; ENTER; (Member B or dashed); ENTER**.

    CHANGE FIELD; 3; ENTER; (Trunk group number of member A to be tested); ENTER; ENTER; (Member B or dashed); ENTER.

    NOTE

    Special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) may be displayed in the **MAAP** error code field when the trunk group number is entered in Field 3. If you are sure that the trunk group number that you entered is a modem pooling trunk group and you wish to test all member As for the trunk group number entered, proceed to Step 52.

    Test 2 starts with the first member A in the trunk group selected (in equipment location order) and runs until all member As in the trunk group are tested.

    Proceed to Step 47.

27. To select a specific MPM or digital facility for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    NOTE

    If a specific digital facility is being tested, Field 5 (member B) **must** be dashed.

(Trunk group number of MPM to be tested); ENTER; **(Member A of MPM to be tested); ENTER; (Member B of MPM to be tested); ENTER**.

CHANGE FIELD; 3; ENTER; (Trunk group number of MPM to be tested); ENTER; (Member A of MPM to be tested); **ENTER; (Member B of MPM to be tested); ENTER**.

NOTE

Special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) may be displayed in the **MAAP** error code field when the trunk group number is entered in Field 3. If you are sure that the trunk group number that you entered is a modem pooling trunk group and you wish to test a specific MPM or digital facility for the trunk group number entered, proceed to Step 52.

Test 2 tests the MPM specified in Fields 3 through 5 or the digital facility specified in Fields 3 and 4.

Proceed to Step 32.

28. **NEXT CIRCUIT** can be used to select a circuit or circuit pair before test execution.

NOTE

If a modem pooling trunk group is disabled by **PROC 100**, Word 2 (Field 18 equals 0), circuits or circuit pairs associated with the disabled trunk group will not be displayed by depressing **NEXT CIRCUIT**.

29. If nothing is specified in the circuit or equipment location fields (Fields 3 through 5 and 7 through 11), two available facilities are displayed in the circuit and equipment location fields from the **first testable trunk group** when **NEXT CIRCUIT** is depressed. If the trunk group contains digital facilities or MPMs with one way modems, member B (Field 5) is dashed.

    Proceed to Step 32.

30. If the circuit field is specified up to member A (Fields 3 and 4), member A is incremented to the next member A when **NEXT CIRCUIT** is depressed.

    Proceed to Step 32.

31. If both members A and B are specified, the member number is advanced corresponding to the type field (Field 6) of the equipment location fields when **NEXT CIRCUIT** is depressed.

    Proceed to Step 32.

32. After the circuit fields are specified, the equipment location fields (Fields 7 through 11) default to the equipment location of member A.

    The type field (Field 6) defaults to 1, indicating the GPP port of member A is displayed in Fields 7 through 11.

    Proceed to Step 33.

33. Before test execution, **NEXT DATA** can be depressed to examine port equipment locations associated with the circuit selected for testing.

34. Successive depression of **NEXT DATA** displays in Fields 6 through 11 the type and port equipment locations of the member A GPP, member A data port, member B GPP, and member B data port.

NOTE

Depressing **NEXT DATA** does not always display 4 equipment locations before testing. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities are being tested.

The maintenance busy status of each port equipment location is displayed in Field 13.

Proceed to Step 45.

35. MPMs or digital facilities can be selected for testing using the type and equipment location fields (Fields 6 through 11).

    Only one member A GPP or one member A data port can be designated as the type of facility to test if an individual circuit is to be tested.

36. A range of member A GPP (equipment location type 1) facilities can be selected for testing.

NOTE

Ranging is not allowed for other equipment location types.

37. To select the type of facility to test, the **CHANGE FIELD** sequence must be used:

    CHANGE FIELD; 6; ENTER; (equipment location type); **ENTER**.

38. Equipment location types are: 1 = Member A GPP port, 2 = Member A data port for a fully specified circuit, or 1 = Member A GPP for a range test.

NOTE

Only equipment location type 1 (member A GPP) can be entered in Field 6 for testing of digital facilities.

39. When the equipment location type is entered in Field 6, the module field (Field 7) blinks for entry.

40. To select all member A GPPs in a module for testing, enter the following:

    (Module number to be tested); ENTER.

    Test 2 starts with the first member A GPP in the module selected and runs until all member A GPPs in the module are tested. In addition, any data port associated with a modem pool is also tested.

    Proceed to Step 47.

41. To select all member A GPPs in a cabinet for testing, enter the following:

    (Module number of cabinet to be tested); **ENTER; (Cabinet number to be tested); ENTER**.

    Test 2 starts with the first member A GPP in the cabinet selected and runs until all member A GPPs in the cabinet are tested.

    Proceed to Step 47.

42. To select all member A GPPs in a carrier for testing, enter the following:

    (Module number of carrier to be tested); ENTER; **(Cabinet number of carrier to be tested); ENTER**; **(Carrier number to be tested); ENTER**.

    Test 2 starts with the first member A GPP in the carrier selected and runs until all member A GPPs in the carrier are tested.

    Proceed to Step 47.

43. To select all member A GPPs in a slot for testing, enter the following:

    (Module number of slot to be tested); ENTER; **(Cabinet number of slot to be tested); ENTER**; **(Carrier number of slot to be tested); ENTER**; **(Slot number to be tested); ENTER**.

    Test 2 starts with the first member A GPP in the slot selected and runs until all member A GPPs in the slot are tested.

    Proceed to Step 47.

44. To select a specific member A GPP or member A data port for testing, enter the following:

    (Module number of member A GPP or member A data, **port to be tested); ENTER; (Cabinet number); ENTER**; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.

    NOTE

    Equipment type (Field 6) must correspond to the equipment location selected or error code 85 (invalid equipment location) is displayed in the **MAAP** error code field.

    Proceed to Step 45.

45. The maintenance busy status of the equipment location displayed in Fields 7 through 11 is displayed in Field 13.

    The circuit displayed in Fields 7 through 11 can be busied out (if required).

    If the circuit is to be busied out for testing, proceed to Step 46. If busy out of the circuit is not required, proceed to Step 47.

46. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

    NOTE

    If Fields 7 through 11 are not entered, special error code 96 (fields 7 through 11 must be entered before use of **BUSY OUT)** is displayed in the **MAAP** error code field.

    Check the maintenance busy status displayed in Field 13.

    If the maintenance busy status equals 5, proceed to Step 47.

    If the maintenance busy status equals 6, depress **BUSY OUT** and proceed to Step 47.

    NOTE

    Special error code 85 (invalid equipment location) may be displayed in the **MAAP** error code field when **BUSY OUT** is depressed. If you are sure that the individual port equipment location that you entered is a modem pooling port equipment location and you wish to test the MPM or digital facility entered, proceed to Step 52.

47. The length of the test **(maximum of 4 minutes for each test type executed)** can be entered in Field 12, or a default test length can be chosen.

    NOTE

    The default test length causes a very short (less than 2 seconds) test. However, processing overhead increases the delay seen at the **MAAP** to less than 15 seconds for each test type. This default test length applies to all bit rates and test types.

48. Either Field 12 (test length) is blinking or the **CHANGE FIELD** sequence must be used to enter the desired test length.

    If Field 12 is blinking, proceed to Step 49.

    If Field 12 is not blinking, perform **CHANGE FIELD; 12; ENTER**, and proceed to Step 49.

49. If a default test length is desired, depress **ENTER**. If a different test length is desired, enter the time (minutes) in Field 12:

    (1 through 4 - maximum of 4 minutes); ENTER.

    NOTE

    The actual test length executed for each test type selected is determined by whether the test for the test type passes or fails. If the test passes, either the default test length or the time entered in Field 12 is used for the test performed. If the test fails, the time of the test is the default test length no matter what time is entered in Field 12.

50. Field 14 (data rate) blinks for entry. The data rate can be entered in Field 14, or a default data rate can be chosen.

    NOTE

    Refer to Table BB, PROC 646 Modem Bit Rates, to determine the data rate for the modem type to be tested.

Table 5-55.

PROC 646—MODEM BIT RATES	
MODEM TYPE	BIT RATE
103J	**300 bits per second**
113C	**300 bits per second**
113D	**300 bits per second**
201C	**2400 bits per second**
202S	**1200 bits per second**
208B	**4800 bits per second**
212A	**300/1200 bits per second**

51. If a default data rate is desired, depress **ENTER**. If a different data rate is desired, enter the data rate in Field 14:

    (Data rate); ENTER.

    Data rate encodes are: 3 = 300 bps, 12 = 1200 bps, 24 = 2400 bps, 48 = 4800 bps, 96 = 9600 bps, 192 = 19.2 kbps, 560 = 56 kbps, 640 = 64 kbps.

52. When special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) or special error code 85 (invalid equipment location) is displayed and you are sure that the trunk group, specific MPM, or digital facility is a modem pooling trunk group or member, perform Steps 53 through 59 as appropriate.

53. Using **PROC 100**, Word 2 enter the trunk group number and depress **DISPLAY, EXECUTE**.
54. Check the encode displayed in Field 18.

    If the encode in Field 18 is a 0, proceed to Step 55.

    If the encode in Field 18 is not a 0, you have entered the wrong trunk group number or an invalid equipment location.
55. Record the data displayed in each field of **PROC 100**, Word 2 for the trunk group entered.
56. Depress **REMOVE, EXECUTE**.
57. Enter the trunk group and the data recorded in Step 55 except for Field 18. Enter a 1, 2, or 3 encode in Field 18 depending on the type of loop back control required in testing the modem pooling trunk group.
58. Depress **ADD, EXECUTE**.

    The modem pooling trunk group can now be tested in **PROC 646** Test 2 or Test 3.
59. Repeat Test 2 from Step 1 of Test 2 Data Entry.

Test 2 Execution

1. To start Test 2 after selecting the test type, the ADFTC to be used for testing, the MPM(s) and/or digital facilities to be tested, the test length and data rate, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.
2. If a facility is maintenance busied out, it is released from busy while under test.
3. When the test encounters a facility in use, a specific fault code is logged in DMIDS records and the test is stopped.

   The data call in progress is not aborted.

   When testing multiple circuits (range testing) and Test 2 encounters a facility in use, the test continues with the next circuit to be tested.
4. **STOP** can be depressed to halt Test 2 at any time.
5. If Test 2 is stopped before one complete testing pass through the facility or range of facilities specified is made, special error code 95 (wait for test to stop) is displayed in the **MAAP** error code field.

   NOTE

   One complete testing pass means that all test types selected for a single circuit have been tested; or, in a range of circuits, all test types selected for each circuit in a range of circuits have been tested.
6. After the current test is completed, special error code 82 (test of range not completed) is displayed in the **MAAP** error code field indicating that one complete pass through the facility or range of facilities is not completed.
7. The original test type selected is displayed in Field 2, the port equipment location of the last facility tested is displayed in Fields 3 through 11, the total number of circuits tested is displayed in Field 14 (if all test types of a circuit are complete), and the total number of failures (if any) is displayed in Field 12.

8. If any failures are displayed in Field 12, test result information can be stepped through as described in Step 10 below when Test 2 is halted using **STOP** even though the facility or range is not tested.

9. To restart the test when Test 2 is halted by use of **STOP** before a single facility or range of facilities are tested at least once, **EXECUTE** is depressed and Test 2 starts at the port equipment location and specific test following the last port equipment location and specific test fully tested.

NOTE

When Test 2 is continued from where it was stopped, any test results gathered to that point are retained.

10. Test 2 operation and display of test results are different when a specific MPM, digital facility, or default equipment location is tested and when a range of MPMs or digital facilities are tested.

    For test operation and display of test results for a default equipment location or a specific MPM or digital facility, proceed to Step 1 of Test 2 Result Display for a Single Circuit.

    For test operation and display of test results for a range of MPMs or digital facilities, proceed to Step 1 of Test 2 Execution and Test Result Display for a Range of Circuits.

Test 2 Result Display for a Single Circuit

1. When Test 2 is completed or **STOP** is depressed for a default equipment location, a specific MPM, or digital facility, the **WAIT** indicator goes off and the following is displayed:

   Field 1 - 2.

   Field 2 - Test type originally selected for testing MPM or digital facility.

   Fields 3 through 5 - Circuit location.

   Field 6 - Type of equipment location (1 through 4).

   Fields 7 through 11 - Port equipment location of MPM or digital facility tested.

   Field 12 - 0 (indicating no failures were found for the MPM or digital facility tested) or 1 (indicating the MPM or digital facility failed the test).

   Field 13 - Data type of 4 (indicating that Field 14 indicates the number of circuits tested).

   Field 14 - 0 (if **STOP** was depressed indicating all tests are not completed) or 1 (indicating 1 MPM, MPM pair, or digital facility tested).

NOTE

Special error code 85 (invalid equipment location) may be displayed in the **MAAP** error code field after **EXECUTE** is depressed. If you are sure that the individual port equipment location that you entered is a modem pooling port equipment location and you wish to test the MPM or digital facility entered, Refer to Step 52 of Test 2 Data Entry above.

2. Depressing **NEXT CIRCUIT** changes the display in the data type and data fields (Fields 13 and 14) and may change the type and equipment location in Fields 6 through 11 depending on the type of failure (if any).

   Field 13 displays a 1 indicating that the data in Field 14 is a specific fault code.

3. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

   Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

   NOTE

   Refer to Table BA, PROC 646 - Field Definitions and Codes, to determine how to interpret bit error rate/bits sent and block error rate/blocks sent.

4. Depressing **NEXT FAULT** repeatedly advances through each test type selected displaying type and equipment location of the failure (if any), specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

   After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

   Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13 and a specific fault code displayed in Field 14 for the same circuit.

5. To examine the port equipment locations of the GPPs, data ports, and the ADFTC used in testing an MPM or digital facility, depress **NEXT DATA**.

   NOTE

   NEXT DATA can only be depressed after **NEXT CIRCUIT** and/or **NEXT CIRCUIT** and **NEXT FAULT** are depressed.

6. Field 6 cycles from 0 through 4 each time **NEXT DATA** is depressed, starting at different positions depending on the type of circuit(s) tested and the failures detected, and displays in Fields 7 through 11 the port equipment locations of the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), member A data port (Field 6 = 2), member B GPP (Field 6 = 3), and member B data port (Field 6 = 4).

   NOTE

   Depressing **NEXT DATA** does not always display 5 equipment locations. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities were tested.

7. The possible starting positions are the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), or member B GPP (Field 6 = 3).

   NOTE

   One way MPMs only display the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), **or** member A data port (Field 6 = 2). Digital facilities only display the ADFTC (Field 6 = 0), **or** member A GPP (Field 6 = 1).

8. When another specific MPM, digital facility, member A GPP, or member A data port is to be tested, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific MPM, digital facility, member A GPP, or member A data port to be tested.

   CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

   Refer to Steps 27 and 28 of Test 2 Data Entry above to select a specific MPM or digital facility to be tested using Fields 3 through 5 (circuit).

   Refer to Steps 37 and 44 of Test 2 Data Entry above to select a specific member A GPP or member A data port to be tested using Fields 7 through 11 (equipment type and equipment location).

9. **EXECUTE** must be depressed to test the specific MPM or digital facility selected for testing.

Test 2 Execution and Test Result Display for a Range of Circuits

1. When a range of MPMs and/or digital facilities or member A GPPs are being tested, the **WAIT** indicator is lighted and the following fields are incremented as each facility is tested:

   NOTE

   Special error code 93 (no circuit found in range) may be displayed in the **MAAP** error code field after **EXECUTE** is depressed if a range of member A GPPs was selected for testing using the type and equipment location (Fields 6 through 10). If you are sure that the range of member A GPP equipment locations that you entered are modem pooling port equipment locations and you wish to test the range of member A GPPs entered, Refer to Step 52 of Test 2 Data Entry above.

   Field 2 - If test type 0 through 2 was entered, Field 2 increments according to the specific tests that are executed.

   NOTE

   If host access is being tested, Field 2 does not increment.

   Field 3 - Trunk group number of MPM or digital facility being tested.

   Field 4 - Member A number of the current MPM or digital facility being tested.

   Field 5 - Dashed or member B number if a two-way MPM is being tested.

   Field 6 - 1 (Equipment type of member A GPP being tested).

   Fields 7 through 11 - Port equipment location of the current MPM or digital facility being tested.

   Field 13 - Data type 2 (indicating that bit error rate/bits sent is displayed in Field 14).

   Field 14 - Bit error rate/bits sent.

   NOTE

   Fields 13 and 14 are updated every 10 seconds.

2. When testing is completed for two MPMs, one digital facility, or a one-way MPM, the bit and block error rates, any specific fault code, and the port equipment locations are stored in DMIDS.

3. If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator goes off.

   The originally selected test type is displayed in Field 2, the circuit location and port equipment location of the last MPM or digital facility tested is displayed in Fields 3 through 11, the current number of circuits tested is displayed in Field 14, and the number of circuits failed is displayed in Field 12.

   Special error code 84 (DMIDS overflow) is displayed in the **MAAP** error code field.

4. Results of the test can be examined at this time (see Steps 9 through 17 below) and Test 2 can be continued from where it was stopped; i.e., from the next MPM and/or digital facility in the range being tested.

CAUTION

If Test 2 is continued from where it was stopped by a DMIDS overflow, any test results gathered to that point are lost and only new failure data is retained.

5. If Test 2 is halted because of a DMIDS overflow, a new test type and range of MPMs, digital facilities, or member A GPPs can be selected instead of continuing the test from where it was stopped.

6. The **CHANGE FIELD** sequence must be used to enter the test type desired and the new range of facilities to be tested as follows:

   CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

   Refer to Steps 22 through 26 of Test 2 Data Entry above to select a range of MPMs or digital facilities to be tested.

   Refer to Steps 36 through 43 of Test 2 Data Entry above to select a range of member A GPPs to be tested.

7. **EXECUTE** must be depressed to begin Test 2 from the new range of facilities entered or from where the test was stopped.

   NOTE

   Before depressing **EXECUTE** to continue Test 2 from where it was stopped because of a DMIDS overflow, the failure data should be examined and recorded for future maintenance activities.

8. When a range of MPMs and/or digital facilities or member A GPPs has completed testing or **STOP** is depressed, the **WAIT** indicator goes off.

   The original test type selected is displayed in Field 2, the original range selected is displayed in Fields 3 through 11, and the number of circuits tested is displayed in Field 14.

   Field 12 displays the number of failures (if any).

9. **All failures with a specific fault code are displayed first followed by passing circuits with a specific fault code of 0**.

   Bit and block error rates are displayed for failing and passing circuits.

   When multiple tests (more than one test type) are performed on MPMs, digital facilities, or member A GPPs, a specific fault code (if any) and bit/block error rates are displayed for all test types executed for each MPM, digital facility, or member A GPP tested.

10. Depressing **NEXT CIRCUIT** displays the first failing or tested circuit as follows:

    Field 1 - 2.

    Field 2 - Test type for the displayed facility.

    Fields 3 through 5 - Trunk group number, member A, and member B (if applicable) of failing or tested facility.

    Field 6 - Type of equipment corresponding to the equipment location displayed in Fields 7 through 11 (i.e., 0 = ADFTC, 1 = member A GPP, 2 = member A data port, 3 = member B GPP, 4 = member B data port).

Fields 7 through 11 - Equipment location of the failing or tested facility (ADFTC, member A GPP, member A data port, member B GPP, or member B data port).

Field 12 - 0 or number of failures.

Field 13 - 1 (indicating that Field 14 displays a specific fault code).

Field 14 - Specific fault code.

11. Depressing **NEXT DATA** examines the port equipment numbers of the GPPs, data ports, and the ADFTC used in testing a facility or facility pair.

NOTE

NEXT DATA can only be depressed after **NEXT CIRCUIT** and/or **NEXT CIRCUIT** and **NEXT FAULT** is depressed.

12. Successive depression of **NEXT DATA** displays in Fields 6 through 11 the type and port equipment locations of the ADFTC; member A GPP; member A data port; member B data GPP; and member B port, starting at different positions depending on the type of circuit(s) tested and the failures detected.

    The possible starting positions are the ADFTC (Field 6 = 0), member A GPP (Field 6 = 11), or member B GPP (Field 6 = 3).

13. Depressing **NEXT FAULT** displays the bit and block error rates for the tested circuit.

    The first time **NEXT FAULT** is depressed, a 2 is displayed in Field 13, and the bit error rate/bits sent is displayed in Field 14.

    Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

NOTE

Refer to Table BA, PROC 646 - Field Definitions and Codes, to determine how to interpret bit error rate/bits sent and block error rate/blocks sent.

14. Depressing **NEXT FAULT** repeatedly advances through each test type selected displaying type and equipment location of the failure (if any), specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

    After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

    Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13 and a specific fault code displayed in Field 14 for the same circuit.

15. Depressing **NEXT CIRCUIT** displays the remaining tested circuits with a 1 displayed in Field 13 and a specific fault code displayed in Field 14.

    NEXT FAULT is used to obtain the bit error rate/bits sent and block error rate/blocks sent for the tested circuits.

16. When more than one trunk group number is tested, depressing **NEXT UNIT** causes the first tested circuit of the next tested trunk group to be displayed.

    NEXT CIRCUIT is used to step through the tested trunk group to display the tested circuits.

    NEXT FAULT is used to obtain the bit error rate/bits sent and block error rate/blocks sent for the tested circuits.

17. When all tested circuits are displayed, depressing **NEXT CIRCUIT** and/or **NEXT UNIT** dashes all fields except Field 1.

18. If a facility is tested with a test type of 0, all tests, and no failure occurs, then any alarm on that facility is automatically resolved in PMIDS.

19. To select another range of MPMs or digital facilities to test, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific range of MPMs or digital facilities to be tested as follows:

    CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

    Refer to Steps 22 through 26 of Test 2 Data Entry above to select a range of MPMs or digital facilities in a trunk group, all member Bs, or all member As to be tested.

    Refer to Steps 36 through 43 of Test 2 Data Entry to select a range of member A GPPs in a module, cabinet, carrier, or slot to be tested.

20. **EXECUTE** must be depressed to begin Test 2 from the new range of MPMs or digital facilities selected for testing.

21. Test 2 automatically turns off the **OTHER FAILS** fault indicator when all MPMs and/or digital facilities that raised an alarm pass Test 2 with a test type of 0 assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

NOTE

MPMs and/or digital facilities alarmed entries in PMIDS are marked as resolved if passed with a test type of 0.

Test 3

Test 3 runs diagnostic tests on modem pool members (MPMs) and digital facilities as determined by the test type specified in Field 2.

Diagnostic tests consist of data module or EIA port remote loop back, modem analog loop back, and modem remote digital loop back (212A type modems only) originating and terminating tests. (Each test type is executed in sequence to isolate the fault.)

For digital facilities, translation defined by **PROC 100** Word 2, Field 18 determines the different places that loop backs may be done.

Types of diagnostic tests for MPMs and digital facilities consist of all tests (test type 0 - includes test types 2, 3, 4, and 5), all EIA (remote digital for 212A) remote loop back tests (test type 1 - includes test types 4 and 5), data module remote loop back test (test type 2), EIA local loop back (analog loop back) tests (test type 3), EIA remote loop back (digital) originating tests (test type 4), and EIA remote loop back (digital) terminating tests (test type 5).

Each type of test is not applicable to all types of modem pool members or digital facilities. Types of modems available with modem pool members tested consist of 103J, 113C, 113D, 202S, 203C, 208B, and 212A.

Test types that can be run in Test 3 for modem pool members and digital facilities are listed below.

1. Test type 0 = Any MPM or digital facility being tested.
2. Test type 1 = Any MPM or digital facility if Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control).
3. Test type 2 = Any MPM or digital facility.
4. Test type 3 = Any MPM or digital facility if Field 18 (test type) of **PROC 100**, Word 2 equals 2 (local loop back control), or 3 (local and remote loop back control).
5. Test type 4 = Any MPM or digital facility if Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control).
6. Test type 5 = Any MPM if Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control).

Several different tests may be run on one modem pooling circuit (or circuit pair).

1. Some tests might fail while other tests pass.
2. When a modem pooling circuit (or circuit pair) test fails, a specific fault code is displayed.
3. Bit error rate/bits sent and block error rate/blocks sent are displayed for passing and failing tests.
4. The bit error rate/bits sent and block error rate/blocks sent are provided for further diagnosis (if required).

Characteristics (i.e., facility type, modem type, loop back control, etc.) of digital trunks used in modem pooling are provided in **PROC 100**, Words 1 and 2.

When performing diagnostic tests on a trunk group basis, **PROC 100**, Word 2 can be used to determine the loop back control of digital trunks.

1. If Field 18 (test type) of **PROC 100**, Word 2 equals 1 (no loop back control), the following test types can be run: all tests (test type 0) and the data module remote loop back test (test type 2) on the digital trunk in Test 3.
2. If Field 18 (test type) of **PROC 100**, Word 2 equals 2 (local loop back control), the following test types can be run: all tests (test type 0), the data module remote loop back test (test type 2), and EIA local loop back (analog loop back) tests (test type 3) on the digital trunk in Test 3.
3. If Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control), the following test types can be run: all tests (test type 0), all EIA remote (remote digital) loop back tests (test type 1), the data module remote loop back test (test type 2), EIA local loop back (analog loop back) tests (test type 3), EIA remote loop back originating tests (test type 4), and EIA remote loop back terminating tests (test type 5) if the trunk group contains modem pool members.

PROC 100, Word 2 can also be used to disable the digital facility testing of a particular modem pooling trunk group.

MPMs and digital facilities can be selected for testing by trunk group number and member A; trunk group number, member A, and Member B (MPM only); or by equipment location.

Test 3 Data Entry

1. Test 3 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 3.

2. When Test 3 is initially called in, Fields 3 through 11 (trunk group member number and equipment location) are dashed, or a default equipment location may be displayed in Fields 3 through 11. Field 14 (data) may display a default specific fault code.
3. The default equipment location can be the last equipment location or trunk group member number displayed in Test 2 of **PROC 646** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a GPP or data port which is part of an MPM or digital facility and is still displayed in **PROC 620** when it is passed.
5. Field 2 (test type) is blanked and blinking, indicating a mandatory entry.
6. Test types that can be run in Test 3 for modem pool members and digital facilities are:

   Test type 0 = Any MPM or digital facility being tested.

   Test type 1 = Any MPM or digital facility if Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control).

   Test type 2 = Any MPM or digital facility.

   Test type 3 = Any MPM or digital facility if Field 18 (test type) of **PROC 100**, Word 2 equals 2 (local loop back control), or 3 (local and remote loop back control).

   Test type 4 = Any MPM or digital facility if Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control).

   Test type 5 = Any MPM if Field 18 (test type) of **PROC 100**, Word 2 equals 3 (local and remote loop back control).

7. To select the type of test to be run on MPMs or digital facilities to be tested, enter the test type number in Field 2 and depress **ENTER**.

   NOTE

   When a default equipment location is displayed, the maintenance busy status is displayed in Field 13 (data type) when the test type is entered.

8. After the test type (Field 2) is entered, the trunk group number field (Field 3) is blinking indicating that a trunk group number of the MPM or digital facility to be tested may be entered.
9. If an equipment location was carried over from Test 2 and it is an MPM or digital facility, its trunk group and member number are displayed in Fields 3 through 5 (as appropriate) and the equipment location is displayed in Fields 7 through 11.

10. A specific MPM or digital facility or the default equipment location can be tested.

    NOTE

    Ranging is not allowed in Test 3 (diagnostic testing).

11. To test the default equipment location, proceed to Step 12.

    To test a specific MPM or digital facility, proceed to Step 13.

12. To test the default equipment location, determine if the ADFTC to be used for testing is to be specified before testing.

    If the ADFTC is to be specified, record the default equipment location (Fields 3 through 5, and 7 through 11 as appropriate) and proceed to Step 14.

    If the ADFTC is not to be specified, proceed to Step 33.

13. If a specific ADFTC is to be used for testing, it **must** be selected at this time.

    To select a specific ADFTC to be used for testing, proceed to Step 14.

    If a specific ADFTC is not to be used for testing, proceed to Step 16.

14. The ADFTC to be used for testing can be specified by entering the complete equipment location and the correct type in Fields 6 through 11 as follows:

    CHANGE FIELD; 6; ENTER; 0; ENTER; (Module number of ADFTC); ENTER; (Cabinet number of ADFTC); ENTER; **(Carrier number of ADFTC); ENTER; (Slot number of ADFTC); ENTER; (Circuit number of ADFTC); ENTER**.

    NOTE

    If the ADFTC is incompletely specified (all fields not entered), special error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Field 7 (module) blinks.

    Proceed to Step 15.

15. If a default equipment location is being tested, enter the default equipment location (recorded in Step 12 above) in Fields 3 through 5, and 7 through 11 (as appropriate) using the **CHANGE FIELD** sequence and proceed to Step 33.

16. MPMs or digital facilities can be selected for testing in one of two methods; i.e., by circuit (Fields 3 through 5) or by equipment location and type (Fields 6 through 11).

    To select MPMs or digital facilities for testing using the circuit method, proceed to Step 17.

    To select MPMs or digital facilities for testing using the equipment location and type, proceed to Step 28.

17. Diagnostic tests of MPMs can be specified with only a member A entry or both member A and member B if the MPM is two way.

    NOTE

    Special error code 87 (invalid circuit fields) is displayed in the **MAAP** error code field if the trunk group number and member A; or trunk group number, member A, and member B are not specified when **EXECUTE** is depressed.

18. Selection of an MPM or digital facility to be tested depends on whether or not a default equipment location is displayed or if a specific ADFTC is selected for testing.

    If a default equipment location is displayed or if a specific ADFTC is selected for testing, the **CHANGE FIELD** sequence **must** be used.

    If no default equipment location is displayed or no specific ADFTC is selected for testing, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the MPM or digital facility to be tested.

19. To select an MPM or digital facility to be tested by using the trunk group number and member A, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    NOTE

    If a specific digital facility or a one-way MPM is being tested, Field 5 (member B) **must** be dashed.

    (Trunk group number of MPM or digital facility to be tested); ENTER; (Member A of MPM or digital facility to be tested); ENTER; ENTER.

    CHANGE FIELD; 3; ENTER; (Trunk group number of MPM or digital facility to be tested); ENTER; (Member A of MPM or digital facility to be tested); ENTER; ENTER.

    NOTE

    Special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) may be displayed in the **MAAP** error code field when the trunk group number is entered in Field 3. If you are sure that the trunk group number that you entered is a modem pooling trunk group and you wish to test an MPM or digital facility by using the trunk group number and member A, proceed to Step 40.

    Test 3 tests the MPM or digital facility specified in Fields 3 and 4.

    Proceed to Step 25.

20. To select an MPM to be tested by using the trunk group number, member A, and member B, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

    NOTE

    Digital facilities cannot be tested by specifying a member B. Special error code 94 (member B invalid for digital facilities) is displayed in the **MAAP** error code field if member B is specified and the trunk group number is a digital facility trunk before **EXECUTE** is depressed.

    (Trunk group number of MPM to be tested); ENTER; **(Member A of MPM to be tested); ENTER; (Member B of MPM to be tested); ENTER**.

    CHANGE FIELD; 3; ENTER; (Trunk group number of MPM to be tested); ENTER; (Member A of MPM to be tested); **ENTER; (Member B of MPM to be tested); ENTER**.

    NOTE

    Special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) may be displayed in the **MAAP** error code field when the trunk group number is entered in Field 3. If you are sure that the trunk group number that you entered is a modem pooling trunk group and you wish to test an MPM by using the trunk group number, member A, and member B, proceed to Step 40.

    Test 3 tests the MPM specified in Fields 3 through 5.

    Proceed to Step 25.

21. **NEXT CIRCUIT** can be used to select a circuit or circuit pair before test execution.

    NOTE

    If a modem pooling trunk group is disabled by **PROC 100**, Word 2 (Field 18 equals 0), circuits or circuit pairs associated with the disabled trunk group will not be displayed by depressing **NEXT CIRCUIT**.

22. If nothing is specified in the circuit or equipment location fields (Fields 3 through 5 and 7 through 11), two available facilities are displayed in the circuit and equipment location fields from the first testable trunk group when **NEXT CIRCUIT** is depressed. If the trunk group contains digital facilities or MPMs with one-way modems, member B (Field 5) is dashed.

    Proceed to Step 25.

23. If the circuit field is specified up to member A (Fields 3 and 4), member A is incremented to the next member A when **NEXT CIRCUIT** is depressed.

    Proceed to Step 25.

24. If both members A and B are specified, the member number is advanced corresponding to the type field (Field 6) of the equipment location fields when **NEXT CIRCUIT** is depressed.

    Proceed to Step 25.

25. After the circuit fields are specified, the equipment location fields (Fields 7 through 11) defaults to the equipment location of the member A GPP.

    The type field (Field 6) defaults to 1 indicating the GPP port of member A is displayed in Fields 7 through 11.

    Proceed to Step 26.

26. Before test execution, **NEXT DATA** can be depressed to examine port equipment locations associated with the circuit selected for testing.

27. Successive depression of **NEXT DATA** displays in Fields 6 through 11 the type and port equipment locations of the member A GPP, member A data port, member B GPP, and member B data port.

    NOTE

    Depressing **NEXT DATA** does not always display 4 equipment locations before testing. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities are being tested.

    The maintenance busy status of each port equipment location is displayed in Field 13.

    Proceed to Step 33.

28. MPMs or digital facilities can be selected for testing using the test type and equipment location fields (Fields 6 through 11).

    Member A GPP, member A data port, member B GPP, or member B data port can be designated as the type of facilities to test.

    NOTE

    Ranging is not allowed in Test 3 (diagnostic testing). Special error code 80 (equipment location not complete) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if ranging is attempted.

29. To select the type of facility to test, the **CHANGE FIELD** sequence must be used:

    CHANGE FIELD; 6; ENTER; (equipment location type); **ENTER**.

    Equipment location types are: 1 = Member A GPP port, 2 = Member A data port, 3 = Member B GPP port, 4 = Member B data port.

    NOTE

    Only equipment location type 1 (member A GPP) can be entered in Field 6 for testing of digital facilities.

30. When the equipment location type is entered in Field 6, the module field (Field 7) blinks for entry.

31. To select an MPM or digital facility to be tested by using the equipment location method, enter the following:

    (Module number of member A GPP, member A data port, **member B GPP, or member B data port to be tested)**; **ENTER; (Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

    NOTE

    Equipment location type (Field 6) **must** correspond to the equipment location selected or error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.

32. After the equipment location fields are specified, the circuit fields (Fields 3 and 4) display the trunk group number and member A number.

    NOTE

    If a modem pooling trunk group is disabled by **PROC 100**, Word 2 (Field 18 equals 0), the circuit fields (Fields 3 and 4) will not display the trunk group number and member A number.

33. The maintenance busy status of the equipment location displayed in Fields 7 through 11 is displayed in Field 13.

    The circuit displayed in Fields 7 through 11 can be busied out (if required).

    If the circuit is to be busied out for testing, proceed to Step 34. If busy out of the circuit is not required, proceed to Step 35.

34. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following.

    NOTE

    If Fields 7 through 11 are not entered, special error code 96 (fields 7 through 11 must be entered before use of **BUSY OUT)** is displayed in the **MAAP** error code field.

    Check the maintenance busy status displayed in Field 13.

    If the maintenance busy status = 5, proceed to Step 35.

    If the maintenance busy status = 6, depress **BUSY OUT** and proceed to Step 35.

    NOTE

    Special error code 85 (invalid equipment location) may be displayed in the **MAAP** error code field when **BUSY OUT** is depressed. If you are sure that the individual port equipment location that you entered is a modem pooling port equipment location and you wish to test the MPM or digital facility entered, proceed to Step 40.

35. The length of the test **(maximum of 4 minutes for each test type executed)** can be entered in Field 12, or a default test length can be chosen.

    NOTE

    The default test length causes a very short (less than 2 seconds) test. However, processing overhead increases the delay seen at the **MAAP** to less than 15 seconds for each test type. This default test length applies to all bit rates and test types.

36. Either Field 12 (test length) is blinking or the **CHANGE FIELD** sequence must be used to enter the desired test length.

    If Field 12 is blinking, proceed to Step 37.

    If Field 12 is not blinking, perform **CHANGE FIELD; 12; ENTER** and proceed to Step 37.

37. If a default test length is desired, depress **ENTER**. If a different test length is desired, enter the time (minutes) in Field 12:

    (1 through 4 - maximum of 4 minutes); ENTER.

    NOTE

    The actual test length executed for each test type selected is determined by whether the test for the test type passes or fails. If the test passes, either the default test length or the time entered in Field 12 is used for the test performed. If the test fails, the time of the test is the default test length no matter what time is entered in Field 12.

38. Field 14 (data rate) blinks for entry. The data rate can be entered in Field 14, or a default data rate can be chosen.

    NOTE

    Refer to Table BB, PROC 646 Modem Bit Rates, to determine the data rate for the modem type to be tested.

39. If a default data rate is desired, depress **ENTER**. If a different data rate is desired, enter the data rate in Field 14:

    (Data rate); ENTER.

    Data rate encodes are: 3 = 300 bps; 12 = 1200 bps; 24 = 2400 bps; 48 = 4800 bps; 96 = 9600 bps; 192 = 19.2 kbps; 560 = 56 kbps; 640 = 64 kbps.

40. When special error code 97 **(PROC 100** has disabled digital facility testing for this trunk group) or special error code 85 (invalid equipment location) is displayed and you are sure that the trunk group, specific MPM, or digital facility is a modem pooling trunk group or member, perform Steps 41 through 47 as appropriate.

41. Using **PROC 100**, Word 2 enter the trunk group number and depress **DISPLAY, EXECUTE**.

42. Check the encode displayed in Field 18.

    If the encode in Field 18 is a 0, proceed to Step 43.

    If the encode in Field 18 is not a 0, you have entered the wrong trunk group number or an invalid equipment location.

43. Record the data displayed in each field of **PROC 100**, Word 2 for the trunk group entered.

44. Depress **REMOVE, EXECUTE**.

45. Enter the trunk group and the data recorded in Step 43 except for Field 18. Enter a 1, 2, or 3 encode in Field 18 depending on the type of loop back control required in testing the modem pooling trunk group.

46. Depress **ADD, EXECUTE**.

    The modem pooling trunk group can now be tested in **PROC 646** Test 2 or Test 3.

47. Repeat Test 3 from Step 1 of Test 3 Data Entry.

Test 3 Execution

1. To start Test 3 after selecting the test type, the ADFTC to be used for testing, the MPM or digital facility to be tested, the test length and baud rate, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. Field 2 displays the test type being executed.

   Field 13 displays a 2, indicating the bit error rate/bits sent is being displayed in Field 14.

   The bit error rate/bits sent is displayed in the data field (Field 14).

   NOTE

   Fields 13 and 14 are updated every 10 seconds.

3. If a facility is maintenance busied out, it is released from busy while under test.

4. When the test encounters a facility in use, a specific fault code is logged in DMIDS records and the test is stopped.

   The data call in progress is not aborted.

5. During Test 3, **STOP** can be depressed to halt the test.

6. If Test 3 is stopped before one complete testing pass through a specific MPM or digital facility or the default equipment location is made, special error code 95 (wait for test to stop) is displayed in the **MAAP** error code field.

   NOTE

   One complete testing pass means that all test types selected are tested for a specific MPM or digital facility or the default equipment location.

7. After the current test is completed, special error code 82 (test of range not completed) is displayed in the **MAAP** error code field indicating that one complete pass through the specific MPM or digital facility or the default equipment location is not completed.

8. The port equipment location of the MPM or digital facility being tested is displayed in Fields 3 through 11 and the total number of failures (if any) is displayed in Field 12.

9. If any failures are displayed in Field 12, test result information can be stepped through as described in Test 3 Result Display below when Test 3 is halted using **STOP** even though the facility is not tested.

10. To restart the test when Test 3 is halted by use of **STOP, EXECUTE** is depressed and Test 3 retests the MPM or digital facility selected for testing.

    NOTE

    When Test 3 is restarted after being halted by use of **STOP**, any test results gathered to that point are retained.

Test 3 Result Display

1. When Test 3 is completed or **STOP** is depressed for a default equipment location, a specific MPM or digital facility the **WAIT** indicator goes off and the following is displayed:

   Field 1 - 3.

   Field 2 - Original test type selected for testing MPM or digital facility.

   Fields 3 through 5 - Circuit location.

   Field 6 - Type of equipment location (1 through 4).

   Fields 7 through 11 - Port equipment location of MPM or digital facility tested.

   Field 12 - 0 (indicating no failures were found for the MPM or digital facility tested) or 1 (indicating the MPM or digital facility failed the test).

   Field 13 - Data type of 4 (indicating that Field 14 indicates the number of circuits tested).

   Field 14 - 0 (if **STOP** was depressed indicating all tests are not completed) or 1 (indicating 1 MPM, MPM pair, or digital facility tested).

   NOTE

   Special error code 85 (invalid equipment location) may be displayed in the **MAAP** error code field after **EXECUTE** is depressed. If you are sure that the individual port equipment location that you entered is a modem pooling port equipment location and you wish to test the MPM or digital facility entered, Refer to Step 40 of Test 3 Data Entry above.

2. When multiple tests are performed on the MPM or digital facility tested, failing tests are displayed first, followed by tests that passed.
3. Depressing **NEXT CIRCUIT** changes the display in the data type and data fields (Fields 13 and 14) and may change the type and equipment location in Fields 6 through 11 depending on the type of failure (if any).

   Field 13 displays a 1, indicating that the data in Field 14 is a specific fault code.
4. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.
5. Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

   NOTE

   Refer to Table BA, PROC 646 - Field Definitions and Codes, to determine how to interpret bit error rate/bits sent and block error rate/blocks sent.

6. Depressing **NEXT FAULT** repeatedly advances through each test type selected displaying type and equipment location of the failure (if any), specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

   After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

   Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

7. To examine the port equipment locations of the GPPs, data ports, and the ADFTC used in testing a MPM or digital facility, depress **NEXT DATA**.

   NOTE

   NEXT DATA can only be depressed after **NEXT CIRCUIT** and/or **NEXT CIRCUIT** and **NEXT FAULT** is depressed.

8. Field 6 cycles from 0 through 4 each time **NEXT DATA** is depressed, starting at different positions depending on the type of circuit tested and the failures detected, and displays in Fields 7 through 11 the port equipment locations of the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), member A data port (Field 6 = 2), member B GPP (Field 6 = 3), and member B data port (Field 6 = 4).

   NOTE

   Depressing **NEXT DATA** does not always display 5 equipment locations. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities were tested.

9. The possible starting positions are the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), or member B GPP (Field 6 = 3).

   NOTE

   One way MPMs only display the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), **or** only display the ADFTC (Field 6 = 0), **or** member A GPP (Field 6 = 1).

10. When another specific MPM, digital facility, member A GPP, member A data port, member B GPP, or member B data port is to be tested, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific MPM, digital facility, member A GPP, member A data port, member B GPP, or member B data port to be tested.

    CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

    Refer to Steps 19 through 24 of Test 3 Data Entry above to select a specific MPM or digital facility to be tested using the circuit method (Fields 3 through 5).

    Refer to Steps 28 through 31 of Test 3 Data Entry above to select a specific MPM or digital facility to be tested using the equipment location and type method (Fields 6 through 11).

11. **EXECUTE** must be depressed to test the specific ADFTC circuit selected for testing.

Repair Guide

When an ADFTC, MPM, or digital facility failure is indicated, **(PROC 646** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), perform the following steps in the order listed to isolate and repair the faulty unit.

The starting point for isolation and repair of alarmed ADFTC, MPM, or digital facilities is **PROC 600**.

1. Execute **PROC 600**, Test 1 to determine which type of modem pooling circuits (ADFTC, MPM, or digital facility) are alarmed (indicated by **PROC 646** being referenced in Field 15 of **PROC 600)**, the severity of the alarms, and the order in which the modem pooling circuits are displayed.

   Record the failing modem pooling circuits displayed in **PROC 600**, Test 1.

2. Determine from the modem pooling circuits recorded if a pattern exists that would assist in determining the type of corrective action required.

   If only ADFTC failures are recorded, perform isolation and repair steps detailed in **ADFTC Alarmed Failures**.

   If only MPM or digital facility failures are recorded, perform isolation and repair steps detailed in **MPM or Digital Facility Alarmed Failures**.

3. When both ADFTC and MPM or digital facility failures are recorded, perform isolation and repair steps for ADFTC failures before performing isolation and repair steps for MPM or digital facility failures.

When user reported troubles associated with modem pooling members are reported, perform isolation and repair steps detailed in **User Reported Troubles**.

To assist in fault isolation, **PROC 620** may be used before or after **PROC 646** to test specific GPPs, data ports, or ADFTCs. Equipment locations are automatically passed from **PROC 620** to **PROC 646** or from **PROC 646** to **PROC 620**.

ADFTC Alarmed Failures

1. Display the failing ADFTC circuit in Test 1 of **PROC 600**.
2. Enter **PROC 646**, Test 1.

   NOTE

   The alarmed ADFTC circuit that was displayed in Test 1 of **PROC 600** is the default equipment location displayed in Test 1 of **PROC 646**.

   Record the specific fault code displayed in Field 14 (data) which was detected by on-line periodic software tests and logged in PMIDS.

3. Enter test type number 0 in Field 2 and depress **ENTER**.

   NOTE

   If the ADFTC circuit is tested with a test type of 0 (all ADFTC self tests) and no failure occurs, any alarm on the ADFTC circuit is automatically resolved in PMIDS.

4. Depress **EXECUTE**.

   If the ADFTC circuit passes (indicated by a 0 in Field 12), proceed to Step 10.

   If the ADFTC circuit fails (indicated by a 1 in Field 12), proceed to Step 5.

5. Depress **NEXT CIRCUIT** and record the specific fault code displayed in Field 14 (data).
6. Replace the CKT1 component or perform corrective action listed in Table BC, PROC 646 - Component Replacements, for the specific fault code displayed in Field 14.
7. Repeat Test 1.

   If the ADFTC passes Test 1, proceed to Step 12.

8. If the ADFTC fails Test 1, replace CKT2 or perform any additional corrective action listed in Table BC, PROC 646 - Component Replacements for the specific fault code recorded.

ADFTC Alarmed Failures

1. Display the failing ADFTC circuit in Test 1 of **PROC 600**.
2. Enter **PROC 646**, Test 1.

   NOTE

   The alarmed ADFTC circuit that was displayed in Test 1 of **PROC 600** is the default equipment location displayed in Test 1 of **PROC 646**.

   Record the specific fault code displayed in Field 14 (data) which was detected by on-line periodic software tests and logged in PMIDS.
3. Enter test type number 0 in Field 2 and depress **ENTER**.

   NOTE

   If the ADFTC circuit is tested with a test type of 0 (all ADFTC self tests) and no failure occurs, any alarm on the ADFTC circuit is automatically resolved in PMIDS.

4. Depress **EXECUTE**.

   If the ADFTC circuit passes (indicated by a 0 in Field 12), proceed to Step 10.

   If the ADFTC circuit fails (indicated by a 1 in Field 12), proceed to Step 5.
5. Depress **NEXT CIRCUIT** and record the specific fault code displayed in Field 14 (data).
6. Replace the CKT1 component or perform corrective action listed in Table BC, PROC 646 - Component Replacements, for the specific fault code displayed in Field 14.
7. Repeat Test 1.

   If the ADFTC passes Test 1, proceed to Step 12.
8. If the ADFTC fails Test 1, replace CKT2 or perform any additional corrective action listed in Table BC, PROC 646 - Component Replacements for the specific fault code recorded.

Table 5-56.

PROC 646 - COMPONENT REPLACEMENTS					
FAULT CODE	COMPONENT REPLACEMENT OR CORRECTIVE ACTION				
	CKT 1	CKT 2	CKT 3	CKT 4	CKT 5
12	Repeat test when switch is less busy. If failure continues with a fault code of 12, use PROC 620 to test time slots (i.e., range on PDIs).				
218	Run PROC 620 on module processor (unit type 7).				
454	Run PROC 646 Test 1.				
455 through 458	Run PROC 646 Test 1 and PROC 620 GPP test by specifying ADFTC unit type 62.				
1000	Run PROC 620 on module processor (unit type 7).				
1001	Run PROC 646 on unit.				
1002	Run PROC 646 on trunk group.				
1003	TDM/2	SN270			
1004	MODEM	SN243			
1005 through 1025	SN261				
1026 through 1029	SN261	Run PROC 620 on IOBI (unit type 12) and PCI (unit type 14).			
1030, 1038, 1045, 1052, 1059, 1066 1073, 1080, 1087, 1094, 1101, 1108, 1115, 1122, 1129, 1136, 1143, 1150, 1157, 1164, 1171, 1178, 1185, 1192, 1199, 1207, 1214, 1221, 1228, 1235, 1242, 1249, 1256, 1263, 1270, 1277	MODEM	TDM/2	SN261		
1031, 1039, 1046, 1053, 1060, 1067, 1074, 1081, 1088, 1095, 1102, 1109, 1116, 1123, 1130, 1137, 1144, 1151, 1158, 1165, 1172, 1179, 1186, 1193, 1200, 1208, 1215, 1222, 1229, 1236, 1243, 1250, 1257, 1264, 1271, 1278	MODEM	TDM/2	SN261		
1032, 1040, 1047, 1054, 1061, 1068 1075, 1082, 1089, 1096, 1103, 1110, 1117, 1124, 1131, 1138, 1145, 1152, 1159, 1166, 1173, 1180, 1187, 1194, 1201, 1209, 1216, 1223, 1230, 1237, 1244, 1251, 1258, 1265, 1272, 1279	MODEM	TDM/2	SN270	SN243	SN261
1034, 1041, 1048, 1055, 1062, 1069, 1076, 1083, 1090, 1097, 1104, 1111, 1118, 1125, 1132, 1139, 1146, 1153, 1160, 1167, 1174, 1181, 1188, 1195, 1202, 1210, 1217, 1224, 1231, 1238, 1245, 1252, 1259, 1266, 1273, 1280	MODEM	TDM/2	SN270	SN243	SN261

Table 5-55. (Contd)

PROC 646 - COMPONENT REPLACEMENTS					
FAULT CODE	COMPONENT REPLACEMENT OR CORRECTIVE ACTION				
	CKT 1	CKT 2	CKT 3	CKT 4	CKT 5
1035, 1042, 1049, 1056, 1063, 1070, 1077, 1084, 1091, 1098, 1105, 1112, 1119, 1126, 1133, 1140, 1147, 1154, 1161, 1168, 1175, 1182, 1189, 1196, 1203, 1211, 1218, 1225, 1232, 1239, 1246, 1253, 1260, 1267, 1274, 1281	TDM/2	SN270	SN261		
1036, 1043, 1050, 1057, 1064, 1071, 1078, 1085, 1092, 1099, 1106, 1113, 1120, 1127, 1134, 1141, 1148, 1155, 1162, 1169, 1176, 1183, 1190, 1197, 1204, 1212, 1219, 1226, 1233, 1240, 1247, 1254, 1261, 1268, 1275, 1282	MODEM	TDM/2	SN270	SN243	SN261
1037, 1044, 1051, 1058, 1065, 1072, 1079, 1086, 1093, 1100, 1107, 1114, 1121, 1128, 1135, 1142, 1149, 1156, 1163, 1170, 1177, 1184, 1191, 1198, 1206, 1213, 1220, 1227, 1234, 1241, 1248, 1255, 1262, 1269, 1276, 1283	SN261				
1284	TDM/2	SN270	SN261		
1285	TDM/2	SN270	SN261		
1286, 1293, 1300, 1307, 1314, 1321, 1328, 1335, 1342, 1349, 1356, 1363, 1370, 1377, 1384, 1391, 1398, 1405, 1412	MODEM	TDM/2	SN261		
1287, 1294, 1301, 1308, 1315, 1322, 1329, 1336, 1343, 1350, 1357, 1364, 1371, 1378, 1385, 1392, 1399, 1406, 1413	MODEM	TDM/2	SN261		
1288, 1295, 1302, 1309, 1316, 1323, 1330, 1337, 1344, 1351, 1358, 1365, 1372, 1379, 1386, 1393, 1400, 1407, 1414	MODEM	TDM/2	SN270	SN243	SN261
1289, 1296, 1303, 1310, 1317, 1324, 1331, 1338, 1345, 1352, 1359, 1366, 1373, 1380, 1387, 1394, 1401, 1408, 1415	MODEM	TDM/2	SN270	SN243	SN261
1290, 1297, 1304, 1311, 1318, 1325, 1332, 1339, 1346, 1353, 1360, 1367, 1374, 1381, 1388, 1395, 1402, 1409, 1416	TDM/2	SN270	SN261		

Table 5-55. (Contd)

PROC 646 - COMPONENT REPLACEMENTS					
FAULT CODE	COMPONENT REPLACEMENT OR CORRECTIVE ACTION				
	CKT 1	CKT 2	CKT 3	CKT 4	CKT 5
1291, 1298, 1305, 1312, 1319, 1326, 1333, 1340, 1347, 1354, 1361, 1368, 1375, 1382, 1389, 1396, 1403, 1410, 1417	MODEM	TDM/2	SN270	SN243	SN261
1292, 1299, 1306, 1313, 1320, 1327, 1334, 1341, 1348, 1355, 1362, 1369, 1376, 1383, 1390, 1397, 1404, 1411, 1418	SN261				
1419 through 1421	If call can be dropped, use BUSY OUT, then RELEASE BUSY, and retest.				
1422 and 1423	Use BUSY OUT, then RELEASE BUSY, and retest.				
1424	Wait for member to become available or use BUSY OUT, then RELEASE BUSY to drop customer call on a busy member.				
1425 and 1426	SN261				
1427	Ensure ADFTC is administered.				
1428	Use BUSY OUT, then RELEASE BUSY if call using ADFTC can be dropped.				
1429	RELEASE BUSY and retest.				
1430	MODEM	SN243			
1431	TDM/2	SN270			

9. If no additional corrective action is listed in Table BC, PROC 646 - Component Replacements, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

10. When alarmed ADFTC circuits pass Test 1 without corrective action being performed (i.e., replacing a circuit pack), further analysis of the problem should be performed by using **PROC 620**, Test 4 and testing unit type 62 (ADFTC).

    If Test 4 of **PROC 620** passes, check the backplane wiring associated with the ADFTC circuit pack.

    If Test 4 of **PROC 620** fails, take the appropriate corrective action.

11. When Test 4 of **PROC 620** passes after taking corrective action, repeat Test 1 of **PROC 646** to retire the cause of the **OTHER FAILS** fault indicator.

12. Test 1 must be run for each alarmed ADFTC circuit recorded in Test 1 of **PROC 600**.

    Use the **CHANGE FIELD** sequence to enter the next recorded ADFTC failure in Fields 7 through 11 (equipment location).

    Repeat Steps 3 through 12 (as appropriate).

13. If all alarmed ADFTC circuits pass Test 1, the **OTHER FAILS** fault indicator automatically goes off if no other sources (including MPM or digital facility failures) are affecting the fault indicator.

MPM or Digital Facility Alarmed Failures

1. Display the failing MPM or digital facility in Test 1 of **PROC 600**.
2. Enter **PROC 646**, Test 3.

   NOTE

   The alarmed MPM or digital facility that was displayed in Test 1 of **PROC 600** is the default equipment location displayed in Test 3 of **PROC 646**.

   Record the specific fault code displayed in Field 14 (data) which was detected by on-line periodic software tests and logged in PMIDS.
3. Enter test type number 0 in Field 2 and depress **ENTER**.
4. Enter the test length in Field 12 or depress **ENTER** for a default test length. The MPM or digital facility can be tested from **1 to 4 minutes for each test type selected** by entering the time (in minutes) in Field 12.

   (1 through 4 - maximum of 4 minutes); ENTER.

   NOTE

   The actual test length executed for each test type selected is determined by whether the test for the test type passes or fails. If the test passes, either the default test length or the time entered in Field 12 is used for the test performed. If the test fails, the time of the test is the default test length no matter what time is entered in Field 12.

5. Enter the data rate in Field 14 or depress **ENTER** for a default data rate.

   (Data rate); ENTER.
6. Depress **EXECUTE**.

   If the MPM or digital facility passes (indicated by a 0 in Field 12), proceed to Step 18.

   If the MPM or digital facility fails (indicated by a 1 in Field 12), proceed to Step 7.
7. Depress **NEXT CIRCUIT** and record the test type (first test type failed) displayed in Field 2, the equipment location displayed in Fields 7 through 11, and the specific fault code displayed in Field 14 (data).
8. Component replacements for the specific fault code displayed in Field 14 are listed in Table BC, PROC 646 - Component Replacements.
9. For modem pooling, the priority order of component replacement is listed in Table BD, PROC 646, Test 3 Failure Groups for Modem Pooling.
10. For digital facilities, the priority order of component replacement is listed in Table BE, PROC 646, Test 3 Failure Groups for Digital Facilities.
11. The order of component replacement depends on the first test type failed (displayed in Field 2) and the type of facility tested.

12. Determine from the specific fault code, the first test type failed, and the facility tested, the first component to replace based on Table BC, and Table BD, or Table BE.

    Replace the component.

13. Repeat Test 3.

    If the facility passes Test 3, proceed to Step 22.

14. If the facility fails Test 3, replace the next component listed in Table BC, and Table BD, or Table BE based on the specific fault code and the type of facility tested.

Table 5-56.

PROC 646, TEST 3
FAILURE GROUPS FOR MODEM POOLING

FIRST TEST TYPE FAILED	FAILURE GROUP FOR FAILING MEMBER IDENTIFIED (IN PRIORITY ORDER)		
	MEMBER A	MEMBER B [2]	ADFTC
4 or 5 [1]	Modem B [2]; modem A; SN243 member A; SN243 member B [2]; TDM/2 member A; TDM/2 member B [2]; SN270/SN271 member A; SN261.	Modem B [2]; TDM/2 member B [2]; SN270/SN271 member B [2]; SN261.	SN261
3	Modem A; TDM/2 member A; SN270/SN271 member A; SN261.		SN261
2	TDM member A; SN270/SN271 member A; SN261.		SN261

[1] This failure group is also applicable with members which cannot use test types 4 or 5, but pass test types 2 and 3 in Test 3 and fail test type 0 in Test 2.

[2] For originating and terminating modem pool members only.

[3] Run PROC 620 on individual SN270/TDM/2 or SN271/TDM/2, SN243, or ADFTC if further isolation of trouble is required.

15. Depressing **NEXT DATA** displays in Field 6 (type) the member A GPP, member A data port, member B GPP, and member B data port equipment locations in Fields 7 through 11.

NOTE

The equipment location displayed in Fields 7 through 11 for data ports determines the location of the modem to be replaced for modem pooling failures. The equipment location displayed in Fields 7 through 11 for member A GPP determines the location of the digital facility to be replaced for digital facility failures.

16. Repeat Steps 13 through 15 until all components listed in Table BC, and Table BD, or Table BE based on the specific fault code and the type of facility are replaced or the problem is corrected.
17. If the facility still fails after all components are replaced, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.
18. When alarmed MPM or digital facilities pass Test 3 without corrective action being performed (i.e., replacing a circuit pack), further analysis of the problem should be performed by changing the length of the test and repeating Test 3 to ensure that the alarmed failure is not intermittent.

Table 5-57.

PROC 646, TEST 3
FAILURE GROUPS FOR DIGITAL FACILITIES

FIRST TEST TYPE FAILED	FAILURE GROUP FOR FAILING MEMBER IDENTIFIED (IN PRIORITY ORDER)	
	MEMBER A [1] [2]	ADFTC [2]
4	Digital facility; TIE/DSU/private line modem; TDM/2; SN270/SN271; SN261.	SN261
3	TIE/DSU/private line modem; TDM/2; SN270/SN271; SN261.	SN261
2	[3] TDM/2 or PDM; SN270/SN271; SN261	SN261

[1] Components included in a particular failure group depend on the specific application.

[2] Run PROC 620 on individual SN270/TDM/2 or SN271/TDM/2 or SN261 if further isolation of trouble is required.

[3] When the digital facility uses an EIA port, replace SN238 instead of TDM/2 or PDM and SN270 or SN271.

19. Four minutes is recommended for the length of the test to ensure no intermittent failures exist.

    Proceed to Step 20.
20. Change the length of the test by performing:

    CHANGE FIELD; 12; ENTER; (4); ENTER.
21. Depress **EXECUTE**.

If the MPM or digital facility passes (indicated by a 0 in Field 12), proceed to Step 21.

If the MPM or digital facility fails (indicated by a 1 in Field 12), perform Steps 7 through 17 (as appropriate).

22. Test 3 must be run for each alarmed MPM or digital facility recorded in Test 1 of **PROC 600**.

    Use the **CHANGE FIELD** sequence to enter the next recorded MPM or digital facility failure in Fields 6 through 11 (equipment type and equipment location).

    Repeat Steps 3 through 21 (as appropriate).

23. If all alarmed failures pass Test 3, perform Test 2 to turn off the **OTHER FAILS** fault indicator.

User Reported Troubles

When user troubles associated with modem pooling members are reported, perform the following steps (as appropriate). Isolation of user reported troubles consist of:

1. General isolation techniques.
2. Isolation of a suspected failing trunk group.
3. Isolation of an unknown modem pool path.

NOTE

Tape issue 1.1 or later for Release 2, Version 3 must be used to isolate an unknown modem pool path.

General Isolation Techniques: Typical user information may include data rate, asynchronous or synchronous, or dial code used which may help to isolate the failing trunk group.

1. For example, if the user dialed **9** and then a remote computer port, the PDM used was set at 1200 bps, asynchronous, full duplex. A modem pool trunk group with matching characteristics would be suspect.
2. On the other hand, if a user dialed a local host computer, then a host access type of trunk group with that dial code is suspect.
3. Incoming calls may also chose a specific trunk group.

To determine the data rate on a data module associated with a modem, **PROC 070** or **PROC 100** can be used.

1. Examine Test 1 of **PROC 600** to determine if any alarmed entries exist for unit type 62 (ADFTC), unit type 65 (modem pooling), and unit type 35 (digital facilities).
2. If alarmed ADFTC circuits exist, perform isolation and repair step **ADFTC Alarmed Failures** above for all alarmed ADFTC circuits in **PROC 600**, Test 1 to isolate the trouble.
3. If alarmed modem pooling or digital facility circuits exist, perform isolation and repair step **MPM or Digital Facility Alarmed Failures** above for all alarmed modem pooling or digital facility circuits in **PROC 600**, Test 1 to isolate the trouble.

4. Examine Test 2 of **PROC 600** to determine if any entries with recorded entries exist for unit type 62 (ADFTC), unit type 65 (modem pooling), or unit type 35 (digital facilities).
5. If entries with recorded errors exist for ADFTC circuits, perform isolation and repair step **ADFTC Alarmed Failures** above for all ADFTC entries with recorded errors in **PROC 600**, Test 2 to isolate the trouble.
6. If entries with recorded errors exist for modem pooling or digital facilities, perform isolation and repair step **MPM or Digital Facility Alarmed Failures** above for all modem pooling or digital facility entries with recorded errors in **PROC 600**, Test 2 to isolate the trouble.

Isolation of a Suspected Failing Trunk Group:

1. Determine from the user the type of modem, data rate, and dial access code used to initiate the call.

   Modem types consist of 103J, 113C, 113D, 202S, 201C, 208B, and 212A.
2. Characteristics (i.e., modem type, loop back control, etc.) of digital trunks used in modem pooling are provided in **PROC 100**, Words 1 and 2.
3. Perform Test 2 of **PROC 646** on the trunk group suspected of failing by entering the trunk group number in Field 3.

   NOTE

   If the trunk group has a data rate of 300 or 1200 bps, set the test length to only 1 minute to identify severe problems quickly.

4. If any members of the trunk group fail, perform isolation and repair step **MPM or Digital Facility Alarmed Failures** above for each failing member of the trunk group to isolate the trouble.
5. If no members of the trunk group fail, use **NEXT FAULT** to determine the bit and block error rate for each member of the trunk group.
6. The bit and block error rate is determined by multiplying the first digit (left most side) in Field 14 by 10 raised to the negative power of the second digit in Field 14.

   The number of bits or blocks sent is determined by multiplying the third digit in Field 14 by 10 raised to the positive power of the fourth digit in Field 14.
7. The threshold for bit and block error rates is 1 X 10 to the minus 5 (or 15 displayed in the first 2 digits of Field 14).
8. Determine which member of the trunk group has the poorest bit and block error rate.
9. Depress **NEXT DATA** and record the equipment location of the GPPs and data ports used in the testing of the MPM with the poorest bit and block error rate.

   NOTE

   Field 6 = 1, Fields 7 through 11 displays the equipment location of member A GPP; Field 6 = 2, Fields 7 through 11 displays the equipment location of member A data port; Field 6 = 3, Fields 7 through 11 displays the equipment location of member B GPP; Field 6 = 4, Fields 7 through 11 displays the equipment location of member B data port.

10. Display the member A GPP equipment location in Fields 7 through 11 of **PROC 646**, Test 2.

11. Use **PROC 620**, Test 4 to test the member A GPP.

    NOTE

    The circuit that was displayed in Test 2 of **PROC 646** is the default equipment location displayed in Test 4 of **PROC 620**.

12. If Test 4 of **PROC 620** fails, take the appropriate corrective action and proceed to Step 14.

    NOTE

    Some failures detected by the GPP test in **PROC 620** are repaired by replacing the associated TDM/2 or PDM.

    If Test 4 of **PROC 620** passes, proceed to Step 13.

13. Repeat Test 4 of **PROC 620** for the member A data port, member B GPP, and member B data port using the **CHANGE FIELD** method to enter the equipment locations recorded in Step 9 above.

    If Test 4 of **PROC 620** fails, take the appropriate corrective action and proceed to Step 14.

    If Test 4 of **PROC 620** passes for all circuits tested (member A GPP; member A data port; member B GPP; member B data port), proceed to Step 16.

14. When **PROC 620** passes after taking corrective action, repeat Test 2 of **PROC 646** to ensure that the failure is corrected.

15. Check the bit and block error rate.

    If the bit and block error rate is acceptable, no further corrective action is required.

16. Enter Test 2 of **PROC 646** and display the member of the trunk group with the poorest bit and block error rate.

17. Replace the modem associated with the member with the poorest bit and block error rate.

    Repeat Test 2.

18. Check the bit and block error rate.

    If the bit and block error rate is acceptable, no further corrective action is required.

19. If the bit and block error rate is the same or worse, replace the data module associated with the member with the poorest bit and block error rate.

    Repeat Test 2.

20. Check the bit and block error rate.

    If the bit and block error rate is acceptable, no further corrective action is required.

21. If the bit and block error rate is the same or worse, check the wiring associated with the ADFTC, MPM or digital facility, modem, and data module.

Isolation of an Unknown Modem Pool Path: When a modem pooling trouble is reported by the user **that** cannot be isolated using **PROC 646, and** no entries (alarmed or error) are displayed in **PROC 600**, Tests 1 and 2 that correspond to the reported trouble, the problem is probably an intermittent trouble that cannot be isolated utilizing the normal techniques.

To isolate an unknown modem pool path, **Tape issue 1.1 or later** of Release 2, Version 3 **must** be used.

If this type of trouble persists for the user, the specific modem pool path for the troublesome connection must be determined and the trunk verification feature used to isolate the faulty component.

NOTE

When this type of trouble occurs again, the user must not hang up. The modem pool path would be disconnected if the user hangs up and no further action can be accomplished. Inform the user that on the next occurrence of this type of trouble to maintain the connection and to notify the technician that this trouble has occurred again.

Determining Modem Pool Connection Path:

The specific modem pool connection path for the troublesome connection can be determined while the connection is still up (refer to Figure 14) as follows:

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Figure 5-14. Modem Pooling Connection Path

1. Use **PROC 962**, Test 3 to enter the initiating circuit equipment location of the DTDM in Fields 2 through 6 and depress **EXECUTE.**

   The corresponding TDM facility equipment location is displayed in Fields 11 through 15.

2. Use **PROC 176** to enter the TDM equipment location displayed in Step 1 and display the corresponding TDM trunk group and trunk number in the group.

3. Use **PROC 180** to enter the TDM trunk group number displayed in Step 2.

   Depress **NEXT DATA** to search for the TDM digital equipment location.

   When the TDM equipment location is displayed, the corresponding modem analog equipment location is also displayed.

4. Use **PROC 962**, Test 2 to enter the modem initiating circuit equipment location (in Fields 2 through 6) displayed in Step 3 and depress **EXECUTE**.

   The corresponding outgoing trunk facility equipment location is displayed in Fields 11 through 15.

5. Use **PROC 176** to enter the outgoing trunk equipment location displayed in Step 4 and display the corresponding outgoing trunk group and trunk number in the group.
6. The connection is no longer needed since the connection path has been established.

   Notify the user that he may disconnect by going on-hook.

Isolating Faulty Component:

To isolate the faulty component (if any), the TVS feature is utilized to reproduce the same troublesome connection path, using the trunk group and trunk numbers obtained above for the TDM and the outgoing trunk.

An extension and data button must be administered on a multifunction telephone set and this extension must be administered for trunk verification in **PROC 285** Field 8.

NOTE

Isolating the faulty component should be performed at a convenient time to the customer, possibly during normal out-of-hours.

1. Using **PROC 350**, Word 2 enter TVS feature 44 and depress **EXECUTE**.

   The TVS dial access code is displayed.
2. Using the TVS administered extension, dial the TVS dial access code.

   Wait for dial tone.
3. Dial the TDM trunk group and trunk number as two consecutive 3-digit numbers.

   NOTE

   Example, for trunk number 1 in trunk group 80, dial 080001.

   Wait for dial tone.
4. Dial the TVS dial access code again.

   Wait for dial tone.
5. Dial the outgoing trunk group and trunk number as two consecutive 3-digit numbers the same way as in Step 3.

   Wait for dial tone.
6. Dial the 7 or 10 digit number of the computer host.

   The troublesome connection path is now active.
7. Determine the type of reception.

   If the reception is good, proceed to Step 8.

   If the reception is not good, proceed to Step 9.
8. Repeat steps 1 through 6 using the DTDM the user reported as a problem.

   If the reception is good, suspect the computer host as the problem.

   If the reception is not good, replace the DTDM.

9. Substitute the DTDM, TDM/modem, or outgoing trunk in the connection path by using the TVS feature to determine which component is faulty. Substitution is performed as follows:

   Trunk - Repeat Steps 1 through 6 using a different number in Step 5.

   TDM/modem - Repeat Steps 1 through 6 using a different number in Step 3.

   DTDM - Administer a new DTDM and perform Steps 1 through 6 using the same numbers.

10. When the reception is good, replace the component that was substituted.

Specific Fault Codes

A specific fault code is a number used to provide a description of a failure.

1. This description provides more detail about the failure associated with a circuit.
2. Specific fault codes are recorded during periodic or time available testing in PMIDS. Demand testing specific fault codes are recorded in DMIDS.
3. Both the PMIDS and DMIDS specific fault codes (normally the same) are available for display during testing.

Table BF, PROC 646 - Specific Fault Code Definitions, lists the specific fault codes in numerical sequence with a definition for each specific fault code.

Further isolation of a failure may be accomplished as follows:

1. Analyze the specific fault codes recorded from PMIDS (first specific fault code recorded before executing Test 1 or 3) and DMIDS (second specific fault code recorded after Test 1 or 3 failed).
2. Determine from the specific fault codes recorded (using Table BF, PROC 646 - Specific Fault Code Definitions), if any additional corrective action can be performed (i.e., cabling, connectors, etc.).
3. Check the wiring associated with the circuit pack(s) and/or components replaced (point to point depending upon specific fault code(s) recorded).

Table 5-58.

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
12	Time slot unavailable.
218	Network order failed.
454	DTLF fault on ADFTC (Digital Self-Test).
455	48-VOL fault on ADFTC (Analog Self-Test).
456	48-VOL and DTLF faults together on ADFTC.
457	Protocol error on ADFTC.
458	DTL idle on ADFTC.
1000	Could not send an S message.
1001	Facility not tested for more than X cycles.
1002	Trunk group not tested for more than X cycles.
1003	Did not receive an off-hook from the MPM (DTIM/2).
1004	Did not receive a ‘‘data set ready’’ from the MPM (modem).
1005	No bits received on a 1-port ADFTC self-test.
1006	Data transmission interrupted: 1-port ADFTC self-test.
1007	Bit-error rate exceeded for 1-port ADFTC self-test.
1008	Block-error rate exceeded for 1-port ADFTC self-test.
1009	EIA update failure during a 1-port ADFTC self-test.
1010	Error overflow during a 1-port ADFTC self-test.
1011	Undefined error during a 1-port ADFTC self-test.
1012	No bits received on a 2-port normal ADFTC self-test.
1013	Data transmission interrupted: 2-port normal ADFTC self-test.
1014	Bit-error rate exceeded for 2-port normal ADFTC self-test.
1015	Block-error rate exceeded for 2-port normal ADFTC self-test.
1016	EIA update failure during a 2-port normal ADFTC self-test.
1017	Error overflow during a 2-port normal ADFTC self-test.
1018	Undefined error during a 2-port normal ADFTC self-test.
1019	No bits received on a 2-port reverse ADFTC self-test.
1020	Data transmission interrupted: 2-port reverse ADFTC self-test.
1021	Bit-error rate exceeded for 2-port reverse ADFTC self-test.
1022	Block-error rate exceeded for 2-port reverse ADFTC self-test.
1023	EIA update failure during a 2-port reverse ADFTC self-test.
1024	Error overflow during a 2-port reverse ADFTC self-test.
1025	Undefined error during a 2-port reverse ADFTC self-test.
1026	Unsent stop message received by ADFTC.
1027	Did not receive expected: test aborted S message.
1028	Did not receive expected: test completed S message.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1029	The bit- and/or block-error rates were not received.
1030	No bits received on a half-duplex test in originating, normal mode.
1031	Data transmission interrupted: half-duplex test in originating, normal mode.
1032	Bit-error rate exceeded for half-duplex test in originating, normal mode.
1034	Block-error rate exceeded for half-duplex test in originating, normal mode.
1035	EIA update failure during a half-duplex originating, normal mode test.
1036	Error overflow during a half-duplex originating, normal mode test.
1037	Undefined error during a half-duplex test in originating, normal mode.
1038	No bits received on a half-duplex test in originating, normal mode at 300 baud.
1039	Data transmission interrupted: half-duplex test in originating, normal mode at 300 baud.
1040	Bit-error rate exceeded for half-duplex test in originating, normal mode at 300 baud.
1041	Block-error rate exceeded for half-duplex test in originating, normal mode at 300 baud.
1042	EIA update failure during a half-duplex originating, normal mode test at 300 baud.
1043	Error overflow during a half-duplex originating, normal mode test at 300 baud.
1044	Undefined error during a half-duplex test in originating, normal mode at 300 baud.
1045	No bits received on a half-duplex test in originating, normal mode at 1200 baud.
1046	Data transmission interrupted: half-duplex test in originating, normal mode at 1200 baud.
1047	Bit-error rate exceeded for half-duplex test in originating, normal mode at 1200 baud.
1048	Block-error rate exceeded for half-duplex test in originating, normal mode at 1200 baud.
1049	EIA update failure during a half-duplex originating, normal mode test at 1200 baud.
1050	Error overflow during a half-duplex originating, normal mode test at 1200 baud.
1051	Undefined error during a half-duplex test in originating, normal mode at 1200 baud.
1052	No bits received on a half-duplex test in originating, normal mode at 2400 baud.
1053	Data transmission interrupted: half-duplex test in originating, normal mode at 2400 baud.
1054	Bit-error rate exceeded for half-duplex test in originating, normal mode at 2400 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1055	Block-error rate exceeded for half-duplex test in originating, normal mode at 2400 baud.
1056	EIA update failure during a half-duplex originating, normal mode test at 2400 baud.
1057	Error overflow during a half-duplex originating, normal mode test at 2400 baud.
1058	Undefined error during a half-duplex test in originating, normal mode at 2400 baud.
1059	No bits received on a half-duplex test in originating, normal mode at 4800 baud.
1060	Data transmission interrupted: half-duplex test in originating, normal mode at 4800 baud.
1061	Bit-error rate exceeded for half-duplex test in originating, normal mode at 4800 baud.
1062	Block-error rate exceeded for half-duplex test in originating, normal mode at 4800 baud.
1063	EIA update failure during a half-duplex originating, normal mode test at 4800 baud.
1064	Error overflow during a half-duplex originating, normal mode test at 4800 baud.
1065	Undefined error during a half-duplex test in originating, normal mode at 4800 baud.
1066	No bits received on a half-duplex test in originating, normal mode at 9600 baud.
1067	Data transmission interrupted: half-duplex test in originating, normal mode at 9600 baud.
1068	Bit-error rate exceeded for half-duplex test in originating, normal mode at 9600 baud.
1069	Block-error rate exceeded for half-duplex test in originating, normal mode at 9600 baud.
1070	EIA update failure during a half-duplex originating, normal mode test at 9600 baud.
1071	Error overflow during a half-duplex originating, normal mode test at 9600 baud.
1072	Undefined error during a half-duplex test in originating, normal mode at 9600 baud.
1073	No bits received on a half-duplex test in originating, normal mode at 19.2 kilobaud.
1074	Data transmission interrupted: half-duplex test in originating, normal mode at 19.2 kilobaud.
1075	Bit-error rate exceeded for half-duplex test in originating, normal mode at 19.2 kilobaud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1076	Block-error rate exceeded for half-duplex test in originating, normal mode at 19.2 kilobaud.
1077	EIA update failure during a half-duplex originating, normal mode test at 19.2 kilobaud.
1078	Error overflow during a half-duplex originating, normal mode test at 19.2 kilobaud.
1079	Undefined error during a half-duplex test in originating, normal mode at 19.2 kilobaud.
1080	No bits received on a half-duplex test in originating, normal mode at 56 kilobaud.
1081	Data transmission interrupted: half-duplex test in originating, normal mode at 56 kilobaud.
1082	Bit-error rate exceeded for half-duplex test in originating, normal mode at 56 kilobaud.
1083	Block-error rate exceeded for half-duplex test in originating, normal mode at 56 kilobaud.
1084	EIA update failure during a half-duplex originating, normal mode test at 56 kilobaud.
1085	Error overflow during a half-duplex originating, normal mode test at 56 kilobaud.
1086	Undefined error during a half-duplex test in originating, normal mode at 56 kilobaud.
1087	No bits received on a half-duplex test in originating, normal mode at 64 kilobaud.
1088	Data transmission interrupted: half-duplex test in originating, normal mode at 64 kilobaud.
1089	Bit-error rate exceeded for half-duplex test in originating, normal mode at 64 kilobaud.
1090	Block-error rate exceeded for half-duplex test in originating, normal mode at 64 kilobaud.
1091	EIA update failure during a half-duplex originating, normal mode test at 64 kilobaud.
1092	Error overflow during a half-duplex originating, normal mode test at 64 kilobaud.
1093	Undefined error during a half-duplex test in originating, normal mode at 64 kilobaud.
1094	No bits received on a half-duplex test in originating, reverse mode.
1095	Data transmission interrupted: half-duplex test in originating, reverse mode.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1096	Bit-error rate exceeded for half-duplex test in originating, reverse mode.
1097	Block-error rate exceeded for half-duplex test in originating, reverse mode.
1098	EIA update failure during a half-duplex originating, reverse mode test.
1099	Error overflow during a half-duplex originating, reverse mode test.
1100	Undefined error during a half-duplex test in originating, reverse mode.
1101	No bits received on a half-duplex test in originating, reverse mode at 300 baud.
1102	Data transmission interrupted: half-duplex test in originating, reverse mode at 300 baud.
1103	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 300 baud.
1104	Block-error rate exceeded for half-duplex test in originating, reverse mode at 300 baud.
1105	EIA update failure during a half-duplex originating, reverse mode test at 300 baud.
1106	Error overflow during a half-duplex originating, reverse mode test at 300 baud.
1107	Undefined error during a half-duplex test in originating, reverse mode at 300 baud.
1108	No bits received on a half-duplex test in originating, reverse mode at 1200 baud.
1109	Data transmission interrupted: half-duplex test in originating, reverse mode at 1200 baud.
1110	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 1200 baud.
1111	Block-error rate exceeded for half-duplex test in originating, reverse mode at 1200 baud.
1112	EIA update failure during a half-duplex originating, reverse mode test at 1200 baud.
1113	Error overflow during a half-duplex originating, reverse mode test at 1200 baud.
1114	Undefined error during a half-duplex test in originating, reverse mode at 1200 baud.
1115	No bits received on a half-duplex test in originating, reverse mode at 2400 baud.
1116	Data transmission interrupted: half-duplex test in originating, reverse mode at 2400 baud.
1117	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 2400 baud.
1118	Block-error rate exceeded for half-duplex test in originating, reverse mode at 2400 baud.
1119	EIA update failure during a half-duplex originating, reverse mode test at 2400 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1120	Error overflow during a half-duplex originating, reverse mode test at 2400 baud.
1121	Undefined error during a half-duplex test in originating, reverse mode at 2400 baud.
1122	No bits received on a half-duplex test in originating, reverse mode at 4800 baud.
1123	Data transmission interrupted: half-duplex test in originating, reverse mode at 4800 baud.
1124	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 4800 baud.
1125	Block-error rate exceeded for half-duplex test in originating, reverse mode at 4800 baud.
1126	EIA update failure during a half-duplex originating, reverse mode test at 4800 baud.
1127	Error overflow during a half-duplex originating, reverse mode test at 4800 baud.
1128	Undefined error during a half-duplex test in originating, reverse mode at 4800 baud.
1129	No bits received on a half-duplex test in originating, reverse mode at 9600 baud.
1130	Data transmission interrupted: half-duplex test in originating, reverse mode at 9600 baud.
1131	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 9600 baud.
1132	Block-error rate exceeded for half-duplex test in originating, reverse mode at 9600 baud.
1133	EIA update failure during a half-duplex originating, reverse mode test at 9600 baud.
1134	Error overflow during a half-duplex originating, reverse mode test at 9600 baud.
1135	Undefined error during a half-duplex test in originating, reverse mode at 9600 baud.
1136	No bits received on a half-duplex test in originating, reverse mode at 19.2 kilobaud.
1137	Data transmission interrupted: half-duplex test in originating, reverse mode at 19.2 kilobaud.
1138	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 19.2 kilobaud.
1139	Block-error rate exceeded for half-duplex test in originating, reverse mode at 19.2 kilobaud.
1140	EIA update failure during a half-duplex originating, reverse mode test at 19.2 kilobaud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1141	Error overflow during a half-duplex originating reverse mode test at 19.2 kilobaud.
1142	Undefined error during a half-duplex test in originating, reverse mode at 19.2 kilobaud.
1143	No bits received on a half-duplex test in originating, reverse mode at 56 kilobaud.
1144	Data transmission interrupted: half-duplex test in originating, reverse mode at 56 kilobaud.
1145	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 56 kilobaud.
1146	Block-error rate exceeded for half-duplex test in originating, reverse mode at 56 kilobaud.
1147	EIA update failure during a half-duplex originating, reverse mode test at 56 kilobaud.
1148	Error overflow during a half-duplex originating, reverse mode test at 56 kilobaud.
1149	Undefined error during a half-duplex test in originating, reverse mode at 56 kilobaud.
1150	No bits received on a half-duplex test in originating, reverse mode at 64 kilobaud.
1151	Data transmission interrupted: half-duplex test in originating, reverse mode at 64 kilobaud.
1152	Bit-error rate exceeded for half-duplex test in originating, reverse mode at 64 kilobaud.
1153	Block-error rate exceeded for half-duplex test in originating, reverse mode at 64 kilobaud.
1154	EIA update failure during a half-duplex originating, reverse mode test at 64 kilobaud.
1155	Error overflow during a half-duplex originating, reverse mode test at 64 kilobaud.
1156	Undefined error during a half-duplex test in originating, reverse mode at 64 kilobaud.
1157	No bits received on a half-duplex test in terminating, normal mode.
1158	Data transmission interrupted: half-duplex test in terminating, normal mode.
1159	Bit-error rate exceeded for half-duplex test in terminating, normal mode.
1160	Block-error rate exceeded for half-duplex test in terminating, normal mode.
1161	EIA update failure during a half-duplex terminating, normal mode test.
1162	Error overflow during a half-duplex terminating, normal mode test.
1163	Undefined error during a half-duplex test in terminating, normal mode.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1164	No bits received on a half-duplex test in terminating, normal mode at 300 baud.
1165	Data transmission interrupted: half-duplex test in terminating, normal mode at 300 baud.
1166	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 300 baud.
1167	Block-error rate exceeded for half-duplex test in terminating, normal mode at 300 baud.
1168	EIA update failure during a half-duplex terminating, normal mode test at 300 baud.
1169	Error overflow during a half-duplex terminating, normal mode test at 300 baud.
1170	Undefined error during a half-duplex test in terminating, normal mode at 300 baud.
1171	No bits received on a half-duplex test in terminating, normal mode at 1200 baud.
1172	Data transmission interrupted: half-duplex test in terminating, normal mode at 1200 baud.
1173	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 1200 baud.
1174	Block-error rate exceeded for half-duplex test in terminating, normal mode at 1200 baud.
1175	EIA update failure during a half-duplex terminating, normal mode test at 1200 baud.
1176	Error overflow during a half-duplex terminating, normal mode test at 1200 baud.
1177	Undefined error during a half-duplex test in terminating, normal mode at 1200 baud.
1178	No bits received on a half-duplex test in terminating, normal mode at 2400 baud.
1179	Data transmission interrupted: half-duplex test in terminating, normal mode at 2400 baud.
1180	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 2400 baud.
1181	Block-error rate exceeded for half-duplex test in terminating, normal mode at 2400 baud.
1182	EIA update failure during a half-duplex terminating, normal mode test at 2400 baud.
1183	Error overflow during a half-duplex terminating, normal mode test at 2400 baud.
1184	Undefined error during a half-duplex test in terminating, normal mode at 2400 baud.
1185	No bits received on a half-duplex test in terminating, normal mode at 4800 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1186	Data transmission interrupted: half-duplex test in terminating, normal mode at 4800 baud.
1187	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 4800 baud.
1188	Block-error rate exceeded for half-duplex test in terminating, normal mode at 4800 baud.
1189	EIA update failure during a half-duplex terminating, normal mode test at 4800 baud.
1190	Error overflow during a half-duplex terminating, normal mode test at 4800 baud.
1191	Undefined error during a half-duplex test in terminating, normal mode at 4800 baud.
1192	No bits received on a half-duplex test in terminating, normal mode at 9600 baud.
1193	Data transmission interrupted: half-duplex test in terminating, normal mode at 9600 baud.
1194	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 9600 baud.
1195	Block-error rate exceeded for half-duplex test in terminating, normal mode at 9600 baud.
1196	EIA update failure during a half-duplex terminating, normal mode test at 9600 baud.
1197	Error overflow during a half-duplex terminating, normal mode mode test at 9600 baud.
1198	Undefined error during a half-duplex test in terminating, normal mode at 9600 baud.
1199	No bits received on a half-duplex test in terminating, normal mode at 19.2 kilobaud.
1200	Data transmission interrupted: half-duplex test in terminating, normal mode at 19.2 kilobaud.
1201	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 19.2 kilobaud.
1202	Block-error rate exceeded for half-duplex test in terminating, normal mode at 19.2 kilobaud.
1203	EIA update failure during a half-duplex terminating, normal mode test at 19.2 kilobaud.
1204	Error overflow during a half-duplex terminating, normal mode test at 19.2 kilobaud.
1206	Undefined error during a half-duplex test in terminating, normal mode at 19.2 kilobaud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1207	No bits received on a half-duplex test in terminating, normal mode at 56 kilobaud.
1208	Data transmission interrupted: half-duplex test in terminating, normal mode at 56 kilobaud.
1209	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 56 kilobaud.
1210	Block-error rate exceeded for half-duplex test in terminating, normal mode at 56 kilobaud.
1211	EIA update failure during a half-duplex terminating, normal mode test at 56 kilobaud.
1212	Error overflow during a half-duplex terminating, normal mode test at 56 kilobaud.
1213	Undefined error during a half-duplex test in terminating, normal mode at 56 kilobaud.
1214	No bits received on a half-duplex test in terminating, normal mode at 64 kilobaud.
1215	Data transmission interrupted: half-duplex test in terminating, normal mode at 64 kilobaud.
1216	Bit-error rate exceeded for half-duplex test in terminating, normal mode at 64 kilobaud.
1217	Block-error rate exceeded for half-duplex test in terminating, normal mode at 64 kilobaud.
1218	EIA update failure during a half-duplex terminating, normal mode test at 64 kilobaud.
1219	Error overflow during a half-duplex terminating, normal mode test at 64 kilobaud.
1220	Undefined error during a half-duplex test in terminating, normal mode at 64 kilobaud.
1221	No bits received on a half-duplex test in terminating, reverse mode.
1222	Data transmission interrupted: half-duplex test in terminating, reverse mode.
1223	Bit-error rate exceeded for half-duplex test in terminating, reverse mode.
1224	Block-error rate exceeded for half-duplex test in terminating, reverse mode.
1225	EIA update failure during a half-duplex terminating, reverse mode test.
1226	Error overflow during a half-duplex terminating, reverse mode test.
1227	Undefined error during a half-duplex test in terminating, reverse mode.
1228	No bits received on a half-duplex test in terminating, reverse mode at 300 baud.
1229	Data transmission interrupted: half-duplex test in terminating, reverse mode at 300 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1230	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 300 baud.
1231	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 300 baud.
1232	EIA update failure during a half-duplex terminating, reverse mode test at 300 baud.
1233	Error overflow during a half-duplex terminating, reverse mode test at 300 baud.
1234	Undefined error during a half-duplex test in terminating, reverse mode at 300 baud.
1235	No bits received on a half-duplex test in terminating, reverse mode at 1200 baud.
1236	Data transmission interrupted: half-duplex test in terminating, reverse mode at 1200 baud.
1237	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 1200 baud.
1238	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 1200 baud.
1239	EIA update failure during a half-duplex terminating, reverse mode test at 1200 baud.
1240	Error overflow during a half-duplex terminating, reverse mode test at 1200 baud.
1241	Undefined error during a half-duplex test in terminating, reverse mode at 1200 baud.
1242	No bits received on a half-duplex test in terminating, reverse mode at 2400 baud.
1243	Data transmission interrupted: half-duplex test in terminating, reverse mode at 2400 baud.
1244	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 2400 baud.
1245	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 2400 baud.
1246	EIA update failure during a half-duplex terminating, reverse mode test at 2400 baud.
1247	Error overflow during a half-duplex terminating, reverse mode test at 2400 baud.
1248	Undefined error during a half-duplex test in terminating, reverse mode at 2400 baud.
1249	No bits received on a half-duplex test in terminating, reverse mode at 4800 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1250	Data transmission interrupted: half-duplex test in terminating, reverse mode at 4800 baud.
1251	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 4800 baud.
1252	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 4800 baud.
1253	EIA update failure during a half-duplex terminating reverse mode test at 4800 baud.
1254	Error overflow during a half-duplex terminating, reverse mode test at 4800 baud.
1255	Undefined error during a half-duplex test in terminating, reverse mode at 4800 baud.
1256	No bits received on a half-duplex test in terminating, reverse mode at 9600 baud.
1257	Data transmission interrupted: half-duplex test in terminating, reverse mode at 9600 baud.
1258	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 9600 baud.
1259	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 9600 baud.
1260	EIA update failure during a half-duplex terminating, reverse mode test at 9600 baud.
1261	Error overflow during a half-duplex terminating, reverse mode test at 9600 baud.
1262	Undefined error during a half-duplex test in terminating, reverse mode at 9600 baud.
1263	No bits received on a half-duplex test in terminating, reverse mode at 19.2 kilobaud.
1264	Data transmission interrupted: half-duplex test in terminating, reverse mode at 19.2 kilobaud.
1265	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 19.2 kilobaud.
1266	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 19.2 kilobaud.
1267	EIA update failure during a half-duplex terminating, reverse mode test at 19.2 kilobaud.
1268	Error overflow during a half-duplex terminating, reverse mode test at 19.2 kilobaud.
1269	Undefined error during a half-duplex test in terminating, reverse mode at 19.2 kilobaud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1270	No bits received on a half-duplex test in terminating, reverse mode at 56 kilobaud.
1271	Data transmission interrupted: half-duplex test in terminating, reverse mode at 56 kilobaud.
1272	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 56 kilobaud.
1273	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 56 kilobaud.
1274	EIA update failure during a half-duplex terminating, reverse mode test at 56 kilobaud.
1275	Error overflow during a half-duplex terminating, reverse mode test at 56 kilobaud.
1276	Undefined error during a half-duplex test in terminating, reverse mode at 56 kilobaud.
1277	No bits received on a half-duplex test in terminating, reverse mode at 64 kilobaud.
1278	Data transmission interrupted: half-duplex test in terminating, reverse mode at 64 kilobaud.
1279	Bit-error rate exceeded for half-duplex test in terminating, reverse mode at 64 kilobaud.
1280	Block-error rate exceeded for half-duplex test in terminating, reverse mode at 64 kilobaud.
1281	EIA update failure during a half-duplex terminating, reverse mode test at 64 kilobaud.
1282	Error overflow during a half-duplex terminating, reverse mode test at 64 kilobaud.
1283	Undefined error during a half-duplex test in terminating, reverse mode at 64 kilobaud.
1284	Did not receive a handshake message.
1285	Handshake failure message received.
1286	No bits received on a full-duplex test.
1287	Data transmission interrupted: full-duplex test.
1288	Bit-error rate exceeded for full-duplex test.
1289	Block-error rate exceeded for full-duplex test.
1290	EIA update failure during a full-duplex test.
1291	Error overflow during a full-duplex test.
1292	Undefined error during a full-duplex test.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1293	No bits received on a full-duplex test in originating mode.
1294	Data transmission interrupted: full-duplex test in originating mode.
1295	Bit-error rate exceeded for full-duplex test in originating mode.
1296	Block-error rate exceeded for full-duplex test in originating mode.
1297	EIA update failure during a full-duplex test in originating mode.
1298	Error overflow during a full-duplex test in originating mode.
1299	Undefined error during a full-duplex test in originating mode.
1300	No bits received on a full-duplex test in originating mode at 300 baud.
1301	Data transmission interrupted: full-duplex test in originating mode at 300 baud.
1302	Bit-error rate exceeded for full-duplex test in originating mode at 300 baud.
1303	Block-error rate exceeded for full-duplex test in originating mode at 300 baud.
1304	EIA update failure during a full-duplex test in originating mode at 300 baud.
1305	Error overflow during a full-duplex test in originating mode at 300 baud.
1306	Undefined error during a full-duplex test in originating mode at 300 baud.
1307	No bits received on a full-duplex test in originating mode at 1200 baud.
1308	Data transmission interrupted: full-duplex test in originating mode at 1200 baud.
1309	Bit-error rate exceeded for full-duplex test in originating mode at 1200 baud.
1310	Block-error rate exceeded for full-duplex test in originating mode at 1200 baud.
1311	EIA update failure during a full-duplex test in originating mode at 1200 baud.
1312	Error overflow during a full-duplex test in originating mode at 1200 baud.
1313	Undefined error during a full-duplex test in originating mode at 1200 baud.
1314	No bits received on a full-duplex test in originating mode at 2400 baud.
1315	Data transmission interrupted: full-duplex test in originating mode at 2400 baud.
1316	Bit-error rate exceeded for full-duplex test in originating mode at 2400 baud.
1317	Block-error rate exceeded for full-duplex test in originating mode at 2400 baud.
1318	EIA update failure during a full-duplex test in originating mode at 2400 baud.
1319	Error overflow during a full-duplex test in originating mode at 2400 baud.
1320	Undefined error during a full-duplex test in originating mode at 2400 baud.
1321	No bits received on a full-duplex test in originating mode at 4800 baud.
1322	Data transmission interrupted: full-duplex test in originating mode at 4800 baud.
1323	Bit-error rate exceeded for full-duplex test in originating mode at 4800 baud.
1324	Block-error rate exceeded for full-duplex test in originating mode at 4800 baud.
1325	EIA update failure during a full-duplex test in originating mode at 4800 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1326	Error overflow during a full-duplex test in originating mode at 4800 baud.
1327	Undefined error during a full-duplex test in originating mode at 4800 baud.
1328	No bits received on a full-duplex test in originating mode at 9600 baud.
1329	Data transmission interrupted: full-duplex test in originating mode at 9600 baud.
1330	Bit-error rate exceeded for full-duplex test in originating mode at 9600 baud.
1331	Block-error rate exceeded for full-duplex test in originating mode at 9600 baud.
1332	EIA update failure during a full-duplex test in originating mode at 9600 baud.
1333	Error overflow during a full-duplex test in originating mode at 9600 baud.
1334	Undefined error during a full-duplex test in originating mode at 9600 baud.
1335	No bits received on a full-duplex test in originating mode at 19.2 kilobaud.
1336	Data transmission interrupted: full-duplex test in originating mode at 19.2 kilobaud.
1337	Bit-error rate exceeded for full-duplex test in originating mode at 19.2 kilobaud.
1338	Block-error rate exceeded for full-duplex test in originating mode at 19.2 kilobaud.
1339	EIA update failure during a full-duplex test in originating mode at 19.2 kilobaud.
1340	Error overflow during a full-duplex test in originating mode at 19.2 kilobaud.
1341	Undefined error during a full-duplex test in originating mode at 19.2 kilobaud.
1342	No bits received on a full-duplex test in originating mode at 56 kilobaud.
1343	Data transmission interrupted: full-duplex test in originating mode at 56 kilobaud.
1344	Bit-error rate exceeded for full-duplex test in originating mode at 56 kilobaud.
1345	Block-error rate exceeded for full-duplex test in originating mode at 56 kilobaud.
1346	EIA update failure during a full-duplex test in originating mode at 56 kilobaud.
1347	Error overflow during a full-duplex test in originating mode at 56 kilobaud.
1348	Undefined error during a full-duplex test in originating mode at 56 kilobaud.
1349	No bits received on a full-duplex test in originating mode at 64 kilobaud.
1350	Data transmission interrupted: full-duplex test in originating mode at 64 kilobaud.
1351	Bit-error rate exceeded for full-duplex test in originating mode at 64 kilobaud.
1352	Block-error rate exceeded for full-duplex test in originating mode at 64 kilobaud.
1353	EIA update failure during a full-duplex test in originating mode at 64 kilobaud.
1354	Error overflow during a full-duplex test in originating mode at 64 kilobaud.
1355	Undefined error during a full-duplex test in originating mode at 64 kilobaud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1356	No bits received on a full-duplex test in terminating mode.
1357	Data transmission interrupted: full-duplex test in terminating mode.
1358	Bit-error rate exceeded for full-duplex test in terminating mode.
1359	Block-error rate exceeded for full-duplex test in terminating mode.
1360	EIA update failure during a full-duplex test in terminating mode.
1361	Error overflow during a full-duplex test in terminating mode.
1362	Undefined error during a full-duplex test in terminating mode.
1363	No bits received on a full-duplex test in terminating mode at 300 baud.
1364	Data transmission interrupted: full-duplex test in terminating mode at 300 baud.
1365	Bit-error rate exceeded for full-duplex test in terminating mode at 300 baud.
1366	Block-error rate exceeded for full-duplex test in terminating mode at 300 baud.
1367	EIA update failure during a full-duplex test in terminating mode at 300 baud.
1368	Error overflow during a full-duplex test in terminating mode at 300 baud.
1369	Undefined error during a full-duplex test in terminating mode at 300 baud.
1370	No bits received on a full-duplex test in terminating mode at 1200 baud.
1371	Data transmission interrupted: full-duplex test in terminating mode at 1200 baud.
1372	Bit-error rate exceeded for duplex test in terminating mode at 1200 baud.
1373	Block-error rate exceeded for full-duplex test in terminating mode at 1200 baud.
1374	EIA update failure during a full-duplex test in terminating mode at 1200 baud.
1375	Error overflow during a full-duplex test in terminating mode at 1200 baud.
1376	Undefined error during a full-duplex test in terminating mode at 1200 baud.
1377	No bits received on a full-duplex test in terminating mode at 2400 baud.
1378	Data transmission interrupted: full-duplex test in terminating mode at 2400 baud.
1379	Bit-error rate exceeded for full-duplex test in terminating mode at 2400 baud.
1380	Block-error rate exceeded for full-duplex test in terminating mode at 2400 baud.
1381	EIA update failure during a full-duplex test in terminating mode at 2400 baud.
1382	Error overflow during a full-duplex test in terminating mode at 2400 baud.
1383	Undefined error during a full-duplex test in terminating mode at 2400 baud.
1384	No bits received on a full-duplex test in terminating mode at 4800 baud.
1385	Data transmission interrupted: full-duplex test in terminating mode at 4800 baud.
1386	Bit-error rate exceeded for full-duplex test in terminating mode at 4800 baud.
1387	Block-error rate exceeded for full-duplex test in terminating mode at 4800 baud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1388	EIA update failure during a full-duplex test in terminating mode at 4800 baud.
1389	Error overflow during a full-duplex test in terminating mode at 4800 baud.
1390	Undefined error during a full-duplex test in terminating mode at 4800 baud.
1391	No bits received on a full-duplex test in terminating mode at 9600 baud.
1392	Data transmission interrupted: full-duplex test in terminating mode at 9600 baud.
1393	Bit-error rate exceeded for full-duplex test in terminating mode at 9600 baud.
1394	Block-error rate exceeded for full-duplex test in terminating mode at 9600 baud.
1395	EIA update failure during a full-duplex test in terminating mode at 9600 baud.
1396	Error overflow during a full-duplex test in terminating mode at 9600 baud.
1397	Undefined error during a full-duplex test in terminating mode at 9600 baud.
1398	No bits received on a full-duplex test in terminating mode at 19.2 kilobaud.
1399	Data transmission interrupted: full-duplex test in terminating mode at 19.2 kilobaud.
1400	Bit-error rate exceeded for full-duplex test in terminating mode at 19.2 kilobaud.
1401	Block-error rate exceeded for full-duplex test in terminating mode at 19.2 kilobaud.
1402	EIA update failure during a full-duplex test in terminating mode at 19.2 kilobaud.
1403	Error overflow during a full-duplex test in terminating mode at 19.2 kilobaud.
1404	Undefined error during a full-duplex test in terminating mode at 19.2 kilobaud.
1405	No bits received on a full-duplex test in terminating mode at 56 kilobaud.
1406	Data transmission interrupted: full-duplex test in terminating mode at 56 kilobaud.
1407	Bit-error rate exceeded for full-duplex test in terminating mode at 56 kilobaud.
1408	Block-error rate exceeded for full-duplex test in terminating mode at 56 kilobaud.
1409	EIA update failure during a full-duplex test in terminating mode at 56 kilobaud.
1410	Error overflow during a full-duplex test in terminating mode at 56 kilobaud.
1411	Undefined error during a full-duplex test in terminating mode at 56 kilobaud.
1412	No bits received on a full-duplex test in terminating mode at 64 kilobaud.
1413	Data transmission interrupted: full-duplex test in terminating mode at 64 kilobaud.
1414	Bit-error rate exceeded for full-duplex test in terminating mode at 64 kilobaud.
1415	Block-error rate exceeded for full-duplex test in terminating mode at 64 kilobaud.
1416	EIA update failure during a full-duplex test in terminating mode at 64 kilobaud.

Table 5-58. (Contd)

PROC 646—SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE	DEFINITION
1417	Error overflow during a full-duplex test in terminating mode at 64 kilobaud.
1418	Undefined error during a full-duplex test in terminating mode at 64 kilobaud.
1419	Member A in use.
1420	Member B in use.
1421	Members A and B in use.
1422	Member A could not be seized.
1423	Member B could not be seized.
1424	No member available for testing.
1425	ADFTC did not return a setup (handshake) result message.
1426	ADFTC did not receive a set test (start handshake) message.
1427	No ADFTC available for testing.
1428	ADFTC in use.
1429	ADFTC maintenance busy.
1430	No on-hook received from modem.
1431	TDM/2 did not go on-hook after test was completed.

PROC 647 - AUTOMATIC TRANSMISSION MEASUREMENT SYSTEM (ATMS) TESTS

Purpose

PROC 647 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from an Automatic Transmission Measurement System (ATMS) failure.

PROC 647 is also used to perform transmission tests between near-end and far-end facilities by measuring loss, noise, and echo impairments when the user suspects an intermittent trouble with analog trunks.

PROC 647 provides a trunk supervision test to determine if a test progress tone, or the ˜1004 Hz tone from the terminating test line can be obtained.

PROC 647 is used to:

1. Display the failure history for trunk circuits failing ATMS scheduled tests.
2. Manually turn off any alarms activated because of a trunk circuit failing ATMS tests.
3. Perform a transmission measurement on selected circuits or a group of circuits.

   NOTE

   Measurement results are only displayed in Test 2.

4. Perform a supervision test on selected circuits or a group of circuits.

Field Definitions and Codes

Each field of **PROC 647** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BG, PROC 647 - Field Definitions and Codes.

Optional input fields are:

1. Field 2 - Select a specific trunk group to be tested (Tests 2 and 3 only).
2. Fields 2 and 3 - Select trunk group and trunk number of a specific trunk to be tested (Tests 2 and 3 only).
3. Fields 4 through 8 - Select equipment location of a specific circuit to be tested (Tests 2 and 3 only).

Operation of Procedure

Overview

PROC 647 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a trunk failure detected during ATMS scheduled tests.

To call in **PROC 647**, perform the following:

1. Depress **PROC NO; 647; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Table 5-59.

PROC 647 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	10* (Tests 2&3) (Contd)	3	Seizing trunk.
2	18-999	Trunk group number.		4	Test in progress.
3	1-255	Trunk number.		5	Test completed.
4-8		Equipment location:		6	Test completed with unacceptable trunk.
4	0-99	Module number.		9	Test(s) terminated and summary information displayed.
5	0-7	Cabinet number.			
6	0-3	Carrier number.	11	0-6	Test line type:
7	0-21	Slot number.		0	No terminating test line administered.
8	0-3	Circuit number.			
9	0-2	Circuit status:		1	102 or old 100-type.
	0	Idle.		2	New 100-type.
	1	In use.		3	LC145 or SN260A.
	2	Demand maintenance busied.		4	SN260B.
	3	Automatic maintenance busied.		5	56A or 105 without return loss.
				6	SN261, ZLC-12, or 105 with return loss.
10* (Test 1)	1-5	Alarm status:			
	1	Major.	12*	0-99	Fault code (Tests 1-3).
	2	Minor.		10-60	Measurement index (Test 2).
	3	Warning.	13*		Failure index:
	4	Errors recorded.		0-60	Index into PMIDS failures (Test 1 only).
	5	Alarm resolved.			
10* (Tests 2&3)	1-6,9	Test state.		0-99	Index into fault codes for displayed circuit (Test 2 only).
	1	Resolving contention.			
	2	Getting ADFTC.			

Table 5-59. (Contd)

PROC 647 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
13*	0-99	Total number of circuits tested (Tests 2 and 3 only).	14*	0-99	Total number of faults for the displayed failing circuit (Test 2 only).
13*	0-74, 91-99	Measurement results (Test 2 only).	14*	0-74, 91-99	Measurement results (Test 2 only).
14*		Total number of failures.	15*	0-99	Trunk type - Same as used in PROC 100 (Prior to execution of Tests 2 and 3 only).
	0-60	Total number of PMIDS failures (Test 1 only).			
	0-99	Total number of failed circuits (Tests 2 and 3 only).	15*	0-74, 91-99	Measurement results (Test 2 only).
* = Fields 10, and 12 through 15 are multiple use fields depending on the test being performed and when the data is displayed.					

Three tests are available:

1. Test 1 - Displays failure history logged in PMIDS by on-line periodic testing. Up to 60 failures can be displayed.

   Test 1 is also used to manually resolve all alarmed circuit failures associated with ATMS.

2. Test 2 - Performs demand tests on selected circuits or a group of circuits and compares transmission measurements to administered thresholds.

3. Test 3 - Performs a supervision test on selected circuits or a group of circuits.

NOTE

Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Test 1

Test 1 provides a failure history of the circuit failures detected by the on-line ATMS periodic software.

NOTE

Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Test 1 is also used to manually resolve the alarmed circuit failures associated with ATMS in PMIDS and to turn off the **OTHER FAILS** fault indicator if no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

NOTE

Measurement results are not displayed in Test 1.

1. Test 1 is the default test when entering **PROC 647** or is selected by using **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 1.

2. When Test 1 is initially called in, Field 1 displays a 1 and all other fields are dashed.
3. To start Test 1, depress **EXECUTE**.
4. The failure history is sorted and a summary is displayed.
5. If no failures exist, the following summary is displayed:

   Field 1 - 1.

   Field 14 - 0 (Indicating no failures).
6. If any failures exist, the summary displays a 1 in Field 1 and the total number of circuits that failed in Field 14 (maximum of 60).
7. Depressing **NEXT CIRCUIT** displays the first failure as follows:

   Field 1 - 1.

   Field 2 - Trunk group.

   Field 3 - Trunk number.

   Fields 4 through 8 - Equipment location of failing circuit.

   Field 9 - Circuit status of the displayed failure.

   Field 10 - Alarm status of failing circuit.

   Field 11 - Terminating test line type.

   Field 12 - Fault code.

   NOTE

   Only one (first, or most severe) fault code is recorded for each failing circuit.

   Field 13 - Failure index (equals number of failures displayed in Field 14).

   Field 14 - Total number of failing circuits recorded in PMIDS.

   Field 15 - Trunk type.
8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing circuits (if any).

   Field 13 decrements by 1 each time **NEXT CIRCUIT** is depressed.

9. When all failing circuits are displayed (1 displayed in Field 13), depressing **NEXT CIRCUIT** dashes Fields 2 through 15.

   Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing circuits can be stepped through again by use of **NEXT CIRCUIT**.

10. The **CLEAR DATA; EXECUTE** sequence is used to manually resolve individual alarmed circuit failures after **EXECUTE** is used to initiate Test 1.

    The failures which are resolved are those failures with an alarm status of 2 (minor) or 3 (warning) displayed in Field 10.

11. To resolve individual circuit failures with an alarm status of 2 or 3, perform Steps 12 and 13.

12. Use **NEXT CIRCUIT** to display the failing circuit with an alarm status of 2 or 3 on the **MAAP**.

NOTE	Individual circuit failures cannot be resolved unless the alarmed circuit is displayed on the **MAAP**.

13. Depress **CLEAR DATA; EXECUTE**.

    Field 10 (alarm status) displays a 5, indicating that the alarmed circuit in PMIDS is marked as resolved.

14. Repeat Steps 12 and 13 for each alarmed circuit failure to turn off the **OTHER FAILS** fault indicator, assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

Test 2

Test 2 is used to test one or more circuits once and compares transmission measurements to administered thresholds for the circuits tested.

NOTE	Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Circuits can be selected for testing by all circuits, trunk group, trunk group and trunk number, or by equipment location.

When a range of circuits are tested, failing circuits are displayed first and passing circuits are displayed after all failing circuits are displayed.

Measurement results can be obtained for failing **and** passing circuits.

NOTE	When test states 2 through 4 (indicates test not fully completed) are displayed in Field 10 for failing circuits, measurement results are not available. Fields 13 through 15 display dashes.

Measurement results are provided for further diagnosis (if required) to determine if the passing circuits are within marginal thresholds or if the thresholds need to be adjusted.

Test 2 Data Entry

1. Test 2 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 2.

2. When Test 2 is initially called in, a default trunk group, trunk number, and equipment location may be displayed in Fields 2 through 8. Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type.
3. The default circuit can be the last circuit displayed in Test 1 of **PROC 647** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a CO trunk or tie trunk equipment location and is still displayed in **PROC 620** when it is passed.
5. All circuits, a range of circuits, a specific circuit, or the default circuit can be tested.

   NOTE

   Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

   To test the default circuit, proceed to Step 14.

6. Selection of a range of circuits to be tested depends on whether or not a default equipment location is displayed.

   If a default equipment location is displayed, the **CHANGE FIELD** sequence **must** be used.

   If no default equipment location is displayed, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the range of circuits to be tested.

7. To test all circuits in the switch, Fields 2 through 8 must be dashed. Perform one of the following depending on whether or not a default equipment location is displayed:

   ENTER.

   CHANGE FIELD; 2; ENTER.

   Test 2 starts with trunk member 1 of the first trunk group (numerically) and runs until all circuits in the switch are tested.

   Proceed to Step 1 of Test 2 Execution.

8. To select all trunks in a trunk group to be tested, perform one of the following depending on whether or not a default equipment location is displayed:

   (Trunk group number); ENTER.

   CHANGE FIELD; 2; ENTER; (Trunk group number); ENTER.

   NOTE

   Field 11 displays the test line type and Field 15 displays the trunk type when the trunk group is entered in Field 2.

Test 2 starts with the first circuit in the trunk group selected and runs until all trunks in the trunk group are tested.

Proceed to Step 1 of Test 2 Execution.

9. A specific circuit can be selected for testing in one of three ways; i.e., by trunk group and trunk number, by equipment location, and by use of **NEXT CIRCUIT** and/or **NEXT UNIT**. (Refer to Steps 10 through 13.)

10. To select a specific circuit using trunk group and trunk number, perform one of the following depending on whether a default equipment location is displayed:

    (Trunk group); ENTER; (Trunk number); ENTER.

    CHANGE FIELD; 2; ENTER; (Trunk group); ENTER; **(Trunk number); ENTER**.

    NOTE

    Fields 4 through 8 display the equipment location of the trunk circuit, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the trunk group and number are entered in Fields 2 and 3.

    Proceed to Step 14.

11. To select a specific circuit using the equipment location, perform one of the following depending on whether or not a default equipment location is displayed:

    CHANGE FIELD; 4; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER**.

    CHANGE FIELD; 4; ENTER; (Module number); ENTER; **CHANGE FIELD; 5; ENTER; (Cabinet number); ENTER**; **CHANGE FIELD; 6; ENTER; (Carrier number); ENTER**; **CHANGE FIELD; 7; ENTER; (Slot number); ENTER**; **CHANGE FIELD; 8; ENTER; (Circuit number); ENTER**.

    NOTE

    Fields 2 and 3 display the trunk group and trunk number, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the equipment location is entered in Fields 4 through 8.

    Proceed to Step 14.

12. Depressing **NEXT CIRCUIT** advances to the next trunk in the displayed trunk group or the first trunk in the next testable trunk group.

    Depressing **NEXT UNIT** advances to the first trunk in the next testable trunk group.

13. To select a specific circuit using **NEXT CIRCUIT** and/or **NEXT UNIT**, perform the following:

    Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 2 through 8.

    Depress **NEXT UNIT** until the trunk group is displayed in Field 2, then depress **NEXT CIRCUIT** (if necessary) until the circuit to be tested is displayed in Fields 3 through 8.

    NOTE

    Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type for the circuit to be tested.

    Proceed to Step 14.

14. A specific circuit or the default circuit can be placed in maintenance busy out status for testing by performing the following:

    Check the circuit status displayed in Field 9.

    If the circuit status = 2 or 3, proceed to Step 1 of Test 2 Execution.

    If the circuit status = 0 or 1, depress **BUSY OUT** and proceed to Step 1 of Test 2 Execution.

Test 2 Execution

1. To start Test 2 after selecting the circuit(s) to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. During testing of a specific circuit or the default circuit, Field 10 (test state) is incremented to indicate progress of Test 2.

3. When the entire switch or an entire trunk group is tested, the following fields are incremented as a circuit is tested:

   Fields 2 and 3 - Trunk group and number.

   Fields 4 through 8 - Equipment location of circuit being tested.

   Field 9 - Circuit status of circuit being tested.

   Field 10 - Test state (encodes 1 through 5).

   Field 11 - Terminating test line type.

   Field 13 - Total number of circuits tested.

   Field 14 - Total number of failures (if any).

   Field 15 - Trunk type.

4. The failure information returned in Test 2 is stored in DMIDS.

   If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator goes off.

NOTE

Although Fields 13 and 14 only display 99 entries, DMIDS allows testing of at least 255 trunks prior to DMIDS overflowing occurring.

5. The original range of circuits selected is displayed in Fields 2 through 8, and special error code 83 (DMIDS overflow - range not completed) is displayed in the **MAAP** error code field.

6. Results of the test can be examined at this time (Refer to Test 2 Result Display below). Test 2 can be restarted from the original range of circuits entered by depressing **EXECUTE**.

CAUTION

If Test 2 is restarted from the original range entered, any test results gathered to that point are lost and only new failure data is retained.

NOTE

Before depressing **EXECUTE** to restart Test 2 from the original range entered, the failure data should be examined and recorded.

7. If Test 2 is halted because of a DMIDS overflow, a new range of circuits to be tested can be entered instead of testing the original range of circuits.

8. The **CHANGE FIELD** sequence must be used to enter the new range of circuits to be tested.

   Refer to Step 7 of Test 2 Data Entry above to select all circuits in the switch to be tested or Step 8 of Test 2 Data Entry above to select all trunks in a trunk group to be tested.

9. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits entered or to start over from the original range of circuits.

10. **STOP** can be depressed when a specific circuit or a range of circuits is being tested.

    The **WAIT** indicator goes off, the original range of circuits selected is displayed in Fields 2 through 8, and test state 9 (test terminated) is displayed in Field 10.

    NOTE

    Special error code 82 **(STOP** used - range not completed) is displayed in the **MAAP** error code field.

11. Test result information can be stepped through as described in Test 2 Result Display below when Test 2 is halted using **STOP** even though the specific circuit or the entire range is not tested.

12. To restart the test when Test 2 is halted by use of **STOP** before the specific circuit or range of circuits are tested at least once, **EXECUTE** is depressed and Test 2 starts from the equipment location following the last equipment location fully tested.

Test 2 Result Display

1. When Test 2 is completed or **STOP** is depressed for a specific circuit, a default circuit, a trunk group, or the entire switch, the **WAIT** indicator goes off and the following is displayed:

   Fields 2 through 8 - Specific circuit, default circuit, or the range of circuits originally selected for testing.

   Field 10 - Test state of 9 indicating test terminated.

   Field 13 - Total number of circuits tested.

   Field 14 - 0 or total number of failures (if any).

2. Depressing **NEXT CIRCUIT** displays the first, and then successive circuits tested.

   Failing circuits are displayed first, followed by passing circuits. If STOP is depressed, circuits are displayed in the order tested.

3. The display of the first circuit tested consists of:

   Field 1 - 2

   Fields 2 and 3 - Trunk group and trunk number.

   Fields 4 through 8 - Equipment location of the displayed circuit.

   Field 9 - Current circuit status of the displayed circuit.

   Field 10 - Test status (indicated by test states 2 through 6).

   Field 11 - Terminating test line type.

   Field 12 - Fault code.

   Field 13 - 0 or failure index (equaling Field 14).

Field 14 - 0 or total number of fault codes recorded for the circuit displayed.

Field 15 - Trunk type.

4. If Field 10 (test state) indicates a test abort encode (2 through 4), an abort cause fault code (1 through 6, or 67 through 99) is displayed in Field 12 and no further information (including measurement data) is available.

5. If Field 10 displays a test completed encode (5 or 6), Field 12 displays either 0 (passed all tests) or the first of one or more fault code(s) (11 through 63) indicating some threshold was exceeded.

   If Field 12 displays a fault code other than 0, Field 13 displays an index (equal to Field 14) and Field 14 displays the total number of fault codes recorded for **the displayed circuit**.

6. If Field 12 displays a 0 or Field 13 displays a 1 (indicating only one fault code), proceed to Step 10 to display measurement results.

   If Field 13 displays a number greater than 1, proceed to Step 7.

7. Depressing **NEXT FAULT** displays a different fault code in Field 12 for the same circuit.

   Field 13 is decremented each time **NEXT FAULT** is depressed.

   Field 10 (test state) either displays a 5 (marginal threshold) or 6 (unacceptable threshold was not passed) for the fault code displayed in Field 12.

8. If a circuit is in-use when testing is attempted (range or single circuit selected), test state 3 is displayed in Field 10, and fault code 5 is displayed in Field 12.

   Field 9 (circuit status) indicates whether the circuit is still in use at time of display.

NOTE

Record each in-use circuit for later testing (see Step 19 below).

9. When all fault codes are displayed (Field 13 = 1), depressing **NEXT FAULT** once more dashes Fields 12 through 14.

   Depressing **NEXT FAULT** again starts the sequence over.

10. Measurement results for the circuit tested, **whether the circuit passed or failed,** are displayed by depressing **NEXT DATA**.

NOTE

When tests states 2 through 4 are displayed in Field 10 for failing circuits, measurement results are not available. Fields 13 through 15 display dashes. Test states 5 and 6 indicate the test is completed and provide measurement data for passing and failing circuits.

11. Six sets of measurements (total of 18 measurements) are always displayed for each tested circuit by repeatedly depressing **NEXT DATA**.

    Measurement results are displayed in sets of three (displayed in Fields 13 through 15) and Field 12 (measurement index) is used to indicate which set is being displayed.

    Field 12 (measurement index) increments from 10 to 60; i.e., 10, 20, 30, 40, 50, and 60 indicating the six sets of measurements for the circuit tested.

12. The values displayed in Fields 13 through 15 refer to thresholds exceeded for measurements of each set. The definition for each measurement is indicated in Table BH, PROC 647 - Measurement Results.

Table 5-60.

PROC 647—MEASUREMENT RESULTS		
FIELD 12 MEASUREMENT INDEX =	FIELD NUMBER =	DEFINITION OF MEASUREMENT VALUES DISPLAYED IN FIELDS 13 THROUGH 15
10	13	Far to near end 404 Hz loss measurement
	14	Far to near end 0 dBm loss measurement
	15	Far to near end 2804 Hz loss measurement
20	13	Near to far end 404 Hz loss measurement
	14	Near to far end 0 dBm loss measurement
	15	Near to far end 2804 Hz loss measurement
30	13	Far to near end 1004 Hz loss measurement
	14	Near to far end 1004 Hz loss measurement
	15	Near end C-message noise without tone measurement
40	13	Far end C-message noise without tone measurement
	14	Near end C-message noise with tone measurement
	15	Far end C-message noise with tone measurement
50	13	Low frequency near end singing return loss measurement
	14	Near end echo return loss measurement
	15	High frequency near end singing return loss measurement
60	13	Low frequency far end singing return loss measurement
	14	Far end echo return loss measurement
	15	High frequency far end singing return loss measurement

13. Values range from 0 through 74, and 91 through 99. A value of 91 through 99 indicates negative numbers 1 through 9.

NOTE

Dashes displayed in any of the three fields (13 through 15) indicate that the measurement is not applicable to the terminating test line (TTL) displayed in Field 11.

14. The order of measurements is the same as that implied by fault codes 11 through 63.

    Fault codes 11 through 13 refer to thresholds exceeded for measurements of the first set (Field 12 = 10) and are displayed in Fields 13 through 15.

    Fault codes 21 through 23 refer to thresholds exceeded for measurements of the second set (Field 12 = 20) and are displayed in Fields 13 through 15.

    Fault codes 31 through 33 refer to thresholds exceeded for measurements of the third set (Field 12 = 30) and are displayed in Fields 13 through 15.

    Fault codes 41 through 43 refer to thresholds exceeded for measurements of the fourth set (Field 12 = 40) and are displayed in Fields 13 through 15.

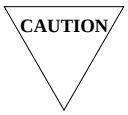
Fault codes 51 through 53 refer to thresholds exceeded for measurements of the fifth set (Field 12 = 50) and are displayed in Fields 13 through 15.

Fault codes 61 through 63 refer to thresholds exceeded for measurements of the sixth set (Field 12 = 60) and are displayed in Fields 13 through 15.

15. Depressing **NEXT DATA** after the sixth set of measurements is displayed (Field 12 = 60) dashes Fields 12 through 15.

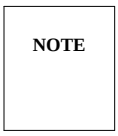
    Depressing **NEXT DATA** once more starts the sequence over with the first set of measurements displayed.

16. When a range of circuits are tested (all circuits in the switch or a trunk group), depressing **NEXT CIRCUIT** advances to the next circuit tested.



Depressing NEXT UNIT advances to the first trunk in the next trunk group and erases all data stored in DMIDS; i.e., circuits tested, fault codes, and measurement data are erased. Do not depress NEXT UNIT while displaying the tested circuits.

17. When a range of circuits are tested, **NEXT FAULT** is used to display all fault codes (if any) for the displayed circuit.



Record all in-use circuits with a 3 displayed in Field 10 (test state) and a 5 displayed in Field 12 (fault code) for later testing. Refer to Step 18 for testing of in-use circuits.

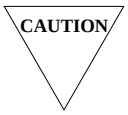
NEXT DATA is used to display measurement results for the displayed circuit.

18. When all tested circuits are displayed, depressing **NEXT CIRCUIT** dashes all fields except Field 1.

    Depressing **NEXT CIRCUIT** once more displays the summary information.

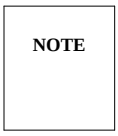
    Depressing **NEXT CIRCUIT** again starts the sequence over.

19. When in-use fault encodes are recorded, **EXECUTE** may be depressed for an additional test attempt on the in-use circuit.



Retesting of in-use circuits should occur only after all Test 2 failure history is examined, since the retesting of an in-use circuit erases all prior test results.

20. To test a circuit recorded as in-use (Step 8 or Step 17 above), use **NEXT CIRCUIT** to display the circuit in Fields 2 through 8.



Note that the circuit status field indicates the current status as idle, in-use, or maintenance busied (0, 1, 2, or 3) displayed in Field 9.

If Field 9 (circuit status) displays a 1, the circuit is in use.

21. Depress **EXECUTE**.

    If the circuit is still in use **and** Field 12 (fault code) displays a 5 indicating prior in-use failure, a camp-on procedure is used. Field 10 (test state) remains in state 3 until the circuit becomes available.

22. When an in-use circuit is tested, use **NEXT FAULT** and **NEXT DATA** as appropriate to determine the status of the circuit and the measurement results recorded.

23. To test other in-use circuits, perform the **CHANGE FIELD** sequence to select the in-use circuit recorded in Step 17 above.

    Refer to Steps 10 and 11 of Test 2 Data Entry above to select an in-use circuit using the trunk group and trunk number or the equipment location of the in-use circuit.

24. When a circuit was busied out and the test passed, or the trouble was corrected, the circuit should be released from busy using **RLS BUSY OUT**.

25. When another specific circuit is to be tested, refer to Steps 10 through 13 of Test 2 Data Entry above to select the specific circuit.

    EXECUTE must be depressed to test the specific circuit selected for testing.

26. To select another range of circuits to test, the **CHANGE FIELD** sequence must be used.

    Refer to Step 7 of Test 2 Data Entry above to select all circuits in the switch to test, or refer to Step 8 of Test 2 Data Entry above to select all circuits in a trunk group to test.

27. **EXECUTE** must be depressed to test the range of circuits selected for testing.

28. When all circuits that raised an alarm pass Test 2, perform the **CLEAR DATA; EXECUTE** sequence in Test 1 of **PROC 647** for each alarmed circuit to resolve the alarmed circuits and to turn off the **OTHER FAILS** fault indicator assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

NOTE

Alarmed circuits in PMIDS are marked as resolved when the **CLEAR DATA; EXECUTE** sequence is used in Test 1 for each alarmed circuit.

Test 3

Test 3 provides a trunk supervision test on one or more circuits. Test execution causes an attempt to obtain either the test progress tone or the ˜1004 Hz tone from the terminating test line.

NOTE

Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Circuits can be selected for testing by all circuits, trunk group, trunk group and trunk number, or by equipment location.

NOTE

Measurement results are not displayed in Test 3.

Test 3 Data Entry

1. Test 3 is selected by use of **NEXT TEST**.

   NOTE

   Use of the **CHANGE FIELD** sequence is not valid to select Test 3.

2. When Test 3 is initially called in, a default trunk group, trunk number, and equipment location may be displayed in Fields 2 through 8. Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type.
3. The default circuit can be the last circuit displayed in Test 1 or 2 of **PROC 647** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a CO trunk or tie trunk equipment location and is still displayed in **PROC 620** when it is passed.
5. All circuits, a range of circuits, a specific circuit, or the default circuit can be tested.

   NOTE

   Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

   To test the default circuit, proceed to Step 14.

6. Selection of a range of circuits to be tested depends on whether or not a default equipment location is displayed.

   If a default equipment location is displayed, the **CHANGE FIELD** sequence **must** be used.

   If no default equipment location is displayed, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the range of circuits to be tested.

7. To test all circuits in the switch, Fields 2 through 8 must be dashed. Perform one of the following depending on whether or not a default equipment location is displayed:

   ENTER.

   CHANGE FIELD; 2; ENTER.

   Test 3 starts with trunk member 1 of the first trunk group (numerically) and runs until all circuits in the switch are tested.

   Proceed to Step 1 of Test 3 Execution.

8. To select all trunks in a trunk group to be tested, perform one of the following depending on whether or not a default equipment location is displayed:

   (Trunk group number); ENTER.

   CHANGE FIELD; 2; ENTER; (Trunk group number); ENTER.

   NOTE

   Field 11 displays the test line type and Field 15 displays the trunk type when the trunk group is entered in Field 2.

   Test 3 starts with the first circuit in the trunk group selected and runs until all trunks in the trunk group are tested.

   Proceed to Step 1 of Test 3 Execution.

9. A specific circuit can be selected for testing in one of three ways; i.e., by trunk group and trunk number, by equipment location, and by use of **NEXT CIRCUIT** and/or **NEXT UNIT**. (Refer to Steps 10 through 13.)

10. To select a specific circuit using trunk group and trunk number, perform one of the following depending on whether a default equipment location is displayed.

    (Trunk group); ENTER; (Trunk number); ENTER.

    CHANGE FIELD; 2; ENTER; (Trunk group); ENTER; **(Trunk number); ENTER**.

    NOTE

    Fields 4 through 8 display the equipment location of the trunk circuit, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the trunk group and number are entered in Fields 2 and 3.

    Proceed to Step 14.

11. To select a specific circuit using the equipment location, perform one of the following depending on whether or not a default equipment location is displayed:

    CHANGE FIELD; 4; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER**.

    CHANGE FIELD; 4; ENTER; (Module number); ENTER; **CHANGE FIELD; 5; ENTER; (Cabinet number); ENTER**; **CHANGE FIELD; 6; ENTER; (Carrier number); ENTER**; **CHANGE FIELD; 7; ENTER; (Slot number); ENTER**; **CHANGE FIELD; 8; ENTER; (Circuit number); ENTER**.

    NOTE

    Fields 2 and 3 display the trunk group and trunk number, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the equipment location is entered in Fields 4 through 8.

    Proceed to Step 14.

12. Depressing **NEXT CIRCUIT** advances to the next trunk in the displayed trunk group or the first trunk in the next testable trunk group.

    Depressing **NEXT UNIT** advances to the first trunk in the next testable trunk group.

13. To select a specific circuit using **NEXT CIRCUIT** and/or **NEXT UNIT**, perform one of the following:

    Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 2 through 8.

    Depress **NEXT UNIT** until the trunk group is displayed in Field 2, then depress **NEXT CIRCUIT** (if necessary) until the circuit to be tested is displayed in Fields 3 through 8.

    NOTE

    Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type for the circuit to be tested.

    Proceed to Step 14.

14. A specific circuit or the default circuit can be placed in maintenance busy out status for testing by performing the following:

    Check the circuit status displayed in Field 9.

    If the circuit status = 2 or 3, proceed to Step 1 of Test 3 Execution.

    If the circuit status = 0 or 1, depress **BUSY OUT** and proceed to Step 1 of Test 3 Execution.

Test 3 Execution

1. To start Test 3 after selecting the circuit(s) to be tested, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

2. During testing of a specific circuit or the default circuit, Field 10 (test state) is incremented to indicate progress of Test 3.

3. When the entire switch or an entire trunk group is tested, the following fields are incremented as a circuit is tested:

   Fields 2 and 3 - Trunk group and number.

   Fields 4 through 8 - Equipment location of circuit being tested.

   Field 9 - Circuit status of circuit being tested.

   Field 10 - Test state (encodes 1 through 5).

   Field 11 - Terminating test line type.

   Field 14 - Total number of failures (if any).

   Field 15 - Trunk type.

4. The failure information returned in Test 3 is stored in DMIDS.

   If DMIDS becomes full at any time during the test, Test 3 is stopped and the **WAIT** indicator goes off.

   NOTE

   Although Fields 13 and 14 only display 99 entries, DMIDS allows testing of at least 255 trunks prior to DMIDS overflowing occurring.

5. The original range of circuits selected is displayed in Fields 2 through 8, and special error code 83 (DMIDS overflow - range not completed) is displayed in the **MAAP** error code field.
6. Results of the test can be examined at this time (refer to Test 3 Result Display below). Test 3 can be restarted from the original range of circuits entered by depressing **EXECUTE**.

CAUTION

If Test 3 is restarted from the original range entered, any test results gathered to that point are lost and only new failure data is retained.

NOTE

Before depressing **EXECUTE** to restart Test 3 from the original range entered, the failure data should be examined and recorded.

7. If Test 3 is halted because of a DMIDS overflow, a new range of circuits to be tested can be entered instead of testing the original range of circuits.
8. The **CHANGE FIELD** sequence must be used to enter the new range of circuits to be tested.

   Refer to Step 7 of Test 3 Data Entry above to select all circuits in the switch to be tested or Step 8 of Test 3 Data Entry above to select all trunks in a trunk group to be tested.
9. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits entered or to start over from the original range of circuits.
10. **STOP** can be depressed when a specific circuit or a range of circuits is being tested.

    The **WAIT** indicator goes off, the original range of circuits selected is displayed in Fields 2 through 8, and test state 9 (test terminated) is displayed in Field 10.

NOTE

Special error code 82 **(STOP** used - range not completed) is displayed in the **MAAP** error code field.

11. Test result information can be stepped through as described in Test 3 Result Display below when Test 3 is halted using **STOP** even though the specific circuit or the entire range is not tested.
12. To restart the test when Test 3 is halted by use of **STOP** before the specific circuit or range of circuits are tested at least once, **EXECUTE** is depressed and Test 3 starts at the equipment location following the last equipment location fully tested.

Test 3 Result Display

1. When Test 3 is completed or **STOP** is depressed for a specific circuit, a default circuit, a trunk group, or the entire switch, the **WAIT** indicator goes off and the following is displayed:

   Fields 2 through 8 - Specific circuit, default circuit, or the range of circuits originally selected for testing.

   Field 10 - Test state of 9 indicating test terminated.

   Field 13 - Total number of circuits tested.

   Field 14 - 0 or total number of failures (if any).

2. Depressing **NEXT CIRCUIT** displays the first and then successive circuits tested.

   Failing circuits are displayed first, followed by passing circuits. If STOP is depressed, circuits are displayed in the order tested.

3. The display of the first circuit tested consists of:

   Field 1 - 3

   Fields 2 and 3 - Trunk group and trunk number.

   Fields 4 through 8 - Equipment location of the displayed circuit.

   Field 9 - Current circuit status of the displayed circuit.

   Field 10 - Test status (indicated by test states 2 through 6).

   Field 11 - Terminating test line type.

   Field 12 - Fault code.

   Field 13 - 0 or failure index (equaling Field 14).

   Field 14 - 0 or total number of fault codes recorded for the circuit displayed.

   Field 15 - Trunk type.

4. Field 10 (test state) displays either a test completed encode of 5 or a test abort encode of 2 through 4.

   If Field 10 displays a test completed encode of 5, Field 12 (fault code) displays a 0 indicating successful completion of Test 3.

5. If Field 10 indicates a test abort encode (2 through 4), an abort cause fault code (1 through 6, or 67 through 99) is displayed in Field 12 and no further information is available.

   NOTE

   Only one (first, or most severe) fault code is recorded for each failing circuit.

6. If a circuit is in-use when testing is attempted (range or single circuit selected), test state 3 is displayed in Field 10, and fault code 5 is displayed in Field 12.

   Field 9 (circuit status) indicates whether the circuit is still in use at time of display.

   NOTE

   Record each in-use circuit for later testing (see Step 10 below).

7. When a range of circuits are tested (all circuits in the switch or a trunk group), depressing **NEXT CIRCUIT** advances to the next circuit tested.
8. Record all in-use circuits with a 3 displayed in Field 10 (test state) and a 5 displayed in Field 12 (fault code) for later testing. Refer to Step 10 for testing of in-use circuits.

CAUTION

Depressing NEXT UNIT advances to the first trunk in the next trunk group and erases all data stored in DMIDS; i.e., circuits tested and fault codes are erased. Do not depress NEXT UNIT while displaying the tested circuits.

9. When all tested circuits are displayed, depressing **NEXT CIRCUIT** dashes all fields except Field 1.

   Depressing **NEXT CIRCUIT** once more displays the summary information.

   Depressing **NEXT CIRCUIT** once more starts the sequence over with the first tested circuit.
10. When in-use fault encodes are recorded, **EXECUTE** may be depressed for an additional test attempt on the in-use circuit.

CAUTION

Retesting of in-use circuits should occur only after all Test 3 failure history is examined, since the retesting of an in-use circuit erases all prior test results.

11. To test a circuit recorded as in-use (Steps 6 or 8 above), use **NEXT CIRCUIT** to display the circuit in Fields 2 through 8.

NOTE

Note that the circuit status field indicates the current status as idle, in-use, or maintenance busied (0, 1, or 2) displayed in Field 9.

   If Field 9 (circuit status) displays a 1, the circuit is in use.
12. Depress **EXECUTE**.

    When an in-use circuit is tested, use **NEXT CIRCUIT** to determine the status of the circuit.
13. If the circuit is still in use **and** Field 12 (fault code) displays a 5 indicating prior in-use failure, a camp-on procedure is used. Field 10 (test state) remains in state 3 until the circuit becomes available.

14. To test other in-use circuits, perform the **CHANGE FIELD** sequence to select the in-use circuit recorded in Step 7 above.

    Refer to Steps 10 and 11 of Test 3 Data Entry above to select an in-use circuit using the trunk group and trunk number or the equipment location of the in-use circuit.

15. When a circuit was busied out and the test passed, or the trouble was corrected, the circuit should be released from busy using **RLS BUSY OUT**.

16. When another specific circuit is to be tested, refer to Steps 10 through 13 of Test 3 Data Entry above to select the specific circuit.

    EXECUTE must be depressed to test the specific circuit selected for testing.

17. To select another range of circuits to test, the **CHANGE FIELD** sequence must be used.

    Refer to Step 7 of Test 3 Data Entry above to select all circuits in the switch to test, or Step 8 of Test 2 Data Entry above to select all circuits in a trunk group to test.

18. **EXECUTE** must be depressed to test the range of circuits selected for testing.

Repair Guide

General

When a trunk circuit failing ATMS scheduled tests is indicated **(PROC 647** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), perform the following steps in the order listed to isolate and repair the faulty unit.

The starting point for isolation and repair of alarmed trunk circuits failing ATMS scheduled tests is Test 1 of **PROC 600** or Test 1 of **PROC 647**.

To isolate an alarmed trunk circuit failing ATMS scheduled tests displayed in Test 1 of **PROC 600** or Test 1 of **PROC 647**, Test 2 of **PROC 647** is executed to determine the extent of the trouble.

1. Execute Test 1 of **PROC 600** or Test 1 of **PROC 647** to determine which circuits are alarmed (indicated by a 2 (minor) or 3 (warning) displayed in the alarm status field).

   Record the alarmed circuits displayed in Test 1 of **PROC 600** or Test 1 of **PROC 647**.

2. Display the alarmed circuit in Test 1 of **PROC 600** or Test 1 of **PROC 647**.

3. Enter **PROC 647** Test 2.

   NOTE

   The alarmed circuit that was displayed in Test 1 of **PROC 600** or Test 1 of **PROC 647** is the default equipment location displayed in Test 2 of **PROC 647**.

4. Depress **EXECUTE**.

   If Test 2 passes, proceed to Step 12.

5. If Test 2 fails, depress **NEXT CIRCUIT**.

   Field 10 indicates the test state and Field 12 displays a fault code. Field 14 displays the number of fault codes for the failing circuit and Field 13 displays the index into the fault codes (equaling Field 14).

6. Record the test state displayed in Field 10 and the fault code displayed in Field 12 and proceed to Step 7.

7. If Field 13 (failure index) displays a 1, proceed to Step 10.

   If Field 13 displays more than 1, proceed to Step 8.

8. Depressing **NEXT FAULT** repeatedly displays the remaining fault codes for the failing circuit.

   Record each test state displayed in Field 10 and the associated fault code displayed in Field 12.

9. When all fault codes are displayed (Field 13 = 1) depressing **NEXT FAULT** once more dashes Fields 12 through 14.

   Proceed to Step 10.

10. Refer to Table BI, PROC 647 - Fault Code Definitions, for a list of the test state, fault codes, and definitions associated with each test state and fault code.

    Proceed to Step 11 to perform corrective action.

11. Perform the corrective action listed below associated with the test state and fault code displayed in Fields 10 and 12 for the failing circuit.

12. Test 2 must be run for each alarmed circuit failure recorded in Test 1 of **PROC 600** or Test 1 of **PROC 647**.

    Repeat Steps 2 through 12 for each recorded alarmed circuit failure.

13. If all alarmed circuit failures pass Test 2, perform the **CLEAR DATA; EXECUTE** sequence in Test 1 of **PROC 647** for each alarmed circuit to resolve the alarmed circuits and to turn off the **OTHER FAILS** fault indicator assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

Test State 2 - Fault Codes 1 and 2

Repeat Test 2 on the same circuit.

Test State 2 - Fault Code 3

1. Perform Test 1 of **PROC 646** and Test 4 of **PROC 620** (unit type 62) to test the ADFTC.

   If the ADFTC passes both tests, proceed to Step 2.

   If the ADFTC fails either test, perform corrective action as required and release the ADFTC from maintenance busy. Proceed to Step 3.

2. If the ADFTC passes **PROC 646** and **PROC 620**, release the ADFTC from maintenance busy status and proceed to Step 3.

3. Repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

Table 5-61.

PROC 647—FAULT CODE DEFINITIONS		
FIELD 10 TEST STATE	FIELD 12 FAULT CODE	DEFINITION
2	1	ADFTC in use
	2	ADFTC not available
	3	ADFTC maintenance busied
3	4	No terminating test line (TTL) administered
	5	Trunk in use
	6	Cannot release busy the trunk
4	1	ADFTC in use (after Test State 2)
	67	No test tone returned from far end (105 type only)
	68	Originating test line (OTL) not assigned as rotary
	69	ADFTC received stop test message
	70	ADFTC self-test fails
	71	Bad I/O to or from OTL
	72	Cannot seize originating register
	73	Dialing of Trunk Verification by Station (TVS) feature failed
	74	Code dialed did not match TVS feature access
	75	Trunk group dial access code inappropriate
	76	Software record incorrect
	77	ADFTC and trunk cannot be connected
	78	Intercept tone detected
	79	Reorder tone detected
	80	Other unexpected tone detected
	81	Ring no answer from far end
	82	Unidentifiable interrupted tone detected
	83	Busy from far end
	84	Far end release
	85	No response from far end
	86	No data returned from far end
	87	Steady unidentifiable tone detected
	88	Broadband energy from far end (noise, voice, or recorded announcement)
	89	Far end test line unavailable, timeout after waiting for test progress tone removal
	90	Near end self-test failed
	91	Far end loss self-test at 0 dBm 1004 Hz failed
	92	Far end noise self-test failed

Table 5-62. (Contd)

PROC 647—FAULT CODE DEFINITIONS		
FIELD 10 TEST STATE	FIELD 12 FAULT CODE	DEFINITION
4 (Contd)	93	Far end high frequency singing return loss self-test failed
	94	Far end echo return loss self-test failed
	95	Far end singing return loss self-test failed
	96	Far end loss self-test at -16 dBm 1004 Hz failed
	97	Far end loss self-test at -16 dBm 404 Hz failed
	98	Far end loss self-test at -16 dBm 2804 Hz failed
	99	Far end noise with tone self-test failed
5 and 6	0	Passed all tests
	11	Failed 404 Hz far end to near end deviation threshold
	12	Failed 0 dBm loss far end to near end loss threshold
	13	Failed 2804 Hz far end to near end deviation threshold
	21	Failed 404 Hz near end to far end deviation threshold
	22	Failed 0 dBm loss near end to far end loss threshold
	23	Failed 2804 Hz near end to far end deviation threshold
	31	Failed 1004 Hz far end to near end level loss threshold
	32	Failed 1004 Hz near end to far end level loss threshold
	33	Failed near end C-message noise threshold
	41	Failed far end C-message without tone noise threshold
	42	Failed near end C-message with tone threshold
	43	Failed far end C-message with tone threshold
	51	Failed near end singing return loss low threshold
	52	Failed near end echo return loss threshold
	53	Failed near end singing return loss high threshold
	61	Failed far end singing return loss low threshold
	62	Failed far end echo return loss threshold
	63	Failed far end singing return loss high threshold

Test State 3 - Fault Code 4

Administer the TTL.

Test State 3 - Fault Code 5

Repeat Test 2 to camp-on the circuit until the circuit is available for testing.

Test State 3 - Fault Code 6

1. Perform Test 4 of **PROC 620** to test the busy circuit.

   NOTE The circuit that was displayed in Test 2 of **PROC 647** is the default equipment location displayed in Test 4 of **PROC 620**.

2. If Test 4 passes, release the circuit from maintenance busy and proceed to Step 3.

   If Test 4 fails, take corrective action as appropriate and release the circuit from maintenance busy. Proceed to Step 3.

3. Repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

Test State 4 - Fault Code 1

Repeat Test 2 on the same circuit.

Test State 4 - Fault Codes 67, 78 Through 82, and 85 Through 88

1. Perform Test 4 of **PROC 620** to test the failing circuit.

   NOTE The circuit that was displayed in Test 2 of **PROC 647** is the default equipment location displayed in Test 4 of **PROC 620**.

2. If Test 4 passes, proceed to Step 3.

   If Test 4 fails, take corrective action as appropriate and repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

   Proceed to Step 8.

3. Use Test 2 of **PROC 642** (Terminal-to-Trunk Test Call) to test the failing circuit.

4. Analyze how far the call went to the far end.

   If the test call completely passes, repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status and proceed to Step 8.

5. If the test call is stuck at state 2, proceed to Step 14.

6. If the test call fails (test call aborted - state 6), take corrective action as appropriate and repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

   Proceed to Step 8.

7. If the test call is answered by someone other than the intended party, i.e., recorded announcement, proceed to Step 13.

8. If Test 2 fails again with the same test state and fault code (test state 4, fault code 67, 78 through 82, or 85 through 88), proceed to Step 9.

   If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.

9. Perform Test 1 of **PROC 646** and Test 4 of **PROC 620** (unit type 62) to test the ADFTC.

   If the ADFTC passes both tests, proceed to Step 10.

   If the ADFTC fails either test, perform corrective action as required and proceed to Step 10.

10. Repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

    Proceed to Step 11.

11. If Test 2 fails again with the same test state and fault code (test state 4, fault code 67, 78 through 82, or 85 through 88), proceed to Step 12.

    If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.

12. Perform the following step in accordance with the fault code displayed.

    Perform Step 13 for fault codes 67 and 78 through 80.

    Perform Step 14 for fault codes 81, 82, and 85 through 88.

13. Some type of translation trouble is indicated. Use translation procedure **PROC 107** to correct the trouble.

14. A trouble with the far end terminating test line is indicated. Refer the trouble to the far end maintenance organization for further diagnosis.

Test State 4 - Fault Codes 68 and 72 Through 75

When fault codes 68 and 72 through 75 are recorded with a test state of 4, some type of translation trouble is indicated.

Fault code 68:

1. For fault code 68 (OTL not assigned as rotary), use translation procedures **PROC 000** and **PROC 010** to determine the assignment of the OTL.
2. If translation is correct, refer the trouble to switch engineers for further diagnosis.
3. If translation is not correct, administer the OTL and repeat Test 2 for the same circuit to determine the status.

Fault code 72:

1. For fault code 72 (cannot seize originating register), use translation procedure **PROC 254** to determine if originating registers are assigned.
2. If originating registers are assigned, refer the trouble to switch engineers for further diagnosis.

   NOTE

   Additional originating registers may be required.

3. If translation is not correct, administer the originating registers (as necessary) and repeat Test 2 for the same circuit to determine the status.

Fault code 73:

1. For fault code 73 (dialing of TVS feature failed), repeat Test 2.
2. If Test 2 fails again with the same test state and fault code (test state 4, fault code 73), use translation procedures **PROC 350 Word 2, PROC 285**, and **PROC 103** to determine the dial code assignment and trunk type of the TVS feature and proceed to Step 3.

NOTE

Refer to AT&T System 85, Release 2, Version 3, Feature Translations Service Manual, 555-102-107, Issue 2 for definition and operation of **PROC 350 Word 2, PROC 285**, and **PROC 103**.

3. If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.
4. If translation is correct, refer the trouble to switch engineers for further diagnosis.
5. If translation is not correct, administer the dial code assignment of the TVS feature and repeat Test 2 for the same circuit to determine the status.

Fault code 74:

1. For fault code 74 (code dialed did not match TVS feature), repeat Test 2.
2. If Test 2 fails again with the same test state and fault code (test state 4, fault code 74), use translation procedure **PROC 350, Word 2** to determine the dial access code assignment of the TVS and proceed to Step 3.

NOTE

Refer to AT&T System 85, Release 2, Version 3, Feature Translations Service Manual, 555-102-107, Issue 2 for definition and operation of **PROC 350, Word 2**.

3. If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.
4. If translation is correct, refer the trouble to switch engineers for further diagnosis.
5. If translation is not correct, administer the dial access code assignment of the TVS feature and repeat Test 2 for the same circuit to determine the status.

Fault code 75:

1. For fault code 75 (trunk group dial access code inappropriate), use translation procedures **PROC 100 Word 1, PROC 175, PROC 010 Word 3**, and **PROC 350, Words 1 and 2** to determine trunk type, trunk group translations, and restrictions.

NOTE

Refer to AT&T System 85, Release 2, Version 3, Feature Translations Service Manual, 555-102-107, Issue 2 for definition and operation of **PROC 100 Word 1, PROC 175, PROC 010 Word 3**, and **PROC 350, Words 1 and 2**.

2. If translation is correct, refer the trouble to switch engineers for further diagnosis.
3. If translation is not correct, administer the trunk group dial access code and repeat Test 2 for the same circuit to determine the status.

Test State 4 - Fault Code 69

1. Repeat Test 2 of **PROC 647** on the same circuit.

   Determine the status of the circuit tested.

2. If Test 2 passes, corrective action is complete.

   If Test 2 fails again with the same test state and fault code (test state 4, fault code 69), escalate the trouble.

   NOTE

   The trouble can be associated with the near end or far end.

3. If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.

Test State 4 - Fault Codes 70, 71, and 90

1. Perform Test 1 of **PROC 646** and Test 4 of **PROC 620** (unit type 62) to test the ADFTC.

   If the ADFTC passes both tests, proceed to Step 2.

   If the ADFTC fails either test, perform corrective action as required and proceed to Step 2.

2. Repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

Test State 4 - Fault Codes 76 and 77

1. Record the information displayed in Fields 2 through 15 for each circuit with a fault code of 76 or 77.
2. When excessive entries (based on experience) are noted, refer the trouble to the switch engineers for further diagnosis.

Test State 4 - Fault Codes 83 and 89

1. Record the information displayed in Fields 2 through 15 for each circuit with a fault code of 83 or 89.
2. When excessive entries (based on experience) are noted, refer the trouble to the far end maintenance organization for further diagnosis.

   NOTE

   If fault codes 83 (busy from far end) and 89 (far end test line unavailable) occur often enough, more equipment may be needed to perform transmission measurements between the near end and far end.

Test State 4 - Fault Codes 84, and 91 Through 99

Refer the trouble to the far end maintenance organization for further diagnosis.

Test State 5 or 6 - Fault Codes 11 Through 63

1. Perform Test 4 of **PROC 620** to test the appropriate circuit.

NOTE

The circuit that was displayed in Test 2 of **PROC 647** is the default equipment location displayed in Test 4 of **PROC 620**.

2. If Test 4 passes, refer the trouble to the facility responsible for connections between the near and far end.

   If Test 4 fails, take corrective action as appropriate and proceed to Step 3.

3. Repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

Transmission Measurements

Measurement results include contributions from three sources:

1. The System 85 (near-end) switch.
2. The trunk circuit.
3. The switch at the location of the terminating test line (far-end).

Table BJ, PROC 647, Measurement Conversion Factors, provides the contributions of DIMENSION PBXs and System 85 switches used as OTL or TTL to the measurement results.

For example, for a CO trunk measurement, facility loss is determined by adding the measured loss on the **MAAP** display to the OTL conversion factor listed in Table BJ plus the CO gain.

An example of computing facility loss is to add the following:

1. The measured loss on the **MAAP** display.
2. Table BJ OTL listing.
3. CO gain (determined from far end switch) that is the location of the far end.

Table 5-63.

PROC 647 - MEASUREMENT CONVERSION FACTORS					
SYSTEM TYPE	TEST CIRCUIT CONNECTED	TRUNK TYPE	MEASUREMENT TYPE		
			LOSS	NOISE	RETURN LOSS
SYSTEM 85 R2V3 (NEAR END)	ADFTC OTL (SN-261)	CO F-N	- 0.125	0	0
		CO N-F	- 0.125	+ 0.125	- 0.25
		TT F-N	- 1.875	0	0
		TT N-F	- 1.875	+ 1.875	- 3.75
		D F-N	- 6.0	0	0
		D N-F	0	+ 6.0	- 6.0
''DIMENSION'' (FAR END)	ANY TTL (ZLC-12) (56A) (LC-145)	CO F-N	- 0.3	+ 0.3	- 0.6
		CO N-F	- 0.3	0	0
		TT F-N	- 2.3	+ 2.3	- 4.6
		TT N-F	- 2.3	0	0
		D F-N	- 2.3	+ 2.3	- 4.6
		D N-F	- 2.3	0	0
SYSTEM 85 R2V3 (FAR END)	ADFTC TTL (SN-261)	CO F-N	- 0.125	+ 0.125	- 0.25
		CO N-F	- 0.125	0	0
		TT F-N	- 1.875	+ 1.875	- 3.75
		TT N-F	- 1.875	0	0
		D F-N	0	+ 6.0	- 6.0
		D N-F	- 6.0	0	0
SYSTEM 85 (FAR END)	FTC TTL (SN-260)	CO F-N	- 0.125	NA	NA
		CO N-F	- 0.125	0	0
		TT F-N	- 1.875	NA	NA
		TT N-F	- 1.875	0	0
		D F-N	0	NA	NA
		D N-F	- 6.0	0	0

Abbreviations:

CO - Analog central office trunk circuit pack.
D - DS-1 interface circuit pack.
F-N - Far-to-near end measurement for loss where OTL end (MAAP display) is the near-end OR
- Far end measurement for noise and return loss where OTL end (MAAP display) is the near-end.
N-F - Near-to-far end measurement for loss where OTL end (MAAP display) is the near-end OR
- Near end measurement for noise and return loss where OTL end (MAAP display) is the near-end.
NA - Not applicable.
OTL - Originating test line.
TT - Analog tie trunk circuit pack.
TTL - Terminating test line.

PROC 650 - DCIU TESTS

Purpose

PROC 650 is used when referenced from **PROC 600** (Alarm Causes/Error Log) or when the **APPL PROCR AP INTER** and **MAJOR, MINOR**, or **WARNING** fault indicators on the alarm panel are lighted.

PROC 650 is used to:

1. Display the failure history for the DCIU.
2. Allow manual resolving of the alarms activated because of a DCIU failure (which turns off the **APPL PROCR AP INTER** fault indicator).

NOTE

DCIU alarmed circuit entries in PMIDS are marked as resolved.

3. Perform a DCIU circuit pack verification test, testing all circuits once and displaying the test results.
4. Detect failures in the DCIU link to the Applications Processor (AP) and isolate the failure to the DCIU or to the interface between the DCIU and the AP by performing internal and external loop back tests.

5. Automatically turn off the **APPL PROCR AP INTER** fault indicator when all circuits that caused an alarm are tested as good.

NOTE

DCIU alarmed circuit entries in PMIDS are marked as resolved.

When performing an external manual looparound test, maintenance personnel **must** be at the customer's premises to further isolate failures associated with the data link between the DCIU and the AP.

During external manual looparound testing, the data set must be set in analog loop back (AL), local loop back, or an ED1E422-10 Group 6 loop back plug **must** be connected to the back of the common control cabinet in order to determine if the DCIU or the interface to the AP is failing.

Field Definitions and Codes

Each field of **PROC 650** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BK, PROC 650 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Field 6 - Select specific data link (1 through 8) to be tested (Test 3 only).
3. Field 7 - Select type of loop back test to be performed (Test 3 only).

Test Equipment Required

An ED1E422-10 Group 6 loop back plug is required to perform the manual external loop back test in Test 3.

The looparound test determines if an interface problem exists between the AP or data set which interfaces with the DCIU.

Operation of Procedure

Overview

PROC 650 is used to determine the cause of the **APPL PROCR AP INTER** fault indicator being lighted resulting from a DCIU failure.

To call in **PROC 650**, perform the following:

1. Depress **PROC NO; 650; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 9 indicates the status of the DCIU and all other fields are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Table 5-64.

PROC 650 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	9	0-3	DCIU status.
2-6		Equipment location.		0	On-line and operational.
2	0-99	Module number.		1	Off-line and operational.
3	0-7	Cabinet number.		2	On-line and out of service.
4	0-3	Carrier number.		3	Off-line and out of service.
5	16-18	Slot number.	10	0-2	Data link status.
6	1-8	Data link number.		0	Translated and operational.
7	0-2	Loop back test type.		1	Translated and busied out.
	0	Internal loop back.		2	Not translated.
	1	External manual loop back.	11	0-15	Failure index.
	2	External automatic loop back.		0-6	Index into PMIDS failures (Test 1 only).
				0-15	Index into DMIDS failures (Test 2 only).
8	1-5	Alarm status.			
	1	Major.	12	0-99	Fault code.
	2	Minor.	13	0-99	Number of frames with failures (1000 bits per frame).
	3	Warning.			
	4	Errors recorded.	14	0-9999	Thousands of loop back test bits sent.
	5	Alarm resolved.			

Three tests are available:

1. Test 1 - Displays DCIU failure history.
2. Test 2 - Performs a verification test on all DCIU circuit packs.
3. Test 3 - Performs a DCIU data link looparound test.

Test 1

Test 1 displays the failure history, in order of alarm severity, of the DCIU failures recorded by periodic on-line software. The failure history includes equipment location, alarm status, DCIU status and fault code information for each recorded failure.

Test 1 is also used to manually turn off the **APPL PROCR AP INTER** fault indicator when all alarmed failures are resolved.

1. Test 1 is the default test when entering **PROC 650** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. Upon initial entry to Test 1, Field 1 displays a 1, Field 9 displays the DCIU status and all other fields are dashed.
3. To start Test 1, depress **EXECUTE**.
4. If no DCIU failures exist, Field 11 (failure index) displays a 0.
5. If any DCIU failures exist, the first failure is displayed as follows:

   Field 1 - 1.

   Field 2 - Module number of displayed failure.

   Field 3 - Cabinet number of displayed failure.

   Field 4 - Carrier number of displayed failure.

   Field 5 - Dashed or slot number of displayed failure.

   Field 6 - Dashed or data link number of displayed failure.

   NOTE

   Fields 5 and 6 are dashed if a specific DCIU circuit pack or data link cannot be identified for the fault code displayed in Field 12.

   Field 7 - Dashed.

   Field 8 - Alarm status (1 = major, 2 = minor, 3 = warning, or 4 = errors recorded) of displayed failure.

   Field 9 - DCIU status.

   Field 10 - Dashed.

   Field 11 - Failure index (total number of DCIU failing circuits; maximum of 6).

   Field 12 - Fault code associated with the displayed failure.

   Fields 13 and 14 - Dashed.
6. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures. Field 11 (failure index) is decremented each time **NEXT CIRCUIT** is depressed.

   When all failures are displayed, depressing **NEXT CIRCUIT** once more dashes all fields except Fields 1 and 9.

   Depressing **NEXT CIRCUIT** again causes the first failure to be displayed.
7. The **CLEAR DATA, EXECUTE** sequence can be used to manually resolve individual DCIU failures or all DCIU failures after **EXECUTE** is used to initiate Test 1.

   The failures that are resolved are those failures with an alarm status of 1, 2, or 3 displayed in Field 8.
8. To resolve individual DCIU failures with an alarm status of 1, 2, or 3, perform the following:

   Use **NEXT CIRCUIT** to display the failing circuit with an alarm status of 1, 2, or 3 on the **MAAP**.

   NOTE

   Individual DCIU failures cannot be resolved unless the failing circuit is displayed on the **MAAP**.

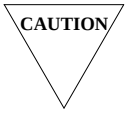
   Depress **CLEAR DATA; EXECUTE**.

9. Field 8 (alarm status) displays a 5, indicating that the failing circuit is resolved.

   The **APPL PROCR AP INTER** fault indicator goes off if no other DCIU failures exist.

10. If the **CLEAR DATA; EXECUTE** sequence is performed when Field 1 displays a 1 and Field 9 displays the DCIU status with all other fields dashed (initial display), all DCIU failures with an alarm status of 1, 2, or 3 are resolved and the **APPL PROCR AP INTER** fault indicator goes off.

11. All DCIU failures with an alarm status of 1, 2, or 3 can be resolved upon entry to **PROC 650**, Test 1, and after displaying and recording all DCIU failures and then using **NEXT CIRCUIT** to display a 1 in Field 1, the DCIU status in Field 9 and all other fields dashed (initial display).



The DCIU failures should be displayed and recorded in order that a record of the equipment location and fault code of each failure is available for maintenance personnel prior to manually resolving alarmed entries.

12. After initial entry to Test 1 and depressing **EXECUTE**, depress **CLEAR DATA; EXECUTE**.

    All DCIU failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the **APPL PROCR AP INTER** fault indicator goes off.

13. After displaying and recording all DCIU failures, depress **NEXT CIRCUIT** until the initial display (Field 1 = 1, Field 9 = DCIU status, with all other fields dashed) is displayed, then depress **CLEAR DATA; EXECUTE**.

    All DCIU failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the **APPL PROCR AP INTER** fault indicator goes off.

14. The **MAJOR, MINOR**, or **WARNING** alarm indicator also goes off if no other sources are affecting the alarm indicator.

Test 2

Test 2 is used to test the entire DCIU. Test 2 performs the following:

1. Displays the current status of the DCIU.
2. Reads the Get-Off-The-Bus (GOTB) register to determine if the DCIU is operational or shutdown, and whether the RAM status is valid.

   If RAM status is valid, reads RAM status words and stores any failures (as indicated by DCIU hardware) in DMIDS.

   If RAM status is not valid, reads maintenance status register and stores circuit pack indictments in DMIDS.
3. Checks counters and mailbox entries for threshold failures recorded by hardware.
4. Performs an ID chip function test on each circuit pack.
5. Tests the parity checker/generator function.
6. Controls circuit pack LEDs for pass/fail indication.

Test 2 provides visual feedback to maintenance personnel on whether a problem is corrected by the use of **RED** and **GREEN** LEDs on the faceplate of the circuit pack that is reseated or replaced.

Test 2 provides alternate circuit pack replacements (if any) when the first circuit pack replaced does not correct the problem.

Test 2 allows for demand reinitialization of the DCIU (when required) by use of **BUSY OUT** and **RLS BUSY OUT**.

Test 2 automatically turns off the **APPL PROCR AP INTER** fault indicator when all circuits that raised an alarm pass Test 2.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. Upon initial entry to Test 2, Field 1 displays a 2, Field 9 displays the DCIU status and all other fields are dashed.

3. To start Test 2, depress **EXECUTE**.

   The **WAIT** lamp on the **MAAP** is lighted while Test 2 is running.

4. When Test 2 is completed, the **WAIT** lamp goes off.

5. If no failures are detected, Field 1 displays a 2, Field 8 (alarm status) displays a 5 if alarmed entries existed in PMIDS indicating the alarm entries are resolved, or a dash if there were no alarmed entries and Field 11 (failure index) displays a 0.

   NOTE

   The **GREEN** LEDs on TN406, TN405, and UN156 are lighted when no failures exist.

6. If any failures are detected, the first failure is displayed as follows:

   Field 1 - 2.

   Fields 2 through 6 - Equipment location of failed circuit.

   NOTE

   Fields 5 and/or 6 are dashed if a specific DCIU circuit pack or data link cannot be identified for the fault code displayed in Field 12.

   Fields 7 and 8 - Dashed.

   Field 9 - DCIU status.

   Field 10 - Dashed or 0 through 2 (data link status).

   NOTE

   Field 10 (data link status) is dashed if Field 6 (data link) is dashed.

   Field 11 - Failure index (total number of failures recorded in DMIDS).

   Field 12 - Fault code associated with the failed circuit.

Fields 13 and 14 - Dashed.

NOTE

The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 2.

7. Depressing **NEXT CIRCUIT** displays an alternate circuit pack (if any) to be replaced.

   The **RED** LED on the original circuit pack goes off and the **RED** LED on the displayed circuit pack in Fields 2 through 6 is lighted.

8. Depressing **NEXT CIRCUIT** again displays the last alternate circuit pack (if any) to be replaced.

   The **RED** LED on the first alternate circuit pack goes off and the **RED** LED on the displayed circuit pack in Fields 2 through 6 is lighted.

9. When all alternate circuit packs are displayed, depressing **NEXT CIRCUIT** once more dashes Fields 2 through 6.

   Depressing **NEXT CIRCUIT** again displays the first circuit pack in the replacement sequence.

10. Depressing **NEXT FAULT** repeatedly displays the remaining failures. Field 11 (failure index) is decremented each time **NEXT FAULT** is depressed.

    When all failures are displayed, depressing **NEXT FAULT** again dashes all fields except Fields 1 and 9.

    Depressing **NEXT FAULT** once more displays the first failure again.

11. The **APPL PROCR AP INTER** fault indicator automatically goes off when Test 2 completes with no failures detected for all DCIU circuits that raised an alarm.

NOTE

DCIU alarmed circuit entries in PMIDS are marked as resolved.

12. The **MAJOR, MINOR**, or **WARNING** alarm indicator also goes off if no other sources are affecting the major, minor, or warning alarm indicator.

When required, a demand reinitialization of the DCIU can be performed by use of **BUSY OUT** and **RLS BUSY OUT**.

Reinitialization of the DCIU is performed as follows:

1. Enter **PROC 650**, Test 2, and depress **EXECUTE**.
2. Depress **BUSY OUT**.
3. When special error code 80 (busy out key pressed once) is displayed in the **MAAP** error code field, depress **BUSY OUT** again.

   BUSY OUT must be depressed twice to reinitialize the DCIU. Special error code 80 must be displayed in the **MAAP** error code field before **BUSY OUT** is depressed the second time.

   Field 9 (DCIU status) changes to 2 (on-line and out-of-service) when **BUSY OUT** is depressed the second time.

4. Depress **RLS BUSY OUT**.

   Field 9 (DCIU status) changes to 0 (on-line and operational) when **RLS BUSY OUT** is depressed.

5. If special error code 85 (DCIU reinit failed) is displayed in the **MAAP** error code field, demand reinitialization of the DCIU failed.

6. If special error code 87 (restore maintenance busy; data links failed) is displayed in the **MAAP** error code field, depress **BUSY OUT** to place the DCIU in maintenance busy status.

   Perform Test 3 to determine the reason for the data link failures.

Test 3

Test 3 is used to test a data link continuously.

Test 3 executes three types of looparound testing and allows for busying out individual data links.

1. Internal looparound testing is performed to test the data link interface hardware (UN156 circuit pack).
2. External looparound testing is performed to test the data link cabling between the backplane and the connector; and between the connector and the data set.

The three types of looparound testing are:

1. Internal: For either an on-line or off-line DCIU, data link loops the test vector defined by the DCIU firmware at the High Level Data Link (HDLC) interface.
2. External manual: For an on-line DCIU, data link loops the test vector defined by the DCIU firmware at an external looparound such as a local area data set AL key operation, external loop back plug, etc.
3. External automatic: For an on-line DCIU, data link loops the test vector defined by the DCIU firmware at an external looparound activated by the RS449 EIA loop back signal.

NOTE

External automatic loop back testing cannot currently be performed. An RS449 compatible data set must be used in order for external automatic loop back testing to work correctly. At present, compatible RS449 data sets are not available.

Maintenance personnel **must** be on the customer's premises to perform the external manual looparound test. Equipment must be disconnected and a looparound adapter installed, or the AL key on the data set depressed.

The external manual looparound test is described in the Repair Guide part of **PROC 650**.

Test 3 monitors the looparound testing at a rate of about 10,000 bits sent per 90 seconds. At least 100,000 bits, requiring 15 minutes should be monitored without error prioring to halting Test 3.

To determine the DCIU hardware integrity up to the local end, a local loopback plug (ED1E422-10 Group 6) can be used. The test should be run for approximately 4000 bits (approximately 32 seconds) and the errors should be 1 or less. If the link is looped back at its remote end, the test must be run as specified in the repair guide section.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. Upon initial entry to Test 3, Field 1 displays a 3, Fields 2 through 6 display the default data link, Field 7 displays a 0 (default loop back test type), Field 9 displays the DCIU status, Field 10 displays the data link status, and all other fields are dashed.
3. To test the default data link, proceed to Step 5.
4. To select another data link to be tested, depress **NEXT CIRCUIT** until the data link to be tested is displayed in Field 6.

   Proceed to Step 5.

   NOTE

   Depressing **NEXT CIRCUIT** cycles Field 6 from 1 through 8 and back to 1.

5. Prior to starting Test 3, it must be determined which type of loop back test is to be performed.

   The loop back field defaults to 0 which indicates that an internal loop back test is performed without further input by maintenance personnel.

   NOTE

   An internal loop back test is used to test the UN156 circuit pack. An external loop back test is used to test the data link cabling.

6. The internal loop back test should be performed first, and if required, the external loop back test(s) should be performed when it is necessary to further isolate a problem with the HDLC.

   NOTE

   Only an internal loop back test can be performed on the off-line DCIU data link.

7. When compatible RS449 data sets are available, the external automatic loop back test is performed without connecting any equipment by setting Field 7 to 2 as follows:

   CHANGE FIELD; 7; ENTER; 2; ENTER.

   NOTE

   At present, compatible RS449 data sets are not available and the external automatic loop back test cannot be performed.

   Proceed to Step 9.

8. The external manual loop back test assists in isolating a problem between the DCIU and the AP.

   The external manual loop back test requires that the loop be closed manually.

   The external manual loop back test must be performed when maintenance personnel are on the customer's premises as equipment must be disconnected and a looparound adapter installed or the AL key depressed.

   The external manual loop back test is described in the Repair Guide part of **PROC 650**.

9. Prior to starting Test 3, the data link must be busied out or untranslated.

   Check the data link status displayed in Field 10.

10. If the data link is busied out (1 displayed in Field 10), proceed to Step 13.

    If the data link is untranslated (2 displayed in Field 12), proceed to Step 13.

11. If the data link is translated and operational (0 displayed in Field 10), depress **BUSY OUT**.

    NOTE

    Special error code 82 (see Note 2) indicating that **BUSY OUT** is not valid for untranslated data links may be displayed in the **MAAP** error code field.

12. When special error code 80 (busy out key pressed once) is displayed in the **MAAP** error code field, depress **BUSY OUT** again.

    BUSY OUT must be depressed twice to perform looparound testing. Special error code 80 must be displayed in the **MAAP** error code field before **BUSY OUT** is depressed the second time.

    Proceed to Step 13.

13. To start Test 3 after selecting the data link to be tested and the type of loop back, depress **EXECUTE**.

    The **WAIT** indicator is not lighted during Test 3 execution.

14. The following special error codes may be displayed in the **MAAP** error code field when **EXECUTE** is depressed.

    Special error code 81 (see Note 1) indicates that the data link must be busied out prior to performing Test 3.

    Special error code 83 (see Note 3) indicates that only internal loop back testing of the data link is allowed on the off-line side of the common control.

15. During execution of Test 3, the following fields are displayed:

    Field 1 - 3.

    Fields 2 through 6 - Equipment location of data link being tested.

    Field 7 - 0, 1, or 2 (type of loop back test).

    Field 8 - Dashed.

    Field 9 - DCIU status.

    Field 10 - Data link status (1 = translated and busied out, 2 = untranslated).

    Fields 11 and 12 - Dashed.

    Field 13 - 0 through 99 (number of frames with failures, 1000 bits per frame).

    Field 14 - 1 through 9999 (thousands of bits sent).

16. During execution of Test 3, the following fields are updated after every 2000 (2 frames) bits are sent:

    Field 13 - Number of frames with failures, 1000 bits per frame (if any).

    Field 14 - Thousands of bits sent.

    NOTE

    Test 3 monitors loop back testing at a rate of about 10,000 bits sent per 90 seconds. (Multiples of 10 displayed in Field 14.)

17. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

18. The testing time required to determine if the data link is functioning properly is approximately 15 minutes. (At least 100,000 bits sent.)

    It is recommended that 1 million bits (approximately 2 and 1/2 hours) be monitored when performing Test 3 in the off-line common control.

    NOTE

    Failure rate (Field 13) should be less than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14). If Field 14 is less than 1000, results are not conclusive if Field 13 is less than 10.

19. A local loopback plug (ED1E422-10 Group 6) can be used to determine the DCIU hardware integrity up to the local end.

    The testing time required to determine if the DCIU hardware up to the local end is functioning properly is approximately 32 seconds. (At least 4000 bits sent.)

    NOTE

    Failure rate (Field 13) should be 1 or less per 4,000 bits sent (i.e., 4 displayed in Field 14).

20. If no failures occur after 10,000 bits are sent (10 displayed in Field 14), the **GREEN** LED on UN156 is lighted. As soon as a failure is detected (before or after 10,000 bits are sent), the **RED** LED on UN156 is lighted and the **GREEN** LED (if lighted) goes off.

21. When Test 3 is stopped, the results of the loop back test are displayed in Fields 13 and 14 and the **RED** or **GREEN** LED is lighted on UN156.

    If the failure rate displayed in Field 13 is more than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14), the data link failed the loop back test.

    If the **RED** LED on UN156 is lighted, at least 1 failure occurred. If the threshold is not exceeded (indicated by Fields 13 and 14), Test 3 passed. If the threshold is exceeded, Test 3 failed.

22. When Test 3 is completed for the data link being tested, the data link should be released from busy. To release busy the data link, perform the following:

    Depress **RLS BUSY OUT**.

    NOTE

    Special error code 82 (see Note 2) indicating that **RLS BUSY OUT** is not valid for untranslated data links may be displayed in the **MAAP** error code field. Untranslated data links cannot be released from busy.

23. If special error code 87 (restore maintenance busy; data links failed) is displayed in the **MAAP** error code field, depress **BUSY OUT** to place the DCIU in maintenance busy status.

    Perform corrective action as required to restore the failed data links.

24. When another data link is to be continuously tested, the **CHANGE FIELD** sequence must be used to select the data link:

    CHANGE FIELD; 6; ENTER; (Data link 1 through 8); ENTER.

25. Repeat Steps 5 through 23 to test the new data link.

Repair Guide

When the **APPL PROCR AP INTER** and **MAJOR, MINOR**, or **WARNING** fault indicators on the alarm panel are lighted (indicating a DCIU failure) or when **PROC 650** is referenced from **PROC 600** (Alarm Causes/Error Log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

General

1. Execute Test 1.

   Step through the failure history and record the equipment location and fault codes associated with each failure.

   NOTE

   Fields 5 and 6 are dashed if a specific DCIU circuit pack or data link cannot be identified for the fault code displayed in Field 12.

2. Execute Test 2.

   If all circuits pass Test 2, the **APPL PROCR AP INTER** fault indicator goes off.

   NOTE

   The **GREEN** LED on each DCIU circuit pack (TN406, TN405, and UN156) are lighted when no failures exist.

3. If all circuits pass Test 2, perform **Looparound Testing** (below) for those failures recorded in Test 1 with a fault code of 6, or 31 through 34 and an alarm status of major, minor, or warning (1, 2, or 3) to ensure that no intermittent problems exist with data links.
4. If any failures are detected in Test 2, display the failure on the **MAAP**.
5. Record the equipment location displayed in Fields 2 through 6 and the fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

   NOTE

   The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 2.

6. Determine if fault code 20 through 35 is displayed in Field 12.
7. If fault code 20 through 35 is **not** displayed in Field 12, proceed to Step 10.
8. If fault code 20 through 35 is displayed in Field 12, repeat Test 2.

   NOTE

   Fault codes 20 through 35 may not be solid failures because the accumulated count needs to be cleared.

9. If fault code 20 through 25 is still displayed in Field 12 after repeating Test 2, proceed to Step 10.

10. At the equipment location displayed in Fields 2 through 5, replace the circuit pack with the **RED** LED lighted.

    CAUTION Reseating or replacing TN406 without use of the GO/HALT switch causes a partial reload. Replace TN406 in the common control carrier as detailed in SWITCH COMPONENT REPLACEMENT - CIRCUIT PACK REPLACEMENTS.

11. Repeat Test 2.

    If Test 2 passes, the **APPL PROCR AP INTER** fault indicator goes off.

    NOTE DCIU alarmed circuit entries in PMIDS are marked as resolved.

    Perform **Demand Reinitialization** (below), if required.

12. If Test 2 fails, step through the failures to determine if the same failure exists.

    If different failures exist, proceed to Step 25.

13. If the same failure exists, display the failure on the **MAAP**.

    Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

    If all fields except Fields 1 and 9 are dashed, no alternate circuit pack is available for replacement.

    Proceed to Step 24.

14. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 2 through 5.

    Record the equipment location displayed in Fields 2 through 6 and the fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

    The **RED** LED on the original circuit pack goes off, and the **RED** LED on the alternate circuit pack is lighted.

15. At the equipment location displayed in Fields 2 through 5, replace the alternate circuit pack.

    CAUTION Reseating or replacing TN406 without use of the GO/HALT switch causes a partial reload. Replace TN406 in the common control carrier as detailed in SWITCH COMPONENT REPLACEMENT - CIRCUIT PACK REPLACEMENTS.

16. Repeat Test 2.

17. If Test 2 passes, the **APPL PROCR AP INTER** fault indicator goes off.

    NOTE DCIU alarmed circuit entries in PMIDS are marked as resolved.

    Perform **Demand Reinitialization** (below), if required.

18. If Test 2 fails, step through the failures to determine if the same failure exists.

    If different failures exist, proceed to Step 25.

19. If the same failure exists, display the failure on the **MAAP**.

    Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

    If all fields except Fields 1 and 9 are dashed, no alternate circuit pack is available for replacement.

    Proceed to Step 24.

20. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 2 through 5.

    Record the equipment location displayed in Fields 2 through 6 and the fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

    The **RED** LED on the first alternate circuit pack goes off, and the **RED** LED on the second alternate circuit pack is lighted.

21. At the equipment location displayed in Fields 2 through 5, replace the second alternate circuit pack.

    CAUTION

    Reseating or replacing TN406 without use of the GO/HALT switch causes a partial reload. Replace TN406 in the common control carrier as detailed in SWITCH COMPONENT REPLACEMENT - CIRCUIT PACK REPLACEMENTS.

22. Repeat Test 2.

    If Test 2 passes, the **APPL PROCR AP INTER** fault indicator goes off.

    NOTE

    DCIU alarmed circuit entries in PMIDS are marked as resolved.

    Perform **Demand Reinitialization** (below), if required.

23. If Test 2 fails, step through the failures to determine if the same failure exists.

    If different failures exist, proceed to Step 25.

24. If the same failure exists, determine if fault codes 6, 15, or 31 through 35 were recorded.

    If fault code 15 was recorded, perform **PROC 614** (Memory Read/Memory Match Tests) to isolate the cause of the problem.

    If fault code 6, or 31 through 35 was recorded, perform **Looparound Testing External Manual** (below) to isolate the cause of the problem.

    If fault codes 6, 15, or 31 through 35 were not recorded, refer to **Fault Codes** (below) for further isolation techniques.

25. If the same failure is not displayed, but Test 2 fails with other failures, repeat Steps 4 through 25 as appropriate.

Demand Reinitialization

When required, a demand reinitialization of the DCIU can be performed by use of **BUSY OUT** and **RLS BUSY OUT**.

Reinitialization of the DCIU is performed as follows:

1. Enter **PROC 650**, Test 2 and depress **EXECUTE**.
2. Depress **BUSY OUT**.
3. When special error code 80 (busy out key pressed once) is displayed in the **MAAP** error code field, depress **BUSY OUT** again.

   BUSY OUT must be depressed twice to reinitialize the DCIU. Special error code 80 must be displayed in the **MAAP** error code field before **BUSY OUT** is depressed the second time.

   Field 9 (DCIU status) changes to 2 (on-line and out-of-service) when **BUSY OUT** is depressed the second time.
4. Depress **RLS BUSY OUT**.

   Field 9 (DCIU status) changes to 0 (on-line and operational) when **RLS BUSY OUT** is depressed.
5. If special error code 85 (DCIU reinit failed) is displayed in the **MAAP** error code field, demand reinitialization of the DCIU failed.
6. If special error code 87 (restore maintenance busy; data links failed) is displayed in the **MAAP** error code field, depress **BUSY OUT** to place the DCIU in maintenance busy status.

   Perform **Looparound Testing** (below) to determine the reason for the data link failures.

Looparound Testing

Overview The three types of looparound testing are internal, external manual, and external automatic.

1. Internal looparound testing is performed to test the data link interface hardware (UN156 circuit pack).
2. External looparound testing is performed to test the data link cabling between the backplane and the connector; and between the connector and the data set.

   NOTE

   External automatic looparound testing cannot currently be performed. An RS449 compatible data set must be used in order for external automatic looparound testing to work correctly. At present, compatible RS449 data sets are not available.
3. When failures are recorded in Test 1 but pass Test 2 without corrective action being taken (i.e., replacing a circuit pack), looparound testing should be performed on those failures with a fault code of 6, or 31 through 34 and an alarm status of major, minor, or warning.
4. The internal loop back test should be performed first; and if required, the external loop back test(s) should be performed when it is necessary to further isolate a problem with the HDLC.
5. Only an internal loop back test can be performed on the off-line DCIU data link.

Internal Internal loop back testing of an on-line or off-line DCIU data link is performed as follows:

1. Enter Test 3 of **PROC 650** and select the data link to be tested.
2. Busy out the data link to be tested.

   BUSY OUT must be depressed twice to perform looparound testing.

3. Internal loop back testing encode 0 is displayed by default in Field 7.
4. Depress **EXECUTE**.

   The **WAIT** indicator is not lighted during Test 3 execution.
5. During execution of Test 3, the following fields are incremented:

   Field 13 - Failures per thousands of bits sent.

   Field 14 - Thousands of bits sent.

   NOTE

   Test 3 monitors loop back testing at a rate of about 10,000 bits sent per 90 seconds. (Multiples of 10 displayed in Field 14.)

6. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

   The testing time required to determine if the data link is functioning properly is approximately 15 minutes. (At least 100,000 bits sent.)

   It is recommended that 1 million bits (approximately 2 and 1/2 hours) be monitored when performing Test 3 in the off-line common control.
7. If no failures occur after 10,000 bits are sent (10 displayed in Field 14), the **GREEN** LED on UN156 is lighted. As soon as a failure is detected (before or after 10,000 bits are sent), the **RED** LED on UN156 is lighted and the **GREEN** LED (if lighted) goes off.
8. When Test 3 is stopped, the results of the loop back test is displayed in Fields 13 and 14.

   The LED on UN156 is not lighted if 10,000 bits were not sent or the **RED** or **GREEN** LED is lighted on UN156.
9. If the failure rate displayed in Field 13 is more than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14), the data link failed the loop back test.
10. If the **RED** LED on UN156 is lighted, at least 1 failure occurred. If the threshold is not exceeded (indicated by Fields 13 and 14), Test 3 passed. If the threshold is exceeded, Test 3 failed.

    NOTE

    Failure rate (Field 13) should be less than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14). If Field 14 is less than 1000, results are not conclusive if Field 13 is less than 10.

11. If Test 3 passes and a data link problem is still suspected, perform **External Manual Looparound Testing** (below) to isolate the trouble.

    If Test 3 passes and no data link problem is suspected, repeat Test 2 to resolve the alarm cause and turn off the **APPL PROCR AP INTER** fault indicator.

12. If Test 3 fails, replace UN156.

    Repeat Test 3.

13. If Test 3 passes, repeat Test 2 to resolve the alarm cause and turn off the **APPL PROCR AP INTER** fault indicator.

14. If Test 3 fails again and a data link problem is still suspected, perform external manual **Looparound Testing** (below) to isolate the trouble.

    If Test 3 fails again and a data link problem is not suspected, refer to **Fault Codes** (below) for further isolation techniques.

15. When Test 3 is completed for the data link being tested, release the data link from busy out.

External Manual Performing the external manual loop back test to isolate an interface problem between the DCIU and the AP results in message handling being suspended for the data link being tested.

External manual loop back test is initiated with the AL key (or local loop back button) on a data set, or connecting an ED1E422-10 Group 6 loop back plug to the back of the common control. Both methods are presented below.

An abbreviated external manual loop back test can be performed to determine the DCIU hardware integrity **only** up to the local end. The local loopback plug (ED1E422-10 Group 6) **must** be used for this abbreviated test. The testing time required to determine if the DCIU hardware up to the local end is functioning properly is approximately 32 seconds. (At least 4000 bits sent.) When 4000 bits have been sent maintenance personnel end the abbreviated test by depressing **STOP**.

External manual loop back testing of an **on-line only** DCIU data link is performed as follows:

1. Enter Test 3 of **PROC 650** and select the data link to be tested.
2. Busy out the data link to be tested.

   BUSY OUT must be depressed twice to perform looparound testing.

3. Determine if a data set is the interface between the AP and the DCIU data link.

   If a data set is the interface, proceed to Step 4.

   If a data set is not the interface, proceed to Step 5.

4. Depress the **AL** key (or local loop back button) on the data set.

   When **AL** is depressed, the **MB, TR, MR**, and **TM** LEDs on the data set are lighted.

   The **TR** LED indicates that the data set detects the terminal ready signal from the switch.

   Proceed to Step 7.

5. At the rear of the common control cabinet, disconnect the cable from the common control connector (F*) corresponding to the UN156 slot and data link that is failing.

   Cable designations are: F0 through F7 = Data link 1 through 8; i.e., F3 = Data link 4.

6. Connect the ED1E422-10 Group 6 loop back plug to the F* connector corresponding to the UN156 slot and data link that is failing and proceed to Step 7.
7. The external manual loop back test is performed by setting Field 7 to 1 as follows:

   CHANGE FIELD; 7; ENTER; 1; ENTER.
8. Depress **EXECUTE**.

   The **WAIT** indicator is not lighted during Test 3 execution.
9. During execution of Test 3, the following fields are incremented:

   Field 13 - Failures per thousands of bits sent.

   Field 14 - Thousands of bits sent.

   NOTE

   Test 3 monitors loop back testing at a rate of about 10,000 bits sent per 90 seconds. (Multiples of 10 displayed in Field 14.)

10. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

    The testing time required to determine if the data link is functioning properly is approximately 15 minutes. (At least 100,000 bits sent.)

    The testing time required to perform an abbreviated test using a local loopback plug (ED1E422-10 Group 6) to determine the DCIU hardware integrity **only** up to the local end is approximately 32 seconds. (At least 4000 bits sent.)
11. If no failures occur after 10,000 bits are sent (10 displayed in Field 14), the **GREEN** LED on UN156 is lighted. As soon as a failure is detected (before or after 10,000 bits are sent), the **RED** LED on UN156 is lighted and the **GREEN** LED (if lighted) goes off.
12. When Test 3 is stopped, the results of the loop back test is displayed in Fields 13 and 14, and the **RED** or **GREEN** LED is lighted on UN156.

    If the failure rate displayed in Field 13 is more than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14), the data link failed the loop back test.

    If the **RED** LED on UN156 is lighted, at least 1 failure occurred. If the threshold is not exceeded (indicated by Fields 13 and 14), Test 3 passed. If the threshold is exceeded, Test 3 failed.

    NOTE

    Failure rate (Field 13) should be less than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14). If Field 14 is less than 1000, results are not conclusive if Field 13 is less than 10.

13. If an abbreviated external manual loop back test was performed, the failure rate (Field 13) should be 1 or less per 4000 bits sent (i.e., 4 displayed in Field 14).

14. If Test 3 passes, determine which method of external manual looparound testing was performed.

    If the **AL** key (or local loop back button) was depressed, repeat Test 2 to resolve the alarm cause and turn off the **APPL PROCR AP INTER** fault indicator.

    If an ED1E422-10 Group 6 loop back plug was used, refer the data set problem to the appropriate personnel.

15. If Test 3 fails, determine which method of external manual looparound testing was performed.

    If the **AL** key (or local loop back button) was depressed, repeat Steps 5 through 12 using an ED1E422-10 Group 6 loop back plug and proceed to Step 15.

    If an ED1E422-10 Group 6 loop back plug was used, refer to **Fault Codes** (below) for further isolation techniques.

16. If Test 3 now passes using the ED1E422-10 Group 6 loop back plug, refer the data set problem to the appropriate personnel.

    If Test 3 fails again, refer to **Fault Codes** (below) for further isolation techniques.

17. Release the **AL** key (or local loop back button) or connect the cable to the connector on the back of the common control carrier as appropriate.

18. When Test 3 is completed for the data link being tested, release the data link from busy out.

Fault Codes

Further isolation of a DCIU failure may be accomplished by analyzing the fault codes recorded from Test 1 (PMIDS) and Test 2 (DMIDS).

1. Determine from Table BL, PROC 650 - Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).
2. Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code recorded).

Table 5-65.

PROC 650 - FAULT CODE DEFINITIONS

FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION	ALARM TYPE
1	TN406	TN405		Shutdown bit detected maintenance register.	Major
2	TN406			RED LED on TN406 maintenance register.	Major
3	TN405	TN406	UN156	TN405 unhealthy maintenance register.	Major
4	UN156	TN406	TN405	UN156 unhealthy maintenance register.	Major
5	TN406			No failures in maintenance register but status control RAM not good.	Major
6	DL [1]	UN156		Status control RAM indicts assigned DL.	Major
7	UN156	LB [2]		Status control RAM indicts unassigned DL.	Warning

Table 5-65. (Contd)

PROC 650 - FAULT CODE DEFINITIONS					
FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION	ALARM TYPE
8	TN406			Status control RAM indicts 8086, DPROM, memory mapper, or firmware.	Major
9	TN405	TN406	LB [2]	Status control RAM indicts local RAM.	Major
10	TN406			Status control RAM indicts 501CC interface.	Major
11	TN405	TN406	UN156	Status control RAM indicts DCIU I/O.	Major
12	TN406			GOTB indicates shutdown by nothing else.	Major
13	S/H [3]	TN406		System bus time-out.	Minor
14	S/H [3]	TN406		Single-byte parity errors.	Minor
15	MEM [4]	TN406		Double-byte parity errors.	Minor
16	S/H [3]	TN406		Write protect violations.	Minor
17	TN405	LB [2]		RAM parity errors.	Major
18	TN406			Sanity time-outs.	Major
19	TN405	TN406	UN156	Local bus time-out.	Major
20	TN406	S/H [3]		Occupancy less than 9000.	Warning
21	TN406	S/H [3]		Occupancy less than 4500.	Minor
22	TN406			Primary queue errors.	Minor
23	TN406			Secondary queue errors.	Minor
24	TN406			Translation errors.	Minor
25	TN406			Memory mapper errors.	Minor
26	TN405	TN406		Protocol timer audits.	Minor
27	TN405			RAM parity checker/generator.	Major
28	TN405	TN406		Memory access.	Major
29	S/H [3]	TN406		Write-protect register audit.	Major
30	S/H [3]	TN406		Write-protect register test.	Major

Table 5-65. (Contd)

PROC 650 - FAULT CODE DEFINITIONS					
FAULT CODE	CKT 1	CKT 2	CKT 3	DEFINITION	ALARM TYPE
31	DL [1]	UN156		HDLC (receive).	Major
32	DL [1]	UN156		HDLC (transmit).	Major
33	DL [1]	UN156		Set asynchronous balanced mode (SABMs).	Major
34	DL [1]	UN156		Frames retransmitted.	Minor
35	UN156	DL [1]		Loop-back test error rate (off-line only).	Minor
36	TN406	TN405	UN156	Re-initialization failed.	Major
37	TN406			Mail box request failed.	Minor
38	TN406			INIT B shutdown DCIU.	Major
39				PROC 650 exited with DCIU busy.	Major
40	TN406			System I/O error.	Minor
41	TN406			Counter request failed.	Warning
42	TN406	TN405	UN156	Re-initialization failed, and stopping DT tests failed also.	Major
43	TN406	TN405	UN156	State vector send failed.	Major
44	TN406			State of health bad; no failures in status control RAM.	Warning
45				PROC 650 ID chip failure.	None
46	TN406			PROC 650 parity CMD failure.	None

[1] DL = Data Link
[2] LB = Local Bus
[3] S/H = Software/Hardware
[4] MEM = Main Memory

PROC 652 - TIME-OF-DAY CLOCK SYNCHRONIZER

Purpose

PROC 652 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a time-of-day clock synchronizer failure.

PROC 652 is used to:

1. Display the equipment location of the time-of-day clock synchronizer and related failures causing a failure indication.
2. Display the maintenance busy status and alarm status of the time-of-day clock synchronizer.
3. Set the time-of-day clock synchronizer to the correct time of day.

When the switch does not include a hardware clock, Test 3 of **PROC 652** may be used to set the software clock.

Field Definitions and Codes

Each field of **PROC 652** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BM, PROC 652 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 7 through 12 - Set time and date of software or hardware time-of-day clocks (Test 3 only).

Operation of Procedure

Overview

PROC 652 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a time-of-day clock synchronizer failure.

Table 5-66.

PROC 652 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	5 (Contd)	8	Invalid time values from hardware.
2	0	Common control carrier.		9	Invalid time values from software.
3	32	Slot number.		10	Clock set failure.
4	0-3	Maintenance busy status:	6	0,1	Clock type (Tests 2 and 3):
	0	Not busied out, not alarmed.		0	Software clock.
	1	Busied out, not alarmed.		1	Hardware clock.
	2	Not busied out, alarmed.	7	1-12	Month.
	3	Busied out, alarmed.	8	1-31	Day.
5		Failure codes:	9	Dash	Not used with hardware clock display.
	1	No response.		1-99	Year for software clock time and date display.
	2	Reserved for future use.	10		Hours of the day:
	3	Reserved for future use.		0	Midnight.
	4	No change in time since last read.		1-11	1 through 11 am.
	5	Software time updated after initialization.		12	Noon.
	6	Small difference between software and hardware clock times.		13-23	1 through 11 pm.
	7	Large difference between software and hardware clock times. Software assumed correct.	11	0-59	Minutes.
			12	0-59	Seconds.
			13		Failure index:
				0	Failure summary.
				1-6	Index into failure history.

Table 5-67.

PROC 652 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
14	1-99	Failure Summary: Sum of approximate number of failures per hour for all failures. Failure History: Approximate number of failures per hour for failure code being displayed.	15	1-17	Failure Summary: Number of hours since oldest individual failure code (to the nearest hour). Individual Failure History: Number of hours since failures started in failure code displayed (to the nearest hour).

To call in **PROC 652**, perform the following:

1. Depress **PROC NO; 652; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Fields 2 and 3 display the equipment location of the time-of-day clock synchronizer (if provided), and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Continuously tests the time-of-day clock circuit and software buffer.
3. Test 3 - Displays and allows either or both the hardware and software time-of-day clocks to be reset.

Test 1

Test 1 provides a failure history of hardware time-of-day clock synchronizer failures. The failure history is recorded by the on-line time-of-day clock program.

Test 1 can also be used to manually turn off the **OTHER FAILS** fault indicator.

1. Test 1 is the default test when entering **PROC 652** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.

NOTE

If the translation records indicate the switch is not equipped with a hardware time-of-day clock synchronizer, special error code 74 is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Further key inputs related to the hardware time-of-day clock synchronizer are ignored by Test 1. However, Test 3 may be used to set the software clock.

3. If no failures occurred, the following is displayed:

   Field 1 - 1.

   Fields 2 and 3 - Equipment location of the hardware time-of-day clock synchronizer.

   Fields 4, 13, and 14 - 0.

   Field 15 - Dashed.

4. If one or more failures occurred, the following summary is displayed:

   Field 1 - 1.

   Fields 2 and 3 - Equipment location of the hardware time-of-day clock synchronizer.

   Field 4 - 0.

   Field 13 - 0 (indicating failure summary).

   Fields 14 and 15 - Failure summary.

5. Depressing **NEXT DATA** displays the failure code with the highest peg count. The display is updated as follows:

   Field 4 - Busy status of the hardware time-of-day clock synchronizer (indicating whether failures recorded were severe enough to cause an alarm).

   Field 5 - First failure code.

   Field 13 - Incremented to 1, indicating first failure code.

   Fields 14 and 15 - Failure history of displayed failure code.

6. Depressing **NEXT DATA** repeatedly displays the remaining failure codes (if any) in descending order of peg count and updates Fields 4, 5, and 13 through 15.

   When all failure codes are displayed, depressing **NEXT DATA** once more dashes Fields 4, 5, and 13 through 15.

   Depressing **NEXT DATA** again executes Test 1 and an updated failure summary is displayed.

7. Performing Test 1 does not busy out the hardware time-of-day clock synchronizer.

8. To manually turn off the **OTHER FAILS** fault indicator (assuming no other sources affecting the **OTHER FAILS** fault indicator are active), after Test 1 is executed at least once, perform the following:

   Depress **CLEAR DATA; EXECUTE**.

9. Field 14 displays a zero (0) and Field 15 is dashed.

NOTE

The hardware time-of-day clock synchronizer alarmed circuit entry in PMIDS is marked as resolved.

Test 2

During execution of Test 2, the following checks are performed:

1. Whether a hardware time-of-day clock synchronizer is provided and appears to be functional.
2. Whether the hardware time-of-day clock changed since last read (read once per second).
3. Whether time and date values are within obvious bounds; i.e., non- Binary-Coded Decimal (BCD) values.

Test 2 continuously tests a combination of the hardware time-of-day clock synchronizer and the software buffer.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress **EXECUTE**.

NOTE

If the translation records indicate the switch is not equipped with a hardware time-of-day clock synchronizer, special error code 74 is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Further key inputs related to the hardware time-of-day clock synchronizer are ignored by Test 2. However, Test 3 may be used to set the software clock.

3. A flashing digit in Field 5 indicates Test 2 is running.

   Fields 7, 8, and 10 through 13 provide a transitional display of the actual time and date generated by the hardware time-of-day clock.

4. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.
5. When **STOP** is depressed, the following is displayed:

   Field 1 - 2.

   Fields 2 and 3 - Equipment location of the hardware time-of-day clock synchronizer.

   Field 4 - Busy/alarm status.

   Field 5 - Failure code.

   Field 6 - 1 (indicating hardware time-of-day clock).

   Fields 7, 8, and 10 through 12 - The display of the actual time and data generated by the hardware time-of-day clock up to the time **STOP** was depressed is frozen.

   Fields 13 through 15 - Dashed.

6. If no failures occurred during Test 2, a 0 is displayed in Field 5.

7. If a failure occurs, the failure code for the first failure is locked into Field 5.
8. **NEXT DATA** can be used to sequence through all the failure codes associated with the failing hardware time-of-day clock.
9. The **OTHER FAILS** fault indicator automatically goes off (indicating the hardware time-of-day clock synchronizer alarm cause is resolved) when the following conditions are met:

   The hardware time-of-day clock synchronizer failure(s) is cleared.

   All other sources of the **OTHER FAILS** fault indicator are cleared.

   NOTE

   The hardware time-of-day clock synchronizer alarmed circuit entry in PMIDS is marked as resolved.

10. The hardware time-of-day clock synchronizer is automatically released from the busy-out condition if it was passing Test 2 when Test 2 was stopped.

Test 3

Test 3 enables maintenance personnel to set the software and/or hardware time-of-day clock.

If the switch does not include a hardware time-of-day clock, the software clock can be set using Test 3.

NOTE

If an attempt is made to set the clock from the off-line processor, special error code 81 (cannot set clock from off-line processor) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.
2. To start Test 3, depress **EXECUTE**.
3. When **EXECUTE** is depressed, the following is displayed:

   Field 1 - 3.

   Fields 2 and 3 - Equipment location of the hardware time-of-day clock.

   Field 4 - Busy/alarm status.

   Field 5 - Dashed.

   Field 6 - 0 (indicating software clock).

   Fields 7 through 12 - Transitional display providing a real-time readout of the actual time and date generated by the software clock.

   Fields 13 through 15 - Dashed.

   NOTE

   If the switch does not include a hardware time-of-day clock, Fields 2 through 5 are dashed.

4. Depressing **NEXT UNIT** causes the hardware time-of-day clock (if provided) to be displayed as follows:

   Fields 1 through 5 - Same as software clock display.

   Field 6 - 1 (indicating hardware time-of-day clock).

   Fields 7, 8, and 10 through 12 - Transitional display providing a real-time readout of the actual time and date generated by the hardware time-of-day clock.

   Fields 9 and 13 through 15 - Dashed.

5. When both clocks are provided, repeated use of **NEXT UNIT** toggles the display between the two clocks.

When the hardware time-of-day clock is replaced or the switch does not include a hardware time-of-day clock, the clock(s) should be set as follows:

1. Display the software clock in Fields 6 through 12.
2. Determine if the software clock time and date is correct.
3. If the software clock is correct:

   If the switch does not include a hardware time-of-day clock, no further action is required.

   If a hardware time-of-day clock is provided, depress **CLEAR DATA; EXECUTE**. Both clocks are set to equal each other.

4. If the software clock is not correct:

   Determine which fields need to be corrected (i.e., month, day, year, hours, minutes, or seconds) and use the **CHANGE FIELD** sequence to change the required fields.

   CHANGE FIELD; (Field number to be changed); **ENTER; (Enter correct data; i.e., month, day, year, hours**, **minutes, or seconds); ENTER**.

5. Repeat the **CHANGE FIELD** sequence as necessary for all fields requiring change, or depress **ENTER** until the field to be changed is indicated with a flashing decimal point.

   Enter the correct data in the appropriate field.

6. When all required fields are corrected, depress **CLEAR DATA; EXECUTE**.

   The software clock or both clocks (when a hardware time-of-day clock is provided) are set to the entered values.

When the clocks are being checked to determine any differences and the hardware time-of-day clock is not replaced, or failure code 6 is indicated, the clocks should be set as follows:

1. Use **NEXT UNIT** to toggle between the two clocks to determine which of the two are correct.
2. Leave the correct clock displayed.
3. Depress **CLEAR DATA; EXECUTE**.

   Both clocks are set to equal each other.

4. If neither clock appears to be correct, toggle to the software clock and input new time and date values using the **CHANGE FIELD** sequence:

   CHANGE FIELD; (Field number to be changed); ENTER; **(Enter correct data); ENTER**.

5. When other fields need to be changed, the **CHANGE FIELD** sequence or **ENTER** can be used to step to the new field and correct data can be entered.

6. When all required fields are corrected, depress **CLEAR DATA; EXECUTE**.

   Both clocks are set to the entered values.

When the clocks are set and the switch includes a hardware time-of-day clock, Test 2 should be run to determine if the hardware time-of-day clock is functioning correctly.

Repair Guide

When a time-of-day clock synchronizer failure is indicated **(PROC 652** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), perform the following steps in the order listed to isolate and repair the faulty unit.

1. Execute Test 1.

   Step through the failure history and record the results.

   Determine the failure codes that are accompanied by an alarm-sent indication (encode 2 or 3 in Field 4).

2. Execute Test 2.

   Record any failure codes.

3. If the circuit passes the test, the hardware time-of-day clock synchronizer alarmed entry in PMIDS is resolved.

   If the circuit was busied out, it is released from the busy out state.

   The **OTHER FAILS** fault indicator goes off if no other sources affecting the **OTHER FAILS** fault indicator are active.

4. When failure codes are recorded, based on the results of Test 2, refer to Table BN, PROC 652 - Time-of-Day Clock Synchronizer Repair Procedure and perform the corrective action indicated for the failure code recorded.

   NOTE

   Prior to replacement of circuit pack TN492, ensure that the battery (comcode 844665836) is connected (or connect) to the back side of the circuit pack.

   a. Mark the date of the next battery replacement (month and year) on the **Date Label** that is attached to the battery.

      NOTE

      The battery replacement date is established by adding 5 years to the date of installation of the TN492 circuit pack and associated battery. Example: TN492 circuit pack replaced July 1987; date to be written on the label is July 1992.

b. Affix the **Date Label** to the faceplate of the TN492 circuit pack.

NOTE

If the **YELLOW** LED is lighted, after the circuit pack is replaced, the battery is **not** connected or wired correctly.

5. When multiple failure codes are indicated, perform the corrective action for the first failure code with an alarm-sent indication (encode 2 or 3 in Field 4).
6. If the hardware time-of-day clock synchronizer is replaced, execute Test 3 to set the time-of-day clock to the correct time and then repeat Test 2.
7. If a failure is still indicated, analyze the failure codes and perform any additional corrective action as required.

   Repeat Test 3 as appropriate, and then Test 2.
8. If all corrective action is taken and the hardware time-of-day clock still fails, check the wiring associated with the replaced circuit pack.

   Failure code 9 is a software problem that cannot be corrected by hardware.

Table 5-68.

PROC 652
TIME-OF-DAY CLOCK SYNCHRONIZER
REPAIR PROCEDURE

FAILURE CODE	CORRECTIVE ACTION	FAILURE CODE	CORRECTIVE ACTION
1	**No Response.** **Replace TN492.**	**6 (Contd)**	**Some counts are expected and do not indicate a fault condition. If Field 4 indicates that an alarm has been sent:** **Replace TN492.**
2	**Reserved for future use.**		
3	**Reserved for future use.**		
4	**The hardware clock is not running.** **Replace TN492.**	**7**	**Large differences in the software and hardware clocks have resulted in the hardware clock being updated by the software clock.** **Replace TN492.**
5	**The software clock has been updated after initialization from a power up.** **This is not an alarmable condition and, therefore, does not require repair activity.**	**8**	**Invalid time values have been received from hardware.** **Replace TN492.**
		9	**Invalid time values have been received from the software.** **This is a software problem that cannot be corrected with hardware.**
6	**There are small differences in the software and hardware clocks resulting in the software clock being updated by the hardware clock.**	**10**	**Clock set failure.** **Replace TN492.**

PROC 653 - ATTENDANT CONSOLE TESTS

Purpose

PROC 653 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a console failure.

PROC 653 is used to:

1. Test all attendant consoles once or a particular console continuously.
2. Display attendant console failures.
3. Resolve the console alarm cause when all consoles pass Test 2.

NOTE

Dual-speed data channels associated with attendant consoles are tested in **PROC 611**.

Field Definitions and Codes

Each field of **PROC 653** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BO, PROC 653 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 4 - Select a specific console for testing (Test 3 only).

Operation of Procedure

Overview

PROC 653 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a console failure.

Table 5-69.

PROC 653 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3	Test number.	10	*	Failure Summary: Sum of approximate number of failures per hour for all failing circuits. Failure History: Approximate number of failures per hour for circuit being displayed.
2	0	Common control carrier.			
3	23-26	Slot number.			
4	0-15	Channel number.			
5	0-40	Failed console.			
6	 0 1 4 5	Failure codes: Pass. On-line periodic. Addressing. Message echo.	11	0-17	Failure Summary: Number of hours since the oldest individual failure started (to the nearest hour). Individual Failure History: Number of hours since failures started in the displayed circuit (to the nearest hour).
7	*	Number of consoles in system.			
8	*	Number of failed channels: Test 1: Number of dual-speed data channels in the failure history. Test 2: Number of dual-speed data channels that failed the test.	12-13		Number of hours plus minutes since: Failure Summary: Most recent failure of any circuit. Failure History: Most recent failure of the displayed circuit.
9		Failed console index:			
	0	Failure Summary.	12	0-136	Hours.
	1-6	Individual failures.	13	0-59	Minutes.

* = Number varies according to switch configuration.

To call in **PROC 653**, perform the following:

1. Depress **PROC NO; 653; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 7 displays the number of consoles in the switch, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Tests all consoles.
3. Test 3 - Tests a specific console continuously.

Test 1

Test 1 displays the failure history of console failures. These failures are detected during call processing, not by periodic tests.

Test 1 can also be used to manually turn off the **OTHER FAILS** fault indicator.

1. Test 1 is the default test when entering **PROC 653**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. The failure history is displayed in the form of a summary.

   The failure summary displays the total number of console failures that occurred.

4. If no failures occurred, Fields 8 through 10 display a 0.
5. If one or more failures occurred, the following summary is displayed:

   Field 1 - 1.

   Field 7 - Total number of consoles in the switch.

   Field 8 - Number of failed channels.

   Field 9 - 0 (Indicating the first failure is not displayed).

   Fields 10 through 13 - Failure summary.

6. Depressing **NEXT CIRCUIT** displays the first failing console in the failure history. The display includes the following:

   Field 1 - 1.

   Fields 2 through 4 - Equipment location of the dual-speed data channel associated with the failing console.

   Field 5 - Console number.

   Field 6 - Failure code associated with the failing console.

Field 7 - Total number of consoles in the switch.

Field 8 - Number of failed channels.

Field 9 - l (Indicating first failing console).

Fields 10 through 13 - Failure history for the displayed console.

7. Depressing **NEXT CIRCUIT** repeatedly displays the failure histories of the remaining failing consoles.

   Fields 2 through 6, and 9 through 13 are updated.

8. Depressing **NEXT CIRCUIT** after all failure histories are displayed, dashes all fields except Fields 1 and 7.

9. Depressing **NEXT CIRCUIT** again causes Test 1 to be executed, starting the sequence over with an updated failure summary.

10. To manually turn off the **OTHER FAILS** fault indicator, (assuming no other sources affecting the **OTHER FAILS** fault indicator are active), after Test 1 is executed at least once, perform the following:

    Depress **CLEAR DATA; EXECUTE**.

NOTE

Alarmed console entries in PMIDS are marked as resolved.

Test 2

Test 2 tests all consoles to determine if any are failing.

Prior to executing Test 2, the handset or headset must be plugged into all consoles or the consoles fail the test.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted.

3. Upon completion of the test the **WAIT** indicator goes off.

   If no failures are detected in Test 2, Field 8 displays a 0.

4. If a failure is detected, the first failed console is displayed as follows:

   Field 1 - 2.

   Fields 2 through 4 - Equipment location of the dual-speed data channel associated with the failing console.

   Field 5 - Console number.

   Field 6 - Failure code associated with the first failure.

   Field 7 - Total number of consoles in the switch.

   Field 8 - Number of failed channels.

Field 9 - Failed console index (1, indicating first failing console).

Fields 10 through 13 - Dashed.

5. **NEXT CIRCUIT** can be depressed repeatedly to display the remainder of the failing consoles.

   Fields 2 through 6, and 9 are updated as appropriate.

6. Depressing **NEXT CIRCUIT** after all failing consoles are displayed, dashes all fields except Fields 1 and 7.

   Depressing **NEXT CIRCUIT** again causes Test 2 to start over.

7. The console alarm cause is resolved when all attendant consoles pass Test 2.

NOTE

Alarmed console entries in PMIDS are marked as resolved.

The **OTHER FAILS** fault indicator automatically goes off when the console alarm cause, and all other alarm sources affecting the **OTHER FAILS** fault indicator are cleared.

Test 3

Test 3 is used to continuously test a specific attendant console that is suspected of having intermittent failures or to trace wiring problems.

The handset or headset must be plugged into the console that is being tested in Test 3 or the console fails.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. A console to be tested must be selected prior to execution of Test 3.

3. A default console may be displayed in Fields 2 through 4.

   Field 2 is flashing, indicating an optional entry field.

   The default console is the last console failure displayed in Test 1 or 2.

4. Either the default console can be tested or another console can be selected for testing by entering the data in the flashing fields and depressing **ENTER** or by using the **CHANGE FIELD** sequence:

   (Carrier number); ENTER; (Slot number); ENTER; **(Channel number); ENTER**.

   CHANGE FIELD; 2; ENTER; (Carrier number); ENTER; **(Slot number); ENTER; (Channel number); ENTER**.

5. If no failures occurred (none displayed in Test 1 or 2), Field 2 is blanked and the decimal point in that field flashed to indicate a mandatory entry field.

6. An equipment location must be entered in Fields 2 through 4 before Test 3 can be executed, as follows:

   (Carrier number); ENTER; (Slot number); ENTER; **(Channel number); ENTER**.

7. Console selection can also be made by using **NEXT CIRCUIT** and/or **NEXT UNIT** when a default console is displayed.

   NEXT CIRCUIT is used to sequence through all consoles in a carrier.

   NEXT UNIT is used to sequence through all appropriately equipped carriers which contain consoles.

8. When **NEXT UNIT** is depressed to sequence to the next equipped carrier, the first applicable console in that carrier is automatically displayed.

   NEXT CIRCUIT steps through the consoles within the selected carrier.

9. To start Test 3, depress **EXECUTE**.

   A flashing digit displayed in Field 6 (failure code) indicates Test 3 is running.

10. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

11. When **STOP** is depressed, a 0 displayed in Field 6 indicates Test 3 passed.

    Any other digit displayed in Field 6 indicates Test 3 failed.

12. When another console is to be tested, perform the following:

    Halt Test 3 by depressing **STOP**.

    Select the console to be tested by using the **CHANGE FIELD** sequence, or **NEXT CIRCUIT, NEXT UNIT**, etc.

    Depress **EXECUTE** to start Test 3.

13. After corrective action is taken, Test 3 must be repeated to clear any previously displayed failure code. After Test 3 indicates a 0, Test 2 must be performed to resolve the console alarm cause of the **OTHER FAILS** fault indicator.

Repair Guide

When an attendant console failure is indicated, **PROC 653** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, the following steps should be performed, in the order listed, to isolate and repair the faulty unit.

1. Verify that the handsets or headsets are plugged into the attendant consoles.
2. Execute Test 1 and record the failure history.
3. Execute Test 2 and record the results.

   If Test 2 passes and a console failure is suspected, perform Test 3 to check for intermittent failures. (See Step 13 below.)

4. If Test 2 fails, use Test 4 of **PROC 620** (unit type 44) to test the attendant interface circuit pack (SN233) associated with the failing console.
5. After passing Test 4 of **PROC 620**, (taking appropriate corrective action as required), enter **PROC 653** and repeat Test 2.

   If Test 2 passes, the console alarm cause is resolved, and the **OTHER FAILS** fault indicator goes off if no other alarmed causes exist.

6. If the same console fails Test 2 again, check the voltages on the console power supply circuit pack MW-4 in the attendant console indicated in Field 5.

   If the voltages are correct, replace console circuit pack AEE1 and repeat Test 2.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of console circuit pack AEE1.

   Proceed to Step 8.

7. If the voltages are incorrect, replace console circuit pack MW-4 and repeat Test 2.

   NOTE

   Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of console circuit pack MW-4.

   Proceed to Step 8.

8. If the same console fails Test 2 again, replace the console indicated in Field 5, and repeat Test 2.
9. If the same console fails Test 2 again, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 2 through 4 to determine if an I/O failure exists.
10. After passing Test 3 of **PROC 611**, (taking appropriate corrective action as required), enter **PROC 653** and repeat Test 2.

    If Test 2 passes, the console alarm cause is resolved, and the **OTHER FAILS** fault indicator goes off if no other alarmed causes exist.

11. If the same console fails Test 2 again, check the wiring associated with the failing console and the attendant interface circuit.
12. Repeat Steps 4 through 11 for each failing console.
13. If intermittent console failures or wiring problems are suspected, execute Test 3 to continuously test the suspect consoles.

    When a failure is indicated, perform corrective action listed in Steps 4 through 10, repeating Test 3 after performing each corrective action.

14. If Test 3 passes after taking corrective action, repeat Test 2 to resolve the console alarm cause.

    If Test 3 fails after taking all corrective action, check the wiring associated with the failing console and the attendant interface circuit.

PROC 654 - DISPLAY TERMINALS TEST

Purpose

PROC 654 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a display terminal failure.

PROC 654 is used to:

1. Display 102D calling number display and 102F or 102G FADS terminal failures.
2. Display the time stamp of each failure.
3. Test each terminal with a short data test to obtain the total failed circuit count.
4. Resolve the alarm cause when all display terminal circuits pass Test 2.

NOTE

Display terminal alarmed circuits in PMIDS are marked as resolved.

When Test 3 is performed to determine if the digits displayed on the display terminal are correct, or if an intermittent failure exists, the observing function of this test **must** be performed at the customer's premises.

NOTE

Dual-speed data channels associated with display terminals are tested in **PROC 611**.

Field Definitions and Codes

Each field of **PROC 654** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BP, PROC 654 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

Operation of Procedure

Overview

PROC 654 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a display terminal failure.

Table 5-70.

PROC 654 - FIELD DEFINITIONS AND CODES

FIELD	CODE	DEFINITION
1	1-3	Test number.
2	1	Calling number display. 102D terminal.
	13	CAS/FADS display. 102F or 102G terminal.
3	Any 2-, 3-, or 4-digit number	Directory number of the called station associated with the selected terminal type.
4	0	Common control carrier.
5	23-26	Slot number.
6	0-15	Channel number.
7	0-9	Digits sequence 0 through 9, test character, and dash are alternated with blanks. They will correspond to all digits displayed on the terminal.
8		Failure code representing the ORed collection of all failures since test started.
	0	Pass.
	1	Data channel address not acknowledged.
8 (Contd)	2	No data reply (echo) from terminal.
	3	Failures 1 and 2.
	4	Bad reply from terminal - echo data nonzero, but no data transmitted.
	5	Failures 1 and 4.
	6	Failures 2 and 4.
	7	Failures 1, 2, and 4.
9	0-7	Failure code from the last transmission to a terminal before the test was terminated. Updated in real time for Test 3 showing current lastest failure while test is running. Refer to Field 8 for encode definitions.
10	0-99	Total number of failed channels.
11-13		Time stamp. A time stamp showing the day of the month, hour, and minute when the alarm cause occurred.
11	1-31	Day of the month.
12	0-23	Hour of the day.
13	0-59	Minutes.

To call in **PROC 654**, perform the following:

1. Depress **PROC NO; 654; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1 and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays failure history and time of each failure.
2. Test 2 - Tests each display terminal with a short data test.
3. Test 3 - Tests a specific display terminal continuously.

Test 1

Test 1 displays a failure history of display terminal failures. The failure history is generated by on-line maintenance software.

Test 1 can also be used to manually turn off the **OTHER FAILS** fault indicator.

1. Test 1 is the default test when entering **PROC 654** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. The total number of display terminal failures is displayed as a summary.
4. If no failures occurred, a 0 is displayed in Field 10.
5. If one or more failures occurred, the following is displayed:

   Field 1 - 1.

   Field 10 - Total number of failed channels.

   Fields 11 through 13 - Day, hour, and minute when the first failure occurred.

6. Depressing **NEXT CIRCUIT** displays the first failing display terminal in the failure history.

   NOTE

   Calling number display failures are displayed before FADS terminal failures.

7. The display includes the following:

   Field 1 - 1.

   Field 2 - Terminal type.

   Field 3 - Extension number for terminal type 1 or unit number for terminal type 13.

   Fields 4 through 6 - Dual-speed data channel equipment location associated with the failing display terminal.

Field 10 - Total number of failed channels.

Fields 11 through 13 - Time stamp (day, hour, and minute) when the failure occurred.

8. After the first failing display terminal is displayed, depressing **NEXT CIRCUIT** repeatedly displays the failure history of the remaining failing display terminals.
9. Fields 2 through 6, and 11 through 13 are updated.

NOTE

All calling number display failures are displayed before FADS terminal failures. Display terminals with more errors recorded are displayed before display terminals with less errors recorded.

10. Depressing **NEXT CIRCUIT** after all failures are displayed dashes Fields 2 through 13.

    Depressing **NEXT CIRCUIT** again causes Test 1 to be executed, starting the sequence over with an updated failure summary.
11. To manually turn off the **OTHER FAILS** fault indicator, assuming no other alarmed sources affecting the **OTHER FAILS** fault indicator are active, after Test 1 is executed at least once, perform the following:

    Depress **CLEAR DATA; EXECUTE**.

NOTE

Display terminal alarmed circuit entries in PMIDS are marked as resolved.

Test 2

Test 2 tests all display terminals to determine if any are failing.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.
2. To start Test 2, depress **EXECUTE**.

   The **WAIT** indicator on the **MAAP** is lighted and Test 2 starts from the lowest display terminal.

NOTE

When Test 2 encounters a FADS (type 102F or 102G) display terminal during testing, the **IN USE** lamp on the **MAAP** can remain on for up to 2 minutes while waiting for the FADS display terminal to be released from its normal function for testing.

3. If no failures are detected, Test 2 stops, the **WAIT** indicator goes off, and a 0 is displayed in Field 10.
4. If a failure is detected, Test 2 stops and the **WAIT** indicator goes off. The display terminal that failed is displayed as follows:

   Field 1 - 2.

   Field 2 - Terminal type.

   Field 3 - Extension number or unit number.

Fields 4 through 6 - Equipment location of dual-speed data channel circuit associated with the failing display terminal.

Fields 8 and 9 - Once and last failure code associated with first failing display terminal.

Field 10 - Circuit count of 1.

Fields 11 through 13 - Dashed.

5. To resume testing, **NEXT CIRCUIT** is depressed.

   Depressing **NEXT CIRCUIT**, after all failing display terminals are displayed, dashes all fields except Fields 1 and 10 (test number and total failed channels).

6. Depressing **NEXT CIRCUIT** again causes Test 2 to be executed from the beginning of the test.

7. The display terminal alarm cause is automatically resolved if all display terminals pass Test 2.

   NOTE

   Display terminal alarmed circuit entries in PMIDS are marked as resolved.

8. The **OTHER FAILS** fault indicator goes off when the display terminal alarm cause, and all other alarm sources affecting the **OTHER FAILS** fault indicator are cleared.

Test 3

Test 3 is used to continuously test a specific display terminal which is suspected of having intermittent failures or to trace wiring problems.

In addition, Test 3 is used to verify that all digits are displayed correctly at each display terminal position.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. A display terminal to be tested must be selected prior to execution of Test 3.

   Display terminal selection can be made as indicated in Steps 3 through 7.

3. If no failures occurred (none displayed in Test 1 or 2), which indicates that a default display terminal does not exist, the lowest featured display terminal type is displayed first in Field 2.

4. If a failure occurred, a default display terminal is displayed.

   The default display terminal is the last failed display terminal displayed by Test 1 or 2.

   Either the default display terminal can be tested or another display terminal can be selected for testing using **NEXT UNIT** and/or **NEXT CIRCUIT**.

5. **NEXT CIRCUIT** is used to display the first display terminal of the lowest display terminal type. Either this display terminal can be tested or another display terminal can be selected for testing.

6. To select another display terminal to be tested, use **NEXT UNIT** and/or **NEXT CIRCUIT** to locate the display terminal to be tested.

7. Depress **NEXT UNIT** repeatedly until the desired terminal type is displayed in Field 2.

   Depress **NEXT CIRCUIT** repeatedly to advance the display to the display terminal location to be tested.

   Dashes are displayed after the last display terminal location in the last terminal type is displayed.

8. Depressing **NEXT CIRCUIT** again displays the first display terminal equipment location in the lowest terminal type.

9. To start Test 3, depress **EXECUTE**.

   The digit displayed in Field 7 of the **MAAP** corresponds with the digit displayed at the terminal being tested.

   The changing display in Field 7 indicates the test is running.

10. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

    This allows maintenance personnel time to observe the digits displayed at the display terminal being tested in order to determine if all digits are correct and to verify existence of intermittent failures.

11. The failure codes detected are recorded by Test 3 and displayed in Fields 8 and 9.

12. To select another display terminal to be tested, perform the following:

    Halt Test 3 by depressing **STOP**.

    Select the new display terminal to be tested using **NEXT UNIT** and/or **NEXT CIRCUIT**.

    Depress **EXECUTE** to start Test 3.

Repair Guide

When a display terminal failure is indicated **(PROC 654** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and record the failure history.

2. Execute Test 2 and record the results.

   If Test 2 passes and a display terminal failure is suspected, perform Test 3 and check for intermittent failures. (Refer to Step 9.)

3. When failures are recorded, based on the results of Test 2, refer to Table BQ, PROC 654 - Display Terminals Repair Procedure, and perform the corrective action indicated.

4. Repeat Test 2 after each corrective action is performed.

   If Test 2 passes, the display terminal alarm cause is resolved and the **OTHER FAILS** fault indicator goes off when all other alarmed sources (if any) affecting the **OTHER FAILS** fault indicator are cleared.

5. If the same display terminal fails Test 2 again, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 4 through 6 to determine if an I/O failure exists.

Table 5-71.

PROC 654 DISPLAY TERMINALS REPAIR PROCEDURE	
FAILURE CODE	CORRECTIVE ACTION
0 (Test 3 only)	Bad data displayed on 102D, 102F, or 102G terminal: Replace the 102D, 102F, or 102G terminal. Replace the 211A Power unit for the 102D, 102F, or 102G terminal.
1 through 7	Replace the 102D, 102F, or 102G terminal. Check the 211A Power Unit for the 102D, 102F, or 102G terminal. Perform PROC 611 Test 2 to isolate dual speed data channel failures.

6. After passing Test 3 of **PROC 611** (taking appropriate corrective action as required), enter **PROC 654** and repeat Test 2.

   If Test 2 passes, the display terminal alarm cause is resolved and the **OTHER FAILS** fault indicator goes off if no other alarm causes exist.

7. If the same display terminal fails Test 2 again, check the wiring associated with the cabling between the 211A power unit, 102D, 102F, or 102G terminal, and the switch.

8. Repeat Steps 3 through 7 for each failing display terminal.

9. If an intermittent failure or wiring problems are suspected, execute Test 3 to continuously test the suspect terminal.

   When a failure is indicated, perform Steps 3 through 7 above.

10. If a 0 is displayed in Field 8, allow Test 3 to run and check the display on the terminal being tested.

    If bad data is displayed on the terminal, perform the corrective action listed in Table BQ, PROC 654 - Display Terminals Repair Procedure.

11. If Test 3 passes after taking corrective action, repeat Test 2 to resolve the display terminal alarm cause.

PROC 655 - SMDR TEST

Purpose

PROC 655 is used when referenced from **PROC 600** (Alarm Causes/Error Log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a SMDR failure.

Tests 3 through 5 of this maintenance procedure **must** be performed on the customer's premises. Successful test completion for Tests 3 through 5 is determined by observing printouts from the SMDR equipment.

PROC 655 is used to:

1. Display SMDR equipment failures.
2. Run an echo test with the SMDR equipment.
3. Resolve the SMDR alarm cause when all circuits pass Test 4.

NOTE

Dual-speed data channels associated with SMDR equipment are tested in **PROC 611**.

Field Definitions and Codes

Each field of **PROC 655** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BR, PROC 655 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 and 3 - Select operation code and data of test word to be transmitted to the SMDR equipment (Test 5 only).

Table 5-72.

PROC 655 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-5	Test number.	8	0-8	Failure code-last: Failure code indicating one or more failures occurring during the last transmission to the SMDR equipment before the test ended or was stopped.
2		Operation code (octal):			
	0	Normal data word.			
	3	No operation.			
	4	Retransmit normal data word.			
	10	Last word in message.			
	14	Retransmit last word in message.	9		Alarm cause status:
				0	None.
				1	SMDR failure.
3	0000-7777	Data word (octal).	10-12		Time stamp: A time stamp showing the day of the month, hour, and minute when the alarm cause occurred.
4	0	Common control carrier.			
5	23-26	Slot number.			
6	0-15	Channel number.	10	0-31	Day of the month.
7		Failure code-once: Accumulative "OR"ing of all failure codes that occurred at least once during a test.	11	0-23	Hour of the day.
			12	0-59	Minute.
			13		Failure codes: Logged in failure history table displayed in Test 1 only.
	0	Pass.			
	1	Data channel address not acknowledged.		0	Failure summary display.
	2	No data reply (echo) from SMDR equipment.		1	No reply or echo mismatch.
	3	Failures 1 and 2.		8	SMDR equipment failure.
	4	Echo mismatch.			
	5	Failures 1 and 4.	14		Message length encode: Number of data words used in a call record.
	6	Failures 2 and 4.			
	7	Failures 1, 2, and 4.			
	8	SMDR equipment failure (reported by SMDR after 16-message buffer filled).		0	12-word message.
				1	15-word message.
				2	18-word message.

Operation of Procedure

Overview

PROC 655 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from an SMDR failure.

To call in **PROC 655**, perform the following:

1. Depress **PROC NO; 655; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Fields 4 through 6 display the data channel equipment location associated with the SMDR equipment, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Five tests are available:

1. Test 1 - Displays failure history.
2. Test 2 - Runs an echo test on the SMDR equipment.
3. Test 3 - Sends an alternating one-zero pattern continuously to the SMDR equipment.
4. Test 4 - Sends a 16-message pattern to the SMDR equipment, testing most digits in each digit's position.
5. Test 5 - Sends a single data word to the SMDR equipment allowing manual entry of operation codes and data words.

Test 1

Test 1 provides a failure history of the SMDR equipment.

Test 1 is also used to manually turn off the **OTHER FAILS** fault indicator.

1. Test 1 is the default test when entering **PROC 655** or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress **EXECUTE**.
3. A summary of the failure history is displayed.
4. If no failures occurred, a 0 is displayed in Fields 9 and 13.
5. If one or more failures occurred, the summary displays a 1 in Field 1, the SMDR alarm cause in Field 9, a 1 or 8 in Field 13 (failure code), and dashes in all other fields.
6. Depressing **NEXT DATA** displays the first failing equipment location and associated failure code. The following information is displayed:

   Field 1 - 1.

   Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Field 9 - SMDR alarm cause.

Fields 10 through 12 - Time stamp (day, hour, and minute) when the failure code displayed in Field 13 occurred.

Field 13 - Failure code (1 or 8).

7. Depressing **NEXT DATA** repeatedly displays all failure codes (Field 13) associated with individual failures recorded in the failure history.

   Depressing **NEXT DATA** after all failures are displayed dashes Fields 9 through 13.

   Depressing **NEXT DATA** again executes Test 1 and an updated failure summary is displayed.

8. To manually turn off the **OTHER FAILS** fault indicator (assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active), after Test 1 is executed at least once, perform the following:

   Depress **CLEAR DATA; EXECUTE**.

9. Field 9 (alarm status) displays a 0.

NOTE

SMDR alarmed entries in PMIDS are marked as resolved.

Test 2

Test 2 runs an echo test with the SMDR equipment.

Test 2 does not interfere with call processing recording of calls.

An alternating one-zero pattern is used for the first echo test. A complementing one-zero pattern is used for the second echo test.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress **EXECUTE**.
3. If no failures are detected, Fields 7 and 8 display a 0.
4. If any failures are detected, the following is displayed:

   Field 1 - 2.

   Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

   Fields 7 and 8 - Failure codes (1 through 8).

Test 3

Test 3 sends a continuous alternating one-zero pattern in the format of a call record message to the SMDR equipment.

When Test 3 is performed, maintenance personnel **must** be on the customer's premises to operate SMDR equipment and to determine if the test is successful by observing the SMDR printout.

CAUTION

Test 3 prevents normal call processing from recording call data using the SMDR equipment. SMDR equipment must be disabled using PROC 275, Word 1 before Test 3 is executed. After Test 3 is completed, SMDR service should be restored using PROC 275, Word 1.

1. Change Field 12 of **PROC 275, Word 1** from 1 to 0 to disable SMDR service.

   NOTE

   Prior to using Test 3, the customer's tape should be unloaded (with customer's permission) and a spare tape loaded.

2. Enter **PROC 655** and select Test 3 by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

3. Upon entry to Test 3, the call record message length to be transmitted to the SMDR equipment is 12 words (indicated by a 0 in Field 14).

4. **NEXT DATA** is used to change the call record message length to be transmitted depending upon the type of SMDR equipment being tested.

   A 1 in Field 14 indicates a 15 word message length; a 2 in Field 14 indicates a 18 word message length.

   Depressing **NEXT DATA** repeatedly cycles Field 14 to 1, 2, and back to 0, etc.

5. To start Test 3, depress **EXECUTE**.

   NOTE

   Special error code 80 is displayed in the **MAAP** error code field if **EXECUTE** is depressed with the SMDR service enabled.

6. During execution of Test 3, the following fields are displayed:

   Field 1 - 3.

   Fields 2 and 3 - Operation code and data word currently being transmitted to the SMDR equipment.

   Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

   Fields 7 and 8 - Once and last failure codes.

   Field 14 - Message length encode.

7. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

   The one-zero pattern data word is complemented each time it is transmitted with 0.5 seconds between words.

   Between the last word transmitted (normally word 12) and the start of the next message is a 2-second delay to allow stopping Test 3.

8. Successful test completion results in a 0 displayed in Fields 7 and 8, and a printout similar to that shown in Figure 15.

9. The printout shown was generated by the printer direct output option.

10. After Test 3 is successfully completed, the customer's tape should be loaded and SMDR service enabled.

    To enable SMDR service, change Field 12 of **PROC 275, Word 1** from 0 to 1.

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Figure 5-15. Sample Printout Generated From Test 3 (12-Word Format)

Test 4

Test 4 sends 16 messages in either 12, 15, or 18 word message formats to the SMDR equipment.

Test 4 is used to load memory in the SMDR equipment with a 16-message block. A 31-message block can be written on magnetic tape by executing Test 4 twice.

Four of the SMDR operation codes are exercised by Test 4; i.e., normal word transmission, last word of message transmission, retransmit normal word, and retransmit last word.

When Test 4 is performed, maintenance personnel **must** be on the customer's premises to operate SMDR equipment and to determine if the test is successful by observing the SMDR printouts.

1. Enter **PROC 655** if SMDR service was enabled in Test 3 or 5 of **PROC 655**.
2. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.
3. Upon entry to Test 4, the call record message length to be transmitted to the SMDR equipment is 12 words (indicated by a 0 in Field 14).
4. **NEXT DATA** is used to change the call record message length to be transmitted depending upon the type of SMDR equipment being tested.

   A 1 in Field 14 indicates a 15 word message length; a 2 in Field 14 indicates a 18 word message length.

   Depressing **NEXT DATA** repeatedly cycles Field 14 to 1, 2, and back to 0, etc.
5. To start Test 4, depress **EXECUTE**.
6. If no failures are detected, Fields 7 and 8 display a 0. The printouts should be checked to ensure that the SMDR equipment is operating properly.
7. If any failures are detected, the following is displayed:

   Field 1 - 4.

   Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Fields 7 and 8 - Once and last failure codes.

Field 14 - Message length encode.

8. When using direct output SMDR equipment, successful completion of Test 4 results in a printout similar to that shown in Figure 16.
9. When using the 9-track magnetic tape SMDR equipment (12 or 15 word messages) only the numerical characters of the messages can be displayed as shown in Figure 17.

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Figure 5-16. 16-Message Test - Sample Printout From Test 4

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Figure 5-17. Displayable Characters on 9-Track SMDR Equipment (Note: Correct Time Is Displayed) From Test 4

10. Hexadecimal dumps for Test 4 are shown in Figure 18 and Figure 19.
11. When Test 4 is successfully completed, the SMDR alarm cause is resolved and the **OTHER FAILS** fault indicator goes off when all other alarm sources (if any) affecting the **OTHER FAILS** fault indicator are cleared.

NOTE

SMDR alarmed entries in PMIDS are marked as resolved.

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Figure 5-18. Hexadecimal Dump for Test 4 Test Call (12-Word Format)

12. The **MAJOR** and/or **MINOR** alarms also go off when all other major and/or minor alarm sources are cleared.

The 16 messages of Figure 16 completely fill and test the direct output SMDR memory buffer, testing each digit in each digit's position.

When using the 9-track magnetic tape SMDR equipment, Test 4 should be executed four times to fill the two 9-track SMDR 31-message memory buffers.

1. Executing Test 4 four times allows displaying an individual call record from each magnetic tape SMDR memory buffer as each 31-message block is written on magnetic tape.
2. By specifying the **EXTENSION NUMBER**, with the thumb wheel switch on the 9-track magnetic tape control panel, a specific call record message from Figure 17 is displayed on the 9-track control panel.

When running Test 4 using the 9-track magnetic tape SMDR equipment, both the tape drive units' **ON-LINE** button and the 9-track control panels' **ON-LINE** button should be depressed.

1. The mode **EXTENSION NUMBER/AUTO** switch should be set in the **EXTENSION NUMBER** mode, and the thumb wheel switch selected to the desired station or extension number to display a specific extension number call record.
2. Depressing **CLEAR DISPLAY** clears the control panel display prior to displaying a new call record.
3. Depressing **DUMP MEMORY** causes the data contained in the **ON-LINE** memory buffer to be written on tape.

   Depressing **DUMP MEMORY** repeatedly causes the data from alternate **ON-LINE** memory to be written on tape.

Test 5

Test 5 sends a single data word to the SMDR equipment and is normally used in repair of SMDR equipment. Test 5 allows sending most words or messages to the SMDR by manually entering it into Fields 2 and 3.

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Figure 5-19. Hexadecimal Dump for Test 4 Test Call (15-Word Format)

When Test 5 is performed, maintenance personnel **must** be on the customer's premises to operate SMDR equipment and to determine if Test 5 is successful by observing the SMDR printout.

CAUTION

Test 5 prevents normal call processing from recording call data using the SMDR equipment. SMDR equipment must be disabled using PROC 275, Word 1 before Test 5 is executed. After Test 5 is completed, SMDR service should be restored using PROC 275, Word 1.

1. Change Field 12 of **PROC 275, Word 1** from 1 to 0 to disable SMDR service.

   NOTE

   Prior to using Test 5, the customer's tape should be unloaded (with customer's permission) and a spare tape loaded.

2. Enter **PROC 655** and select Test 5 by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 5; ENTER.

3. When Test 5 is called in, a default test word (operation code and data word) is displayed in Fields 2 and 3.

   To test the default test word, proceed to Step 7.

4. Field 2 is blinking, indicating an optional entry field. To select an operation code and data word different than the default test word, enter the following:

   (Operation code); ENTER; (Data word); ENTER.

   Proceed to Step 7.

5. Operation codes and data words can also be selected for testing by using the **CHANGE FIELD** sequence:

   CHANGE FIELD; 2; ENTER; (Operation code); **ENTER; (Data word); ENTER**.

   Proceed to Step 7.

6. In addition, operation codes and data words can also be selected for testing by use of **NEXT DATA**.

   Depressing **NEXT DATA** selects the next of ten operation codes and data words that are available to be transmitted. (Refer to Figure 20.)

   When the operation code and data word to be used is displayed in Fields 2 and 3 by depressing **NEXT DATA**, proceed to Step 7.

7. To start Test 5, depress **EXECUTE**.

   NOTE

   Special error code 80 is displayed in the **MAAP** error code field if **EXECUTE** is depressed with the SMDR service enabled.

8. During execution of Test 5, the following is displayed:

   Field 1 - 5.

   Fields 2 and 3 - Operation code and data word currently being transmitted to the SMDR equipment.

Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Fields 7 and 8 - Once and last failure codes.

9. Each time **EXECUTE** is depressed, the operation code and data word displayed in Fields 2 and 3 are transmitted to the SMDR equipment.

   NEXT DATA is used to select a different operation code and data word to be transmitted prior to depressing **EXECUTE**.

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Figure 5-20. List of Operation Codes and Data Words Available Using the NEXT DATA Key in Test 5

10. Successful test completion results in a 0 displayed in Fields 7 and 8 and a printout similar to that shown in Figure 21.

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Figure 5-21. Sample Printout From Test 5, Using 11 Normal Data Word Operation Codes Followed by an End-of-Message Operation Code. The Data Word is an Alternating Ones-Zeros Pattern.

11. After Test 5 is successfully completed, the customer's tape should be loaded and SMDR service enabled.

    To enable SMDR service, change Field 12 of **PROC 275, Word 1** from 0 to 1.

Repair Guide

Overview

When a SMDR failure is indicated **(PROC 655** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted), perform the following steps in the order listed to isolate and repair the faulty unit.

1. Execute Test 1, step through the failure history, and record the results.
2. Execute Test 2 and record the results.
3. Execute Test 4 for the direct output SMDR version or the 9-track magnetic tape SMDR version.

   When the 9-track magnetic tape SMDR version is being tested, dump the memory so that when Test 4 is executed twice, the 16-message test completely fills one memory buffer and the corresponding tape record.
4. Execute Test 4 (twice for a 31-message tape buffer), record the failures, and compare several of the messages with Figures 16 and 17.

   Repeat Test 4 for the alternate memory buffer for 9-track SMDR testing.
5. Based on the results of Tests 2 and 4, perform the corrective action indicated (in the order listed) in isolation and repair steps:

   Repair procedure for direct output SMDR.

   Repair procedure for 9-track SMDR.
6. Test 3 can be used to determine if failures are intermittent or to use the logic probe at test points on the SMDR equipment to trace wiring problems.
7. Test 5 can be used to transmit a single data word repeatedly (by depressing **EXECUTE** repeatedly) and to change the single data word transmitted to help isolate failures in the SMDR equipment.
8. When I/O failures are suspected between the dual-speed data channel and the SMDR equipment, perform **PROC 611**, Test 3 entering the equipment location displayed in Fields 4 through 6.

Repair Procedure for Direct Output SMDR

Use the following steps to repair a printer or paper tape punch SMDR.

1. Perform the corrective action listed for the failure code recorded as a result of Test 2 and the type of message error or incorrect operation as a result of Test 4 (if appropriate).
2. Execute Test 3 for each corrective action taken until the final repair is made.
3. Verify correct operation of the SMDR equipment using Test 4.
4. Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of common control circuit packs.

5. Refer to SMDR COMPONENT REPLACEMENT for steps on:

   Replacement of SMDR carrier circuit packs.

   Replacement of SMDR clock/calendar display.

Failure Code 0 - Time or Date Is Incorrectly Displayed: At the SMDR carrier:

1. Replace LC66 (time).
2. Replace LC67 (date).
3. Check the wiring associated with the replaced circuit packs.
4. Replace the SMDR clock assembly.

Failure Code 0 - No Printout Message:

1. Determine if HP-H05-10525T logic probe is provided or available:

   If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

   If the logic probe is not available, proceed to Step 6.
2. At the SMDR carrier, insert the logic probe into test point **TP8** of LC63 or LC374 circuit pack for at least 5 seconds.
3. Execute Test 4.

   If the logic probe is not flashing, proceed to Step 4.

   If the logic probe is flashing, proceed to Step 5.
4. At the SMDR carrier, insert the logic probe into test point **TP1** of circuit pack LC62.

   If the logic probe is not flashing, replace LC62 at the SMDR carrier.

   If the logic probe is flashing, replace LC63 or LC374 at the SMDR carrier.
5. If the logic probe is flashing and no characters are being sent to the printer:

   If the date is not printed, replace LC65 at the SMDR carrier.

   If the date is printed, replace LC64 at the SMDR carrier.
6. When no logic probe is available, perform Steps 7 through 9 as appropriate.
7. At the SMDR carrier, replace LC62.

   At the SMDR carrier, replace LC63 or LC374.
8. Execute Test 4.
9. If no characters are being sent to the printer:

   If the date is not printed, replace LC65 at the SMDR carrier.

   If the date is printed, replace LC64 at the SMDR carrier.

Failure Code 0 - Invalid Printout Message: At the SMDR carrier:

1. Replace LC63 or LC374.
2. Replace LC39.
3. Replace LC64.

Failure Code 1, 3, 5, 7, or 8:

1. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
2. At the SMDR carrier, replace LC62.
3. Check the wiring associated with the replaced circuit packs.

Failure Code 2:

1. Verify TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6 is set for high speed data.
2. At the SMDR carrier, replace LC62.
3. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
4. Check the wiring associated with the replaced circuit packs.

Failure Code 4:

1. At the SMDR carrier, replace LC62.
2. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
3. Check the wiring associated with the replaced circuit packs.

Failure Code 6:

1. At the SMDR carrier, check for a blown fuse.
2. At the SMDR carrier, replace LC62.
3. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
4. Check the wiring associated with the replaced circuit packs.

Repair Procedure for 9-Track SMDR

Use the following steps to repair magnetic tape SMDR equipment.

1. Perform the corrective action listed for the failure code recorded as a result of Test 2 and the type of message error or incorrect operation as a result of Test 4 (if appropriate).
2. Execute Test 2 and/or Test 4 for each corrective action taken until the final repair is made.
3. Verify correct operation of the SMDR equipment using Test 4.
4. Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of common control circuit packs.
5. Refer to SMDR COMPONENT REPLACEMENT for steps on:
    a. Replacement of SMDR carrier circuit packs.
    b. Replacement of SMDR formatter circuit packs.
    c. Replacement of SMDR tape drive circuit packs.
    d. Photosensors adjustment.
    e. Tape speed and ramp time adjustments.
    f. Capstan servo zero and tension arm travel adjustments.
    g. Replacement of SMDR clock/calendar display.
    h. Replacement of SMDR formatter.
    i. Replacement of SMDR tape drive.

Failure Code 0 - Time and/or Date Failure: At the SMDR carrier:

1. Replace LC66 (time).
2. Replace LC67 (date).
3. Check the wiring associated with the replaced circuit packs.
4. Replace the SMDR clock assembly.

Failure Code 0 - Data Not Recorded on Tape:

1. Determine if HP-H05-10525T logic probe is provided or available:

    If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

    If the logic probe is not available, proceed to Step 13.
2. Load a spare 9-track tape. Ensure the write-enable ring is installed on the tape and verify the tape is threaded correctly.
3. Connect the logic probe to test point **TP1** on the LC178 and execute Test 4 twice.

4. Determine the status of the logic probe.

   If the logic probe is not flashing, proceed to Step 5.

   If the logic probe is flashing, proceed to Step 6.

5. If the logic probe did not flash, perform the following at the SMDR carrier:
   a. Check for a blown fuse.
   b. Replace LC177.
   c. Replace LC68.
   d. Replace LC175.
   e. Replace LC178.
   f. Replace LC63 or LC374.
   g. Replace LC40.
   h. Check the wiring associated with the replaced circuit packs.
6. If the logic probe flashed, perform Steps 7 through 12 as appropriate.
7. At the SMDR carrier:
   a. Replace LC175.
   b. Replace LC176.
   c. Replace LC177.
8. At the SMDR formatter:
   a. Replace board 4062.
   b. Replace board 4257.
9. At the SMDR tape drive:
   a. Replace board 3842.
   b. Replace board 4843.
   c. Replace board 4207.
   d. Replace board 4188.
   e. Replace board 4209.
   f. Replace board 3844 and adjust the photosensors.
10. Check the cabling between the formatter, tape drive, and SMDR carrier, and the wiring associated with the replaced SMDR circuit packs.
11. Replace the SMDR formatter.
12. Replace the SMDR tape drive.
13. When no logic probe is available, perform Steps 14 through 19 as appropriate.

14. At the SMDR carrier:
    a. Check for a blown fuse.
    b. Replace LC177.
    c. Replace LC68.
    d. Replace LC175.
    e. Replace LC178.
    f. Replace LC63 or LC374.
    g. Replace LC40.
    h. Replace LC176.
15. At the SMDR formatter:
    a. Replace board 4062.
    b. Replace board 4257.
16. At the SMDR tape drive:
    a. Replace board 3842.
    b. Replace board 4843.
    c. Replace board 4207.
    d. Replace board 4188.
    e. Replace board 4209.
    f. Replace board 3844 and adjust the photosensors.
17. Check the cabling between the formatter, tape drive, and SMDR carrier, and the wiring associated with the replaced SMDR circuit packs.
18. Replace the SMDR formatter.
19. Replace the SMDR tape drive.

Failure Code 0 - Data Not Displayed at System Control Panel:

1. Determine if HP-H05-10525T logic probe is provided or available:

   If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

   If the logic probe is not available, proceed to Step 17.
2. Ensure the write-enable ring is on the tape.
3. Connect the logic probe to test point **TP1** on the LC178 circuit pack.
4. Execute Test 4 twice.
5. Determine the status of the logic probe.

   If the logic probe is not flashing, proceed to Step 6.

   If the logic probe is flashing, proceed to Step 10.

6. If the logic probe did not flash, perform Steps 7 through 9 as appropriate.
7. At the SMDR carrier:
    a. Check for a blown fuse.
    b. Check output voltages on the 207B power supply.
8. At the SMDR carrier, replace the first circuit pack listed below. If the logic probe still does not flash, replace the next circuit pack and retest; etc.
    a. LC177.
    b. LC68.
    c. LC175.
    d. LC178.
    e. LC63 or LC374.
    f. LC40
9. Check the wiring associated with the replaced circuit packs.
10. If the logic probe flashed, perform Steps 11 through 16 as appropriate.
11. At the SMDR carrier:
    a. Replace LC175.
    b. Replace LC176.
    c. Replace LC177.
12. At the SMDR formatter:
    a. Replace board 4062.
    b. Replace board 4257.
13. At the SMDR tape drive:
    a. Replace board 3842.
    b. Replace board 4843.
    c. Replace board 4207.
    d. Replace board 4188.
    e. Replace board 4209.
    f. Replace board 3844 and adjust the photosensors.
14. Check the cabling between the formatter, tape drive, and SMDR carrier, and the wiring associated with the replaced SMDR circuit packs.
15. Replace the SMDR formatter.
16. Replace the SMDR tape drive.
17. When no logic probe is available, perform Steps 18 through 23 as appropriate.

18. At the SMDR carrier:
    a. Check for a blown fuse.
    b. Replace LC177.
    c. Replace LC68.
    d. Replace LC175.
    e. Replace LC178.
    f. Replace LC63 or LC374.
    g. Replace LC40.
    h. Replace LC176.
19. At the SMDR formatter:
    a. Replace board 4062.
    b. Replace board 4257.
20. At the SMDR tape drive:
    a. Replace board 3842.
    b. Replace board 4843.
    c. Replace board 4207.
    d. Replace board 4188.
    e. Replace board 4209.
    f. Replace board 3844 and adjust the photosensors.
21. Check the cabling between the formatter, tape drive, and SMDR carrier, and the wiring associated with the replaced SMDR circuit packs.
22. Replace the SMDR formatter.
23. Replace the SMDR tape drive.

Failure Code 0 - Incorrect Data Display at System Control Panel:

1. At the SMDR carrier:
    a. Replace LC68.
    b. Replace LC63 or LC374.
    c. Replace LC175.
    d. Replace LC176.
    e. Replace LC177.
    f. Replace LC178.
2. Check for trouble in the System 85 software.

Failure Code 0 - Tape Fails to Load:

1. Ensure the write-enable ring is installed.

   The write-enable lamp lights if installed.
2. If the tape does not advance to the load point, perform Steps 3 through 7 (as appropriate) at the tape drive.
3. Adjust the photosensors on board 3844.
4. Replace board 3844.

   Replace board 4843.
5. Replace board 3645 and adjust the tape speed and ramp time.
6. Replace board 4306 and adjust the capstan servo zero and tension arm travel.
7. Replace the SMDR tape drive.
8. If the tape does not stop at the load point, perform Steps 9 through 14 as appropriate.
9. Adjust the photosensors on board 3844 at the tape drive.
10. Replace board 3844 and adjust the photosensors at the tape drive.
11. Replace board 4062 at the formatter.
12. Check the cabling between the tape drive and formatter.
13. Replace the SMDR formatter.
14. Replace the SMDR tape drive.
15. If the **ON LINE** lamp on the tape drive does not light, refer to **Failure Code 0 - ON LINE Lamp Does Not Light at the Tape Drive**.

Failure Code 0 - Tape Fails to Rewind:

1. Verify that the tape is threaded correctly.
2. Adjust the photosensors on board 3844 at the tape drive.
3. If the tape fails to rewind completely onto the supply reel, perform Steps 4 and 5 as appropriate.
4. Replace board 4843 at the tape drive.

   Replace board 3645 at the tape drive and adjust the tape speed and ramp time.
5. Replace the SMDR tape drive.
6. If the tape fails to rewind to the load point, perform Steps 7 through 13 as appropriate.
7. At the SMDR carrier, replace LC177.

   If the **UNLOAD** lamp on LC177 does not light when the **TAPE UNLOAD** button is depressed, check the wiring between LC177 and the **TAPE UNLOAD** button.
8. At the SMDR carrier, replace LC175.
9. At the SMDR formatter, replace board 4062.

10. At the SMDR tape drive:
    a. Replace board 3842.
    b. Replace board 4843.
    c. Replace board 3645 and adjust the tape speed and ramp time.
    d. Replace board 4306 and adjust the capstan servo zero and tension arm travel.
11. Check the wiring associated with the replaced circuit packs and the cabling between the SMDR carrier, formatter, and tape drive.
12. Replace the SMDR formatter.
13. Replace the SMDR tape drive.

Failure Code 0 - Tape Fails to Move When DUMP MEMORY Button Is Depressed:

1. Determine if HP-H05-10525T logic probe is provided or available:

   If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

   If the logic probe is not available, proceed to Step 17.
2. Connect the logic probe to test point **TP10** on the LC177 circuit pack and observe the logic probe when **DUMP MEMORY** is depressed.
3. Depress **DUMP MEMORY**.
4. Determine the status of the logic probe.

   If the logic probe is not flashing, proceed to Step 5.

   If the logic probe is flashing, proceed to Step 9.
5. If the logic probe did not flash, perform Steps 6 through 8 as appropriate.
6. At the SMDR carrier, replace LC68.

   Depress **DUMP MEMORY**.
7. If the logic probe still does not flash, replace LC177 at the SMDR carrier.
8. Check the wiring associated with the replaced circuit packs.
9. If the logic probe flashed, perform Steps 10 through 16 as appropriate.
10. Verify that the tape is threaded correctly.
11. At the SMDR carrier, replace LC177.
12. At the SMDR formatter, replace board 4062.
13. At the SMDR tape drive:
    a. Replace board 3842.
    b. Replace board 4843.
14. Check the wiring between LC177 and the formatter and the cabling between the formatter and tape drive.

15. Replace the SMDR formatter.
16. Replace the SMDR tape drive.
17. When no logic probe is available, perform Steps 18 through 24 as appropriate.
18. Verify that the tape is threaded correctly.
19. At the SMDR carrier:
    a. Replace LC68.
    b. Replace LC177.
20. At the SMDR formatter, replace board 4062.
21. At the SMDR tape drive:
    a. Replace board 3842.
    b. Replace board 4843.
22. Check the wiring between LC177 and the formatter and the cabling between the formatter and tape drive.
23. Replace the SMDR formatter.
24. Replace the SMDR tape drive.

Failure Code 0 - ON LINE Lamp Does Not Light at the Tape Drive:

1. At the SMDR tape drive, replace board 4843.
2. Check the cabling between the tape drive and the formatter.
3. Replace the SMDR tape drive.

Failure Code 1, 3, 5, 7, or 8:

1. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
2. At the SMDR carrier, replace LC62.
3. Check the wiring associated with the replaced circuit packs.

Failure Code 2, 4, or 6:

1. At the SMDR carrier, replace LC62.
2. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
3. Check the wiring associated with the replaced circuit packs.

Failure Code 9:

1. Determine if HP-H05-10525T logic probe is provided or available:

   If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

   If the logic probe is not available, proceed to Step 8.
2. Connect the logic probe to test point **TP8** on the LC68 circuit pack.
3. Determine the status of the logic probe.

   If the logic probe is not flashing, perform Steps 4 and 5 as appropriate.

   If the logic probe is flashing, perform Steps 6 and 7 as appropriate.
4. At the SMDR carrier, replace LC62.
5. Check the wiring associated with the replaced circuit pack.
6. At the SMDR carrier:
   a. Replace LC62.
   b. Replace LC68.
   c. Replace LC63 or LC374.
   d. Replace LC40.
   e. Replace LC177.
   f. Replace LC178.
7. Check the wiring associated with the replaced circuit packs.
8. When no logic probe is available, perform Steps 9 and 10 as appropriate.
9. At the SMDR carrier:
   a. Replace LC62.
   b. Replace LC68.
   c. Replace LC63 or LC374.
   d. Replace LC40.
   e. Replace LC177.
   f. Replace LC178.
10. Check the wiring associated with the replaced circuit packs.

PROC 656 - NCOSS TEST

Purpose

PROC 656 provides the capability to test NCOSS and/or 3B2 LSU equipment when a trouble is reported or suspected.

Tests 2 through 4 of this maintenance procedure **must** be performed on the customer's premises. Successful test completion for Tests 2 through 4 is determined by observing printouts from the NCOSS equipment.

PROC 656 is used to:

1. Run an echo test with the NCOSS/3B2 LSU equipment.

   NOTE

   Dual-speed data channels associated with NCOSS/3B2 LSU equipment are tested in **PROC 611**.

2. Send an alternating one-zero pattern continuously.
3. Send a 16-message pattern.
4. Send 1 test word at-a-time.

Field Definitions and Codes

Each field of **PROC 656** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BS, PROC 656 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 and 3 - Select operation code and data of test word to be transmitted to the NCOSS/3B2 LSU equipment (Test 4 only).

Table 5-73.

PROC 656 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-4	Test number.	7		Failure code-once: Accumulative "OR"ing of all failure codes that occurred at least once during a test.
2		Operation code (octal):			
	0	Normal data word.			
	3	No operation.		0	Pass.
				1	Data channel address not acknowledged.
	4	Retransmit normal data word.		2	No data reply (echo) from NCOSS equipment in all cases.
	10	Last word in message.		3	Failures 1 and 2.
	14	Retransmit last word in message.		4	Echo mismatch.
				5	Failures 1 and 4.
				6	Failures 2 and 4.
4	0	Common control carrier.		7	Failures 1, 2, and 4.
				8	Equipment failure (reported by NCOSS).
5	23-26	Slot Number.	8	0-8	Failure code-last: Failure code indicating one or more failures occurring during the last transmission to the NCOSS equipment before the test ended or was stopped.
6	0-15	Channel number.			

Operation of Procedure

Overview

PROC 656 is used to test NCOSS/3B2 LSU equipment.

To call in **PROC 656**, perform the following:

1. Depress **PROC NO; 656; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Fields 4 through 6 display the data channel equipment location associated with the NCOSS/3B2 LSU equipment, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

CAUTION

NCOSS/3B2 LSU call recording is blocked under the following conditions - While Test 2, 3, and 4 are executing. In Test 3, the 16 message pattern is sent in less than 1 second. In Test 4, the blockage is extended for 2 minutes after EXECUTE is depressed.

Four tests are available:

1. Test 1 - Runs an echo test on the NCOSS/3B2 LSU equipment.
2. Test 2 - Sends an alternating one-zero pattern continuously to the NCOSS/3B2 LSU equipment.
3. Test 3 - Sends 16 messages to the NCOSS/3B2 LSU equipment testing most digits in each digit's position.
4. Test 4 - Sends a single data word to the NCOSS/3B2 LSU equipment allowing manual entry of operation codes and data words.

Test 1

Test 1 runs an echo test with the NCOSS or 3B2 LSU equipment.

Test 1 does not interfere with normal call processing recording of calls.

An alternating one-zero pattern is used for the first echo test transmission. A complementing one-zero pattern is used for the second echo test transmission.

1. Test 1 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 1; ENTER.

2. When Test 1 is initially called in, the data channel associated with the highest NCOSS/3B2 LSU equipment location is displayed in Fields 4 through 6.

   To test the displayed circuit, proceed to Step 4.

3. To select another NCOSS/3B2 LSU circuit to be tested, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Proceed to Step 4.

4. To start Test 1, depress **EXECUTE**.
5. If no failures are detected, Fields 7 and 8 display a 0.
6. If any failures are detected, the following is displayed:

   Field 1 - 1.

   Fields 4 through 6 - Data channel equipment location associated with the NCOSS/3B2 LSU equipment.

   Fields 7 and 8 - Failure codes (1 through 8).

7. To test another NCOSS/3B2 LSU circuit, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Repeat Steps 4 through 7 (as appropriate).

Test 2

Test 2 sends a continuous alternating one-zero pattern in the format of a call record message to the NCOSS/3B2 LSU equipment.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 4 through 6.

   NOTE

   The default equipment location is the last equipment location displayed in Test 1.

   To test the default equipment location, proceed to Step 4.

3. To select another NCOSS/3B2 LSU circuit to be tested, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Proceed to Step 4.

4. To start Test 2, depress **EXECUTE**.

   CAUTION

   While Test 2 is executing, NCOSS/3B2 LSU call recording is blocked.

5. During execution of Test 2, the following fields are displayed:

   Field 1 - 2.

   Fields 2 and 3 - Operation code and data word currently being transmitted to the NCOSS/3B2 LSU equipment.

   Fields 4 through 6 - Data channel equipment location associated with the NCOSS/3B2 LSU equipment.

   Fields 7 and 8 - Once and last failure codes (if any).

6. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.

7. The one-zero pattern data word is complemented each time it is transmitted with 0.5 seconds between words.

   Between the last word transmitted (normally word 18) and the start of the next message is a 2-second delay to allow stopping Test 2.

8. Successful test completion results in a 0 displayed in Fields 7 and 8.

9. To test another NCOSS/3B2 LSU circuit, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Repeat Steps 4 through 9 (as appropriate).

Test 3

Test 3 sends 16 messages in either 12, 15, or 18 word message formats to the NCOSS/3B2 LSU equipment.

Four of the NCOSS/3B2 LSU operation codes are exercised by Test 3; i.e., normal word transmission, last word of message transmission, retransmit normal word, and retransmit last word.

When Test 3 is performed, maintenance personnel **must** be on the customer's premises to determine if the test is successful by observing the NCOSS printout.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 3; ENTER.

2. When Test 3 is initially called in, a default equipment location may be displayed in Fields 4 through 6.

   NOTE

   The default equipment location is the last equipment location displayed in Test 1.

   To test the default equipment location, proceed to Step 4.

3. To select another NCOSS/3B2 LSU circuit to be tested, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Proceed to Step 4.

4. To start Test 3, depress **EXECUTE**.

   CAUTION

   While Test 3 is executing (16 message pattern sent in less than 1 second), NCOSS/3B2 LSU call recording is blocked.

5. If no failures are detected, Fields 7 and 8 display a 0.

   The printout (refer to Figure 22) should be checked to ensure that the NCOSS equipment is operating properly.

6. If any failures are detected, the following is displayed:

   Field 1 - 3.

   Fields 4 through 6 - Data channel equipment location associated with the NCOSS/3B2 LSU equipment.

   Fields 7 and 8 - Once and last failure codes.

7. To test another NCOSS/3B2 LSU circuit, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Repeat Steps 4 through 7 (as appropriate).

Test 4

Test 4 sends a single data word to the NCOSS/3B2 LSU equipment and is normally used in repair of NCOSS/3B2 LSU equipment. Test 4 allows sending most words or messages to the NCOSS/3B2 LSU equipment by manually entering it into Fields 2 and 3.

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Figure 5-22. Hexadecimal Dump for Test 3 Test Call (18-Word Format)

When Test 4 is performed, maintenance personnel **must** be on the customer's premises to determine if the test is successful by observing the NCOSS/3B2 LSU equipment.

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

   CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default equipment location may be displayed in Fields 4 through 6.

   NOTE

   The default equipment location is the last equipment location displayed in Test 1.

   To test the default equipment location, proceed to Step 4.

3. To select another NCOSS/3B2 LSU circuit to be tested, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

   Proceed to Step 4.

4. When Test 4 is called in, a test word (operation code and data word) is displayed in Fields 2 and 3.

5. Depressing **NEXT DATA** selects the next of ten operation codes and data words that are available to be transmitted. (Refer to Figure 23.)

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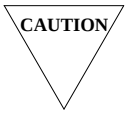
Figure 5-23. List of Operation Codes and Data Words Available using the NEXT DATA Key in Test 4

6. Operation codes and data words can be manually entered into Fields 2 and 3 using the **CHANGE FIELD** sequence:

   CHANGE FIELD; 2; ENTER; (Operation code); ENTER; **(Data word); ENTER**.

7. To start Test 4, depress **EXECUTE**.



When Test 4 is executed, NCOSS/3B2 LSU call recording is blocked for 2 minutes after EXECUTE is depressed.

8. During execution of Test 4, the following fields are displayed:

   Field 1 - 4.

   Fields 2 and 3 - Operation code and data word currently being transmitted to the NCOSS/3B2 LSU equipment.

   Fields 4 through 6 - Data channel equipment location associated with the NCOSS/3B2 LSU equipment.

   Fields 7 and 8 - Once and last failure codes (if any).

9. Each time **EXECUTE** is depressed, the operation code and data word displayed in Fields 2 and 3 are transmitted to the NCOSS/3B2 LSU equipment.

   NEXT DATA can be used to select a different operation code and data word to be transmitted prior to depressing **EXECUTE**.

10. To test another NCOSS/3B2 LSU circuit, depress **NEXT CIRCUIT** until the data channel associated with the circuit to be tested is displayed in Fields 4 through 6.

    Repeat Steps 5 through 10 (as appropriate).

Repair Guide

When an NCOSS/3B2 LSU failure is reported or suspected, perform the following steps in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and record the results.
2. Execute Test 3, record the results, and look at the printout.
3. If Test 3 fails or the printout is not correct, the NCOSS or 3B2 LSU equipment is faulty.

   Refer the problem to the appropriate personnel.

4. Test 2 can be used to determine if failures are intermittent or to trace wiring problems.
5. Test 4 can be used to transmit a single data word repeatedly (by depressing **EXECUTE** repeatedly) and to change the single data word transmitted to help isolate failures in the NCOSS or 3B2 LSU equipment.
6. Repeat Steps 1 through 5 for each NCOSS/3B2 LSU failure.
7. When I/O failures are suspected between the dual-speed data channel and the NCOSS or 3B2 LSU equipment, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 4 through 6.

PROC 960 - QUEUE ACTIVITY

Purpose

PROC 960 is used to display queue information for a particular equipment location, or to display the equipment locations associated with a particular queue.

Field Definitions and Codes

Each field of **PROC 960** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BT, PROC 960 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6 - Select a specific equipment location to determine the queue activity (Test 1 only).
3. Field 8 - Select a specific queue number to determine the equipment locations on the queue (Test 2 only).

Operation of Procedure

Overview

PROC 960 is used to determine the queue activity.

To call in **PROC 960**, perform the following:

1. Depress **PROC NO; 960; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 2 is blanked and blinking, and all other fields are dashed.
2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Displays queue information for an entered equipment location.

   The equipment location contains the internal trunk number for a pseudo trunk.

2. Test 2 - Displays queue information and the first trunk in queue for an entered queue number.

Table 5-74.

PROC 960 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1,2	Test number.	8	0-255	Queue number.
2-6		Equipment location:	9	0-255	Trunk group number.
2	0-30	Module number.	10	0-999	Queue index.
3	0-6	Cabinet number.			
4	0-3	Carrier number.	11	0-999	Queue length.
5	0-21	Slot number.			
6	0-7	Circuit number.	12	0-127	Trunk type.
7	0-2	Busied or unequipped:	13	0-3	QBIT (Queue status):
	0	Equipped with hardware and not maintenance busy.		0	Not on any queue.
				1	On idle queue.
	1	Unequipped with hardware or maintenance busy.		2	On a busy queue without QBIT set. (Error condition.)
	2	Pseudo trunk.		3	On a busy queue.

Test 1

Test 1 is used to display the queue information for an entered equipment location.

The equipment location fields (4 through 6) display the internal trunk record number when Field 7 displays a 2.

1. Test 1 is the default test when entering **PROC 960** or is selected by use of **NEXT TEST**.
2. When Test 1 is initially called in, Field 2 (module) is blanked and blinking to indicate that data must be entered.
3. The equipment location to be displayed is entered as follows:

   (Module number); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.

4. To start Test 1, depress **EXECUTE**.
5. The busied or unequipped status is displayed in Field 7 and the queue status is displayed in Field 13 when **EXECUTE** is depressed.
6. For a trunk equipment location that is not on a queue (0 displayed in Field 13), no further information is provided.
7. The following information is provided for trunk equipment locations that are in queue:

   Field 1 - 1.

   Fields 2 through 6 - Equipment location selected.

   Field 7 - 0 or 2.

   Field 8 - Queue number.

   Field 9 - Trunk group number.

   Field 10 - Dashed.

   Field 11 - Queue length.

   Field 12 - Trunk type.

   Field 13 - QBIT (1 = on idle queue or 3 = on busy queue).
8. When another specific equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific equipment location.

   Either all or any part of the equipment location fields can be changed.
9. **EXECUTE** must be depressed to display the queue information for the specific equipment location entered.

Test 2

Test 2 is used to display the queue information and first trunk in queue for an entered queue number.

1. Test 2 is selected by use of **NEXT TEST**.
2. When Test 2 is initially called in, a default equipment location from Test 1 may be displayed in Fields 2 through 6 and Field 8 (queue number) is blinking to indicate that data may be entered.

   Either the default equipment location may be displayed or a specific queue number can be selected for display.
3. To select a specific queue number to be displayed, enter the following:

   (Queue number); ENTER.
4. To start Test 2, depress **EXECUTE**.
5. The following information for the first trunk equipment location of the queue number entered is displayed as follows:

   Field 1 - 2.

   Fields 2 through 6 - Trunk equipment location.

Field 7 - Busied or unequipped.

NOTE

If Field 7 equals 2 (pseudo trunk), Fields 4 through 6 display an internal trunk number and Fields 2 and 3 are dashed.

Field 8 - Queue number selected.

Field 9 - Trunk group number.

Field 10 - Queue index.

Field 11 - Queue length.

Field 12 - Trunk type.

Field 13 - Dashed.

6. Depressing **NEXT CIRCUIT** repeatedly displays the remaining trunks in the queue.

   When all trunks in the queue are displayed, depressing **NEXT CIRCUIT** once more dashes Fields 2 through 7, 12 and 13.

   Depressing **NEXT CIRCUIT** again displays the first trunk equipment location in the queue.

7. Depressing **NEXT UNIT** steps to the next queue number.

   NEXT CIRCUIT can be used to step through the new queue number if Field 11 is greater than 0.

8. When all queues are displayed, depressing **NEXT UNIT** again dashes Fields 2 through 8, 12 and 13. Fields 9 through 11 display a 0.

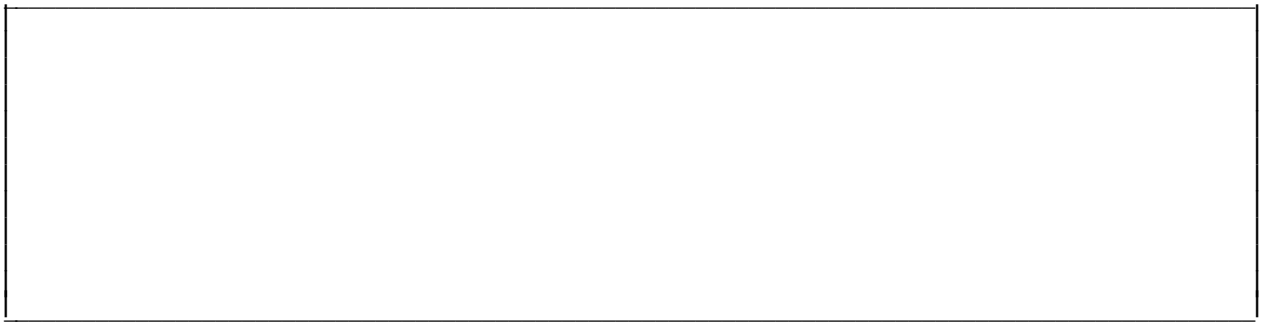
   Depressing **NEXT UNIT** once more displays the first queue number.

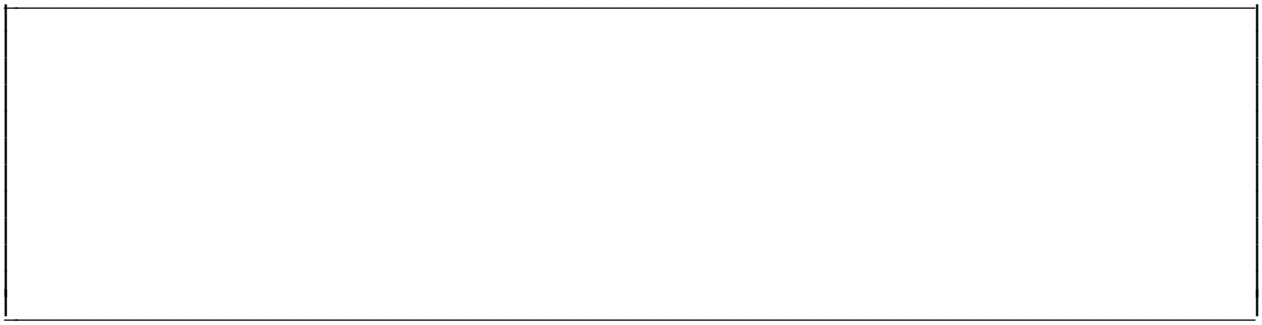
9. When another specific queue number is to be displayed without stepping through all queue numbers using **NEXT UNIT**, the **CHANGE FIELD** sequence must be used to select the specific queue number:

   CHANGE FIELD; 8; ENTER; (Queue number); ENTER.

10. **EXECUTE** must be depressed to display the trunk equipment locations of the specific queue number entered.

PROC 961 - CONNECTION ACTIVITY





Purpose

PROC 961 is used to display the connection status activity; i.e., connection number, module and accumulator number, and equipment location.

Field Definitions and Codes

Each field of **PROC 961** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BU, PROC 961 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Field 2 - Select a specific connection number to determine the equipment location, constat table number, acport table number, and time slot identity (Test 1 only).
3. Fields 6 and 7 - Select a specific time slot identity to determine the connection number and constat table number (Test 2 only).

4. Fields 9 through 13 - Select a specific equipment location to determine the constat table number, acport table number, connection number and time slot identity accumulator number (Test 3 and Test 5 only).

NOTE

Test 5 is only available for Release 2, Version 3 **tape issue 1.2** or later.

5. Field 6 - Select a specific module to determine the connection number and the first active accumulator on a module (Test 4 only).

Table 5-75.

PROC 961 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-5*	Test number.	8	1-6	ACPORT table number.
2	0-77777	Connection number (octal).	9-13		Equipment location:
3	0,1	Busy/idle bit.	9	0-30	Module number.
			10	0-6	Cabinet number.
4	1-6	Constat table number.	11	0-3	Carrier number.
			12	0-21	Slot number.
5	0,1	In-use status.	13	0-7	Circuit number.
6-7		Time slot identity:	14	0-6	Number of ports in connection.
6	0-30	Module number.			
7	1-255	Accumulator number.	15	1-6	Port Index.
* = Test 5 is only available for Release 2, Version 3 tape issue 1.2 or later.					

Operation of Procedure

Overview

PROC 961 is used to determine the connection activity.

To call in **PROC 961**, perform the following:

1. Depress **PROC NO; 961; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 2 is blanked and blinking, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Five tests are available:

1. Test 1 - Displays equipment location, constat table number, acport table number, and time slot information for an entered connection number.
2. Test 2 - Displays connection number and constat table number for an entered time slot identity accumulator number.
3. Test 3 - Displays constat table number, acport table number, connection number, and time slot identity accumulator number for an entered equipment location (i.e., modem pool member).
4. Test 4 - Displays the connection number and the first active accumulator on a module.
5. Test 5 - Displays constat table number, acport table number, connection number, and time slot identity accumulator number for an entered DTDM equipment location.

NOTE

Test 5 is only available for Release 2, Version 3 **tape issue 1.2** or later.

Test 1

Test 1 displays the equipment location, constat table number, acport table number, and time slot identity for an entered connection number.

1. Test 1 is the default test when entering **PROC 961** or is selected by use of **NEXT TEST**.
2. When Test 1 is initially called in, a default connection number may be displayed in Field 2.

   Field 2 (connection number) is blanked and blinking, indicating an optional entry field.
3. The default connection number can be the last connection number displayed in Tests 2 through 5 of **PROC 961**.

   Either the default connection number may be displayed or a specific connection number can be selected for display.
4. A specific connection number can be selected for display by entering the connection number (in octal) in Field 2:

   (Connection number); ENTER.
5. To start Test 1, depress **EXECUTE**.
6. The busy/idle status of the connection number is provided in Field 3 (0 = idle, 1 = busy) when **EXECUTE** is depressed.
7. For a connection number that is not busied (0 displayed in Field 3), no further information is provided.
8. For a busied connection (1 displayed in Field 3), the following information is provided:

   Field 1 - 1.

   Field 2 - Connection number selected.

   Field 3 - 1.

   Field 4 - Constat table number.

Fields 6 and 7 - Module and accumulator number.

Field 8 - Acport table number.

Fields 9 through 13 - Equipment location on the connection.

Field 14 - Number of ports in connection.

Field 15 - Port index.

9. Depressing **NEXT CIRCUIT** displays the next port in the acport tables.

   Field 8 displays the number of the acport table and Field 14 displays the total number of acport tables being used for the current constat table number (Field 4).

10. Depressing **NEXT CIRCUIT** after all ports in the acport tables are displayed dashes Fields 2 through 15.

    Depressing **NEXT CIRCUIT** once more causes the first entry to be displayed.

11. Depressing **NEXT UNIT** decrements the constat table number displayed in Field 4.

    When all constat table numbers are displayed, depressing **NEXT UNIT** again dashes Fields 2 through 15.

    Depressing **NEXT UNIT** once more causes the first entry to be displayed.

12. Depressing **NEXT DATA** advances the display to the next busied connection number and displays the data for that connection number.

    When all busied connection numbers are displayed, depressing **NEXT DATA** again dashes Fields 2 through 15.

    Depressing **NEXT DATA** once more causes the first entry to be displayed.

13. When another specific connection number is to be displayed, the **CHANGE FIELD** sequence must be used to select the connection number:

    CHANGE FIELD; 2; ENTER; (Connection number); ENTER.

14. **EXECUTE** must be depressed to display the equipment location, constat table number, acport table number, and time slot identity for the entered connection number.

Test 2

Test 2 displays the connection number and constat table number for an entered time slot identity accumulator number.

1. Test 2 is selected by use of **NEXT TEST**.

2. When Test 2 is initially called in, a default module and accumulator number may be displayed in Fields 6 and 7.

   The default module and accumulator number can be the last and accumulator number displayed in Tests 1 or 3 through 5 of **PROC 961**.

3. Field 6 (module) is blinking, indicating an optional entry field.

   Either the default module and accumulator number may be displayed or a specific module and accumulator number can be selected for display.

4. A specific module and accumulator number can be selected for display by performing one of the following depending on whether or not a default module and accumulator number are displayed:

   (Module number); ENTER; (Accumulator number); ENTER.

   CHANGE FIELD; 6; ENTER; (Module number); ENTER; **(Accumulator number); ENTER**.

5. To start Test 2, depress **EXECUTE**.

6. A search of all of the constat tables for the entered module and accumulator number is performed when **EXECUTE** is depressed.

7. If the module and accumulator number are not found, the constat table number is displayed in Field 4, a 0 is displayed in Field 5 and no other information is provided.

8. If the module and accumulator are found in the constat tables, the following information is provided:

   Field 1 - 2.

   Field 2 - Connection number.

   Field 3 - 1.

   Field 4 - Constat table number.

   Field 5 - 1.

   Field 6 - Module number selected.

   Field 7 - Accumulator number selected.

9. When another specific module and accumulator number is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific module and accumulator number:

   CHANGE FIELD; 6; ENTER; (Module number); ENTER; **(Accumulator number); ENTER**.

10. **EXECUTE** must be depressed to display the connection number and constat table number for the module and accumulator number entered.

Test 3

Test 3 displays the constat table number, acport table number, connection number, and time slot identity for an entered equipment location (i.e., modem pool member).

1. Test 3 is selected by use of **NEXT TEST**.

2. When Test 3 is initially called in, a default equipment location may be displayed in Fields 9 through 13.

   Field 9 (module) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Tests 1, 2, 4, or 5 of **PROC 961**.

   Either the default equipment location may be displayed or a specific equipment location can be selected for display.

4. A specific equipment location can be selected for display by performing one of the following depending on whether or not a default equipment location is displayed:

   (Module number); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.

   CHANGE FIELD; 9; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

5. To start Test 3, depress **EXECUTE**.
6. A search of all of the acport tables for the entered equipment location is performed when **EXECUTE** is depressed.
7. If the equipment location is not found, a 0 is displayed in Field 5 and no other information is provided.
8. If the equipment location is found in the acport tables, the following information is provided:

   Field 1 - 3.

   Field 2 - Connection number.

   Field 3 - 1.

   Field 4 - Constat table number.

   Field 5 - 1.

   Fields 6 and 7 - Time slot identity.

   Field 8 - Acport table number.

   Fields 9 through 13 - Equipment location selected.

9. When another specific equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific equipment location:

   CHANGE FIELD; 9; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

10. **EXECUTE** must be depressed to display the constat table number, acport table number, connection number, and time slot identity for the entered equipment location.

Test 4

Test 4 displays the connection number and the first active accumulator for an entered module number.

1. Test 4 is selected by use of **NEXT TEST**.
2. When Test 4 is initially called in, a default module number may be displayed in Field 6.

   Field 6 (module) is blinking, indicating an optional entry field.

3. The default module number can be the last module number displayed in Tests 1 through 3 or 5 of **PROC 961**.

   Either the default module number can be displayed or a specific module number can be selected for display.

4. A specific module number can be selected for display by performing one of the following depending on whether or not a default module number is displayed:

   (Module number); ENTER.

   CHANGE FIELD; 6; ENTER; (Module number); ENTER.

5. To start Test 4, depress **EXECUTE**.

6. The following information is provided for the module entered:

   Field 1 - 4.

   Field 2 - Connection number.

   Field 4 - Constat table number.

   Field 5 - 1.

   Field 6 - Module number selected.

   Field 7 - First active accumulator in module.

7. Depressing **NEXT CIRCUIT** displays the next active accumulator in Field 7 for the module entered in Field 6.

   Field 2 displays the connection number that the accumulator is on.

8. Depressing **NEXT CIRCUIT** after all active accumulators are displayed for the module entered in Field 6 dashes Fields 2 through 15.

   Depressing **NEXT CIRCUIT** once more causes the first active accumulator for the module entered in Field 6 to be displayed.

9. Depressing **NEXT UNIT** increments the module number displayed in Field 6.

   When all modules are displayed, depressing **NEXT UNIT** again dashes Fields 2 through 15.

   Depressing **NEXT UNIT** once more causes the first entry to be displayed.

Test 5

Test 5 is used to assist in maintenance of modem pooling.

Test 5 displays the constat table number, acport table number, connection number, and time slot identity for an entered DTDM equipment location.

Test 5 is **only** available for Release 2, Version 3 **tape issue 1.2** or later.

1. Test 5 is selected by use of **NEXT TEST**.

2. When Test 5 is initially called in, a default DTDM equipment location may be displayed in Fields 9 through 13.

   Field 9 (module) is blinking, indicating an optional entry field.

3. The default DTDM equipment location can be the last DTDM equipment location displayed in Tests 1 through 4 of **PROC 961**.

   Either the default DTDM equipment location may be displayed or a specific DTDM equipment location can be selected for display.

4. A specific DTDM equipment location can be selected for display by performing one of the following depending on whether or not a default DTDM equipment location is displayed:

   (Module number); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.

   CHANGE FIELD; 9; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

5. To start Test 5, depress **EXECUTE**.

6. A search of all of the acport tables for the entered DTDM equipment location is performed when **EXECUTE** is depressed.

7. If the DTDM equipment location is not found, a 0 is displayed in Field 5 and no other information is provided.

8. If the DTDM equipment location is found in the acport tables, the following information is provided:

   Field 1 - 5.

   Field 2 - Connection number.

   Field 3 - 1.

   Field 4 - Constat table number.

   Field 5 - 1.

   Fields 6 and 7 - Time slot identity.

   Field 8 - Acport table number.

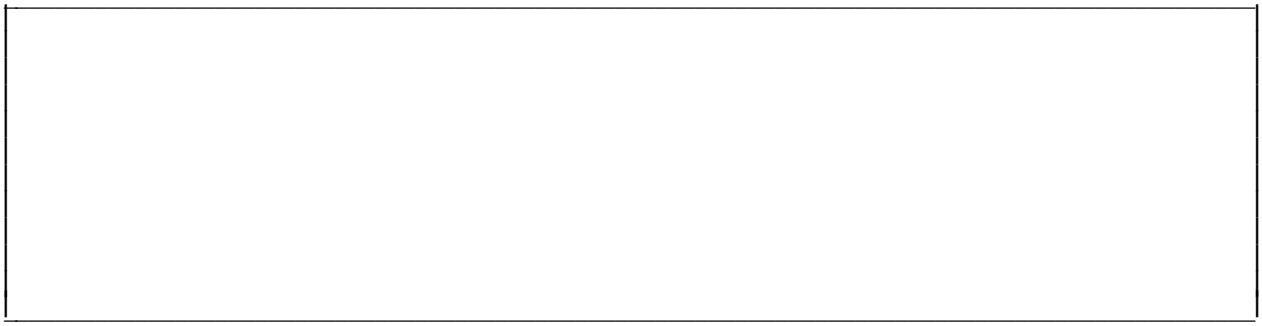
   Fields 9 through 13 - Equipment location selected.

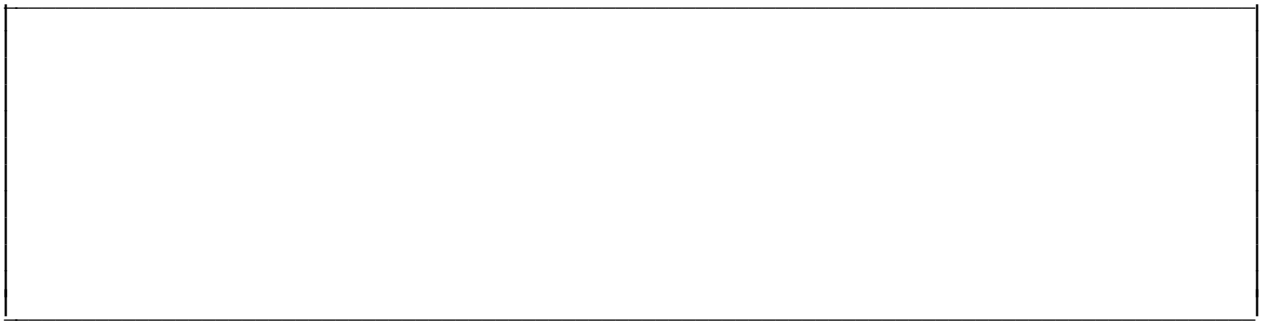
9. When another specific DTDM equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific equipment location:

   CHANGE FIELD; 9; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

10. **EXECUTE** must be depressed to display the constat table number, acport table number, connection number, and time slot identity for the entered DTDM equipment location.

PROC 962 - FACILITY CONNECTIONS





Purpose

PROC 962 is used to display the trunk number linkages for line records and the facility and conference facility linkages for trunk records.

PROC 962 also displays the progress mark and linkage information for an entered equipment location.

Field Definitions and Codes

Each field of **PROC 962** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BV, PROC 962 - Field Definitions and Codes.

Optional input fields are:

1. Field 1 - Change test number.
2. Fields 2 through 6 - Select a specific equipment location to determine the facility connection information.

Table 5-76.

PROC 962 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
1	1-3*	Test number.	8 (Contd)	5	Invalid location.
2-6		Initiating circuit equipment location:		6	Maintenance busy.
				7	Unequipped circuit.
2	0-30	Module number.	9	0-2047	Progress mark (octal).
3	0-6	Cabinet number.			
4	0-3	Carrier number.	10	1-6	Internal number type:
5	0-21	Slot number.		1	Internal number.
6	0-7	Circuit number.		2	Queuing trunk.
7	0-5	Circuit type:		3	Intercom (ICOM) record.
	0	Unequipped.		4	Attendant switch loop.
	1	Line.		5	Attendant originating register.
	2	Trunk.		6	Dial pulse originating register.
	3**	72 series terminal for Test 1 and Test 2; DTDM for Test 3.	11-15		Facility or conference port equipment location:
	4	TMS.	11	0-30	Module number.
	5	Pseudo trunk.	12	0-7	Cabinet number.
8	0-7	Status:	13	1-3	Carrier number.
	0	Noncontrol, nonconference.	14	0-21	Slot number.
	1	In control, nonconference.	15	0-7	Circuit number.
	2	Noncontrol, in conference.	11-15		TMS time slot number for a multi-module call:
	3	In control, in conference.	11,12	Dashed	Not applicable for TMS time slot.
	4	Not on time slot.			

Table 5-76. (Contd)

PROC 962 - FIELD DEFINITIONS AND CODES					
FIELD	**CODE**	**DEFINITION**	**FIELD**	**CODE**	**DEFINITION**
11-15 (Contd)		TMS time slot number for a multi-module call (Contd):	16 (Contd)	6	Station - Conference (Conference facility 1 through 8).
13 and 14	1-511	TMS time slot number. (Fields 13 and 14 are read as one Field.)	17	0-5	Circuit type:
				0	Unequipped.
15	Dashed	Not applicable for TMS time slot.		1	Line.
				2	Trunk.
16	1-6	How linked:		3**	DTDM if initiating equipment location is a digital modem pool port; otherwise 72 series terminal.
	1	Trunk - facility 1.			
	2	Trunk - facility 2.			
	3	Trunk - facility 3.			
	4	Station.		4	TMS.
	5	Not used.		5	Pseudo trunk.
			18	1-8	Conference port number.

* = Test 3 is only available for Release 2, Version 3 tape issue 1.2 or later.
** = DTDM is only applicable if Test 3 is available.

Operation of Procedure

Overview

PROC 962 is used to determine the facility connections.

To call in **PROC 962**, perform the following:

1. Depress **PROC NO; 962; ENTER**.

   Test 1 is automatically selected.

   Field 1 displays a 1, Field 2 is blanked and blinking, and all other fields are dashed.

2. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - A static test that displays a copy of the connection information for an initiating equipment location.
2. Test 2 - A dynamic test that continually updates the progress mark of the initiating equipment location.
3. Test 3 - A dynamic test that continually updates the progress mark of the initiating DTDM equipment location.

NOTE

Test 3 is only available for Release 2, Version 3 **tape issue 1.2** or later.

Test 1

Test 1 is a static test that displays a copy of the connection information for an initiating circuit.

The connection information is not updated until **EXECUTE** is depressed again.

1. Test 1 is the default test when entering **PROC 962** or is selected by use of **NEXT TEST**.
2. When Test 1 is initially called in, a default equipment location may be displayed in Fields 2 through 6.

   Field 2 (module) is blinking, indicating an optional entry field.
3. The default equipment location can be the last equipment location displayed in Test 2 or 3 of **PROC 962**.

   To display the default equipment location, proceed to Step 5.
4. A specific equipment location can be selected for display by entering the following:

   (Module number); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.
5. To start Test 1, depress **EXECUTE**.
6. The initiating circuit and its status and the facility or conference port data linked to the initiating circuit is provided when **EXECUTE** is depressed. A TMS time slot may be displayed in the facility or conference port equipment location (Fields 13 and 14) if a multi-module call has been made.
7. The following information is displayed for the initiating circuit and the facility or conference port linked to the initiating circuit:

   Field 1 - 1.

   Fields 2 through 6 - Initiating circuit equipment location.

   Field 7 - Initiating circuit type.

   Field 8 - Initiating circuit status.

   Field 9 - Progress mark (octal). Refer to Table BW for a definition of the octal encode.

   Field 10 - Internal number type (1 - indicating internal number when Field 17 = 5) or dashed.

   Fields 11 through 15 - Facility or conference port equipment location or dashed.

Field 16 - How the facility or conference port is linked.

Field 17 - Facility or conference port circuit type or dashed.

Field 18 - Conference port number or dashed.

8. The following information is displayed when a multi-module call has been made:

   Field 1 - 1.

   Fields 2 through 6 - Initiating circuit equipment location.

   Field 7 - Initiating circuit type.

   Field 8 - Initiating circuit status.

   Field 9 - Progress mark (octal). Refer to Table BW for a definition of the octal encode.

   Fields 10 through 12 - Dashed.

   Fields 13 and 14 - TMS time slot number.

   NOTE

   Fields 13 and 14 are read as one field to obtain the TMS time slot number.

   Fields 15 through 18 - Dashed.

9. If the initiating circuit is a trunk record, depressing **NEXT CIRCUIT** repeatedly steps through all the facilities that are linked.

10. If the initiating circuit is a conference record, depressing **NEXT CIRCUIT** repeatedly steps through all equipment locations on the conference.

    The conference port number is displayed in Field 18.

11. When all facilities or conference records are displayed, depressing **NEXT CIRCUIT** again dashes Fields 10 through 18.

    Depressing **NEXT CIRCUIT** once more restores the display to its initial state.

12. When a facility or conference port equipment location is displayed, depressing **CLEAR DATA; EXECUTE** transfers the facility or conference port equipment location to the initiating circuit equipment location.

    NOTE

    A TMS time slot number **cannot** be transferred to the initiating circuit equipment location.

13. After transfer, depressing **EXECUTE** displays the new facility or conference port equipment location associated with the new initiating circuit equipment location.

14. When Fields 11 through 15 display an ICOM record (Field 10 = 3), depressing **CLEAR DATA; EXECUTE** is used to display the facilities on the connection.

15. The facilities on the connection are displayed by depressing **EXECUTE** and **NEXT CIRCUIT**.

16. When another initiating circuit equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific initiating circuit equipment location:

    CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

17. **EXECUTE** must be depressed to display a copy of the connection information for the entered initiating circuit.

Test 2

Test 2 is a dynamic test that continually updates the progress mark of the initiating circuit.

Test 2 is similar to Test 1 except that the connection information is displayed every time the progress mark changes, instead of only when depressing **EXECUTE**.

1. Test 2 is selected by use of **NEXT TEST**.
2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 2 through 6.

   Field 2 (module) is blinking, indicating an optional entry field.
3. The default equipment location can be the last equipment location displayed in Test 1 or Test 3 of **PROC 962**.

   To display the default equipment location, proceed to Step 5.
4. A specific equipment location can be selected for display by entering the following:

   (Module number); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.
5. To start Test 2, depress **EXECUTE**.
6. The initiating circuit and its status and the facility or conference port data linked to the initiating circuit is provided when **EXECUTE** is depressed. A TMS time slot number may be displayed in the facility or conference port equipment location (Fields 13 and 14) if a multi-module call has been made.
7. The following information is displayed for the initiating circuit and the facility or conference port linked to the initiating circuit:

   Field 1 - 2.

   Fields 2 through 6 - Initiating circuit equipment location.

   Field 7 - Initiating circuit type.

   Field 8 - Initiating circuit status.

   Field 9 - Progress mark (octal). Refer to Table BW for a definition of the octal encode.

   Field 10 - Internal number type (1 - indicating internal number when Field 17 = 5) or dashed.

   Fields 11 through 15 - Facility or conference port equipment location or dashed.

   Field 16 - How the facility or conference port is linked.

   Field 17 - Facility or conference port circuit type or dashed.

   Field 18 - Conference port number or dashed.

8. The following information is displayed when a multi-module call has been made:

   Field 1 - 2.

   Fields 2 through 6 - Initiating circuit equipment location.

   Field 7 - Initiating circuit type.

   Field 8 - Initiating circuit status.

   Field 9 - Progress mark (octal). Refer to Table BW for a definition of the octal encode.

   Fields 10 through 12 - Dashed.

   Fields 13 and 14 - TMS time slot number.

   NOTE

   Fields 13 and 14 are read as one field to obtain the TMS time slot number.

   Fields 15 through 18 - Dashed.

9. If the initiating circuit is a trunk record, depressing **NEXT CIRCUIT** repeatedly steps through all the facilities that are linked.

10. If the initiating circuit is a conference record, depressing **NEXT CIRCUIT** repeatedly steps through all equipment locations on the conference.

    The conference port number is displayed in Field 18.

11. When all facilities or conference records are displayed, depressing **NEXT CIRCUIT** again dashes Fields 10 through 18.

    Depressing **NEXT CIRCUIT** once more restores the display to its initial state.

12. When a facility or conference port equipment location is displayed, depressing **CLEAR DATA; EXECUTE** transfers the facility or conference port equipment location to the initiating circuit equipment location.

    NOTE

    A TMS time slot number **cannot** be transferred to the initiating circuit equipment location.

13. After transfer, depressing **EXECUTE** displays the new facility or conference port equipment location associated with the new initiating circuit equipment location.

14. When Fields 11 through 15 display an ICOM record (Field 10 = 3), depressing **CLEAR DATA; EXECUTE** is used to display the facilities on the connection.

15. The facilities on the connection are displayed by depressing **EXECUTE** and **NEXT CIRCUIT**.

16. When a change occurs in the progress mark (Field 9) of the initiating circuit after **EXECUTE** is depressed, the display is updated as the change occurs. Refer to Table BW for a definition of the octal encode.

17. When another initiating circuit equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific initiating circuit equipment location:

    CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

18. **EXECUTE** must be depressed to display the connection information for the entered initiating circuit.

Test 3

Test 3 is a dynamic test that continually updates the progress mark of the initiating DTDM circuit.

Test 3 is **only** available for Release 2, Version 3 **tape issue 1.2** or later.

Test 3 is similar to Test 1 except that the connection information is displayed every time the progress mark changes, instead of only when depressing **EXECUTE**.

NOTE

A facility or conference port equipment location (Fields 11 through 15) **cannot** be transferred to the initiating DTDM circuit equipment location.

1. Test 3 is selected by use of **NEXT TEST**.
2. When Test 3 is initially called in, a default DTDM equipment location may be displayed in Fields 2 through 6.

   Field 2 (module) is blinking, indicating an optional entry field.
3. The default DTDM equipment location can be the last DTDM equipment location displayed in Test 1 or Test 3 of **PROC 962**.

   To display the default DTDM equipment location, proceed to Step 5.
4. A specific DTDM equipment location can be selected for display by entering the following:

   (Module number); ENTER; (Cabinet number); ENTER; **(Carrier number); ENTER; (Slot number); ENTER**; **(Circuit number); ENTER**.
5. To start Test 3, depress **EXECUTE**.
6. The initiating DTDM circuit and its status and the facility or conference port data linked to the initiating circuit is provided when **EXECUTE** is depressed. A TMS time slot number may be displayed in the facility or conference port equipment location (Fields 13 and 14) if a multi-module call has been made.
7. The following information is displayed for the initiating DTDM circuit and the facility or conference port linked to the initiating DTDM circuit:

   Field 1 - 3.

   Fields 2 through 6 - Initiating DTDM circuit equipment location.

   Field 7 - Initiating circuit type.

   Field 8 - Initiating circuit status.

   Field 9 - Progress mark (octal). Refer to Table BW for a definition of the octal encode.

   Field 10 - Internal number type (1 - indicating internal number when Field 17 = 5) or dashed.

   Fields 11 through 15 - Facility or conference port equipment location or dashed.

   Field 16 - How the facility or conference port is linked.

Field 17 - Facility or conference port circuit type or dashed.

Field 18 - Conference port number or dashed.

8. The following information is displayed when a multi-module call has been made:

   Field 1 - 3.

   Fields 2 through 6 - Initiating DTDM circuit equipment location.

   Field 7 - Initiating circuit type.

   Field 8 - Initiating circuit status.

   Field 9 - Progress mark (octal). Refer to Table BW for a definition of the octal encode.

   Fields 10 through 12 - Dashed.

   Fields 13 and 14 - TMS time slot number.

   NOTE

   Fields 13 and 14 are read as one field to obtain the TMS time slot number.

   Fields 15 through 18 - Dashed.

9. When a change occurs in the progress mark (Field 9) of the initiating DTDM circuit after **EXECUTE** is depressed, the display is updated as the change occurs. Refer to Table BW for a definition of the octal encode.

10. When another initiating DTDM circuit equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific initiating DTDM circuit equipment location:

    CHANGE FIELD; 2; ENTER; (Module number); ENTER; **(Cabinet number); ENTER; (Carrier number); ENTER**; **(Slot number); ENTER; (Circuit number); ENTER**.

11. **EXECUTE** must be depressed to display the connection information for the entered initiating DTDM circuit.

Table 5-77.

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS **DISPLAYED IN FIELD 9 OF PROC-962**			
OCTAL	NAME	OCTAL	NAME
00	**TRUNK_IDLE**	**104**	**WAIT_TO_SETTLE_11**
01	**FIRST_DIGIT_DIAL**	**106**	**WAIT_TO_SETTLE_1**
02	**MULT_DIGIT_MATCH**	**110**	**TIME_STTR_DTONE**
03	**SEQ_WAIT_5**	**112**	**WAIT_TO_SETTLE_5**
04	**TIME_ICPT**	**114**	**TIME_FOR_CNCT**
05	**WAIT_TO_SETTLE_2**	**116**	**T_LIMBO**
06	**FIRST_DIGIT_MATCH**	**120**	**RING_STA_TRUNK**
07	**SOFT_HOLD**	**122**	**SEQ_WAIT_22**
10	**INCOMING_CALL**	**124**	**SEQ_WAIT_23**
11	**MORE_DIGITS_DIAL**	**126**	**SEQ_WAIT_16**
12	**INSEIZE MATCH**	**130**	**TRK_WAIT_NET_1**
13	**DIAL_ICOM**	**132**	**TRK_WAIT_NET_2**
14	**DIAL_CO_ONE**	**134**	**NULL_TESTING**
15	**SEQ_WAIT_15**	**136**	**REJECT_TIMING**
16	**SEQ_WAIT_2**	**140**	**SEQ_WAIT_20**
17	**SEQ_WAIT_6**	**142**	**SEQ_WAIT_21**
40	**SEQ_WAIT_7**	**144**	**DID_DIAL**
42	**FLASH_TIME_3**	**146**	**DID_MATCH_STATE**
44	**DIAL_CO**	**150**	**DID_TONE**
46	**CO_WAIT_TSLOT**	**152**	**DID_WAIT_TSLOT**
50	**ICOM_RING**	**154**	**DID_WAIT_OR**
52	**SEQ_WAIT_3**	**156**	**3WAY_TALK_SST**
54	**TONE_STA_SOFT_HOLD**	**160**	**SEQ_WAIT_11**
56	**TONE_TRK_SOFT_HOLD**	**162**	**SEQ_WAIT_12**
60	**SEQ_WAIT_4**	**164**	**FLASH_TIME_6**
62	**FLASH_TIME_1**	**166**	**3WAY_TALK_SST**
64	**FLASH_TIME_2**	**170**	**SEQ_WAIT_13**
66	**TALK_ICOM**	**172**	**SEQ_WAIT_14**
70	**SEQ_WAIT_1**	**174**	**FLASH_TIME-8**
72	**TALK_STA_TRUNK**	**176**	**3WAY_TALK_SSS**
74	**FLASH_TIME_5**	**200**	**FLASH_TIME_7**
76	**SEQ_WAIT_17**	**202**	**XFER_TRUNK_STA**
100	**FLASH_TIME_9**	**204**	**WAIT_TO_SETTLE_9**
102	**SEQ_WAIT_18**	**206**	**WAIT_TO_SETTLE_7**

Table 5-77. (Contd)

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS DISPLAYED IN FIELD 9 OF PROC-962			
OCTAL	NAME	OCTAL	NAME
210	FLASH_TIME_4	314	TIE_WAIT_4
212	SEQ_WAIT_10	316	FIRST_DIGIT_TIE
214	WAIT_TO_SETTLE_10	320	FIRST_MATCH_TIE
216	SEQ_WAIT_8	322	MULTI_DIGIT_TIE
220	SEQ_WAIT_9	324	MULT_MATCH_TIE
222	DIAL_HOLD	326	TIME_TIE_SEIZE
224	HARD_HOLD	330	TIE_DIAL_ICOM
226	SEQ_WAIT_HOLD	332	TIE_WAIT_8
230	RING_STA_HELD_TK	334	TIE_WAIT_9
232	SEQ_WAIT_RING_TK	336	TIE_WAIT_10
234	TAAS_PM	340	TIE_DISC_1
236	TAAS_WAIT_1	342	TIE_DISC_2
240	G_CAMP_SEQ1	344	DIAL_TIE_TRK
242	G_CAMP_D_TONE3	346	TIE_WAIT_11
244	G_CAMP_D_QT3	350	TONE_FOR_TIE
246	G_CAMP_D_TONE2	352	TRK_WAIT_NET_5
250	G_CAMP_D_QT3	354	CFWD_COLLECT_DIGITS
252	G_CAMP_D_TONE	356	CFWD_ALL_RING
254	G_CAMP_D_TALK	360	CFWD_ATND_ST1
256	FIRST_DIGIT_0_CWAIT	362	CFWD_ATND_ST2
260	ORG_CWAIT	364	CFWD_CFIRM_TN_LINE
262	RSTR_CO_CK	366	SEQ_WAIT_DIC
264	RSTR_CO_ONE	370	TELDIC_DIAL_RCT
266	TIE_RSTR_CO_ONE	372	TELDIC_TALK_TT
270	TIE_RSTR_CO_CK	374	SDL_PAGE_DIAL_WAIT
272	TIE_WAIT_2	376	CFM_WAIT_DLPG
274	DR_WAIT_TSLOT	400	SDL_PAGING
276	TIE_WAIT_3	402	AZ_PAGE
300	DR_WAIT_OR	404	ANI_WAIT_1
302	TIME_DELAY_DIAL	406	ANIO_PM_CO
304	TIE_WAIT_5	410	ANIO_PM_CS
306	TIE_WAIT_6	412	TALK_TRUNK_TRUNK
310	TRK_WAIT_NET_4	414	TAND_WAIT_4
312	TIE_WAIT_1	416	TAND_WAIT_5

Table 5-77. (Contd)

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS DISPLAYED IN FIELD 9 OF PROC-962			
OCTAL	NAME	OCTAL	NAME
420	TAND_WAIT_6	524	SP_OGT_MATCH
422	CF_TALK	526	SPAD_DIAL
424	FIRST_DIGIT_EXEC	530	SPAD_FIRST_DIAL
426	EXEC_OVRIDE	532	SPAD_FIRST_MATCH
430	DIAL_EXEC	534	SPAD_STA_DIAL
432	EXEC_OVR_ALERT	536	SPAD_MULT_DIAL
434	SEQ_WAIT_ALERT	540	SPAD_MULT_MATCH
436	WAIT_CFIRM	542	SPAD_LAST_DIAL
440	CFWD_ICOM_RING	544	SPAD_TRK_DIAL
442	CFWD_RING_STA_TRK	546	SP_CFIRM
444	CFWD_RING_TIMING	550	SP_WAIT
446	CF_WAIT_1	552	SM_MATCH_8
450	FIRST_DIGIT_CB	554	SM_MATCH_10
452	AUTO_CB_CALLING	556	CTS_DICOM_DIG1
454	MORE_DIGITS_CB	560	CTS_DICOM_DIG2
456	CB_CONFIRM_TONE	562	DSS_BTN_WAIT
460	CB_AWAIT_CTL_DISC	564	DSS_WAIT
462	AUTO_CB_ENABLE_1	566	DSS_CHG_FIRST_DIG
464	AUTO_CB_ENABLE_2	570	DSS_CHG_FIRST_MTCH
466	RING_CB_WAIT_1	572	DSS_CHG_MULTI_DIAL
470	RING_CB_CLG_STA	574	ENT_OGT_1
472	RING_CB_WAIT_2	576	ENT_OGT_2
474	CI_DIAL	600	IN_OGTO
476	CIAD_FIRST_DIAL	602	OGT_ALRT_1
500	CIAD_FIRST_MATCH	604	TIME_RTRY
502	CIAD_MULT_DIAL	606	OGT_WAIT_1
504	CIAD_DIAL	610	OGT_MATCH
506	CI_CFIRM	612	RA_WAIT_TSLOT
510	CI_WAIT	614	RA_WAIT_1
512	SP_DIAL	616	RA_WAIT_2
514	SP_FIRST_MATCH	620	RA_WAIT_OR
516	SP_MULT_DIAL	622	RA_WAIT_3
520	SEQ_WAIT_SC	624	RA_DIAL_COMB
522	CCSA_SP_DIAL	626	REM_ACC_CALL

Table 5-77. (Contd)

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS DISPLAYED IN FIELD 9 OF PROC-962			
OCTAL	NAME	OCTAL	NAME
630	RA_WAIT_4	734	SM_MATCH_7
632	RA_WAIT_IDLE	736	TRK_WAIT_NET_11
634	ATTN_DIAL_AUTH	740	TRK_WAIT_NET_12
636	TIE_WAIT_7	742	TRK_WAIT_NET_13
640	TIE_TONE	744	TRK_WAIT_NET_14
642	DIAL_CCSA	746	TRK_WAIT_NET_15
644	TAND_WAIT_1	750	SM_DIAL_2
646	TAND_WAIT_2	752	SM_MATCH_2
650	TIE_DIAL_CCSA	754	SM_DIAL_3
652	TIE_DIAL_CO	756	SM_MATCH_3
654	TAND_WAIT_3	760	SM_DIAL_9
656	TIE_DIAL_CO_ONE	762	SM_MATCH_9
660	TAND_WAIT_7	764	TALK_STA_TRUNK_RCL
662	TAND_WAIT_8	766	3WAY_TALK_SST_RCL
664	TIE_DIAL_TIE	770	3WAY_TALK_SST_RCL
666	TAND_WAIT_9	772	TALK_TRUNK_TRUNK_RCL
670	TAND_DISC_1	774	TMRCL_TONE
672	TAND_DISC_2	776	TMRCL_WAIT
674	TAND_DISC_3	1000	DID_RC
676	TAND_DISC_4	1002	RC_PLAY
700	TRK_WAIT_NET_3	1004	SEQ_WAIT_RC
702	TRK_WAIT_NET_6	1006	SM_MATCH_11
704	TRK_WAIT_NET_7	1010	SM_MATCH_ARS
706	TRK_WAIT_NET_8	1012	ARS_DIAL
710	SM_ORDER_1	1014	ARS_OGT_MATCH
712	SM_ORDER_2	1016	ARS_WAIT_1
714	SM_DIAL_1	1020	ARS_DIAL_CO
716	SM_MATCH_1	1022	ARS_TIME_CNCT
720	SM_MATCH_4	1024	ARS_WARNING_TONE
722	SM_DIAL_5	1026	ARS_TIE_DIAL
724	SM_MATCH_5	1030	ARS_TIE_DIAL_CO
726	SM_DIAL_6	1032	SM_MATCH_TIE_ARS
730	SM_MATCH_6	1034	TTRS_INIT
732	SM_DIAL_7	1036	TTST_STATE_1

Table 5-77. (Contd)

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS DISPLAYED IN FIELD 9 OF PROC-962			
OCTAL	NAME	OCTAL	NAME
1040	TTST_STATE_2	1144	ATT_TRK_WAIT
1042	DT_TEST_STATE	1146	P_HOLD_THRU_D
1044	MISC_TEST_STATE	1150	ATT_HOLD_OR1
1046	IN_QUE	1152	ATT_HOLD_OR2
1050	AT_ORIG	1154	ATT_HOLD_OR3
1052	ALERT_G	1156	P_HOLD_G_D_RNG
1054	ALERT_GD	1160	P_HOLD_G_D
1056	TALK_G_ONLY	1162	RECALL_GD
1060	G_PTY_DIAL_D1_REM	1164	F_TIME_GD_G_PTY
1062	A_ORIG_DIAL_D1_REM	1166	F_TIME_GD_D_PTY
1064	MATCH_G_ONLY	1170	F_TM_P_HOLD_GD_RNG
1066	MATCH_ORIG	1172	TRK_WAIT_NET_9
1070	TALK_G_D	1174	TRK_WAIT_NET_10
1072	TALK_D_ONLY	1176	G_CAMP_A_TONE
1074	RING_D_ONLY	1200	G_CAMP_A_TALK
1076	RING_G_D	1202	G_CAMP_D_UTONE_A_HLD
1100	TALK_D_TONE	1204	G_CAMP_A_HOLD
1102	TALK_G_D_TONE	1206	G_FLSH_A_HOLD
1104	P_HOLD_G_ONLY	1210	WAIT_FOR_BEEP
1106	F_TIME_G_ONLY	1212	G_CAMP_D_UTONE1_A_HD
1110	T_HOLD_G_D_RNG	1214	G_CAMP_D_UTONE2_A_HD
1112	F_TIME_G_D_RNG	1216	TALK_G_D_PRTY
1114	WAIT_ANS_1	1220	LISTEN_CONF_TONE
1116	CODE_MATCH_G_PTY	1222	TRK_CODE_ACT_TGA
1120	CODE_MATCH_A_ORIG	1224	TRK_CODE_CNL_TGA
1122	WAIT_SEIZE_2	1226	BV_START
1124	WAIT_SEIZE_3	1230	BV_DIAL
1126	DIAL_TRK_G_PRY	1232	BV_INIT_TONE
1130	DIAL_TRK_A_ORIG	1234	BV_TALK_NO_TONE
1132	DIAL_CODE_G_PPY	1236	BV_TALK_W_TONE
1134	DIAL_CODE_A_ORIG	1240	BV_ICOM
1136	ATTD_WAIT	1242	BV_ST_TR
1140	ATTD_DR_WAIT	1244	G_PTY_DIAL_TIE_D1
1142	ATT_CP_WAIT	1246	G_PTY_DIAL_TIE

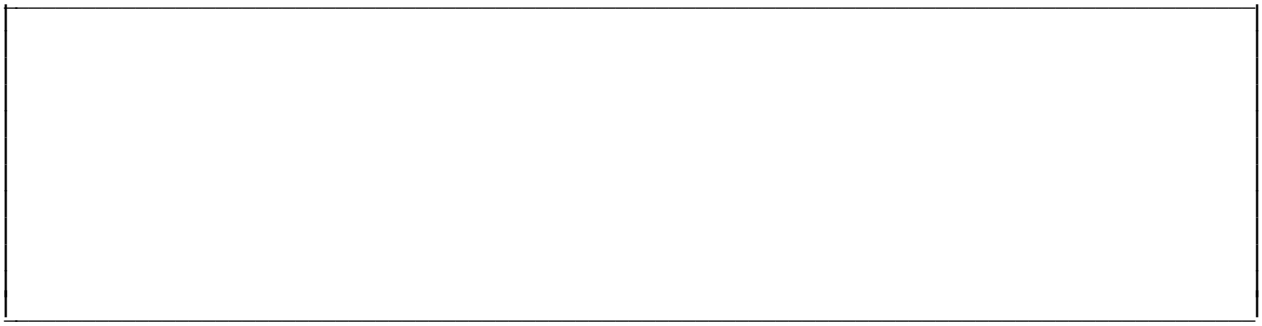
Table 5-77. (Contd)

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS DISPLAYED IN FIELD 9 OF PROC-962			
OCTAL	NAME	OCTAL	NAME
1250	A_ORIG_DIAL_TIE	1354	G_PPY_CCSA_D1
1252	WAIT_AUTO_TIE_1	1356	MERGE_CCSA
1254	WAIT_DIAL_TIE_1	1360	P_HOLD_DIAL_CCSA
1256	G_WAIT_DIAL_TIE_1	1362	HOLD_CCSA_1
1260	G_WAIT_AUTO_TIE_1	1364	HOLD_CCSA_2
1262	MERGE_TIE_ATT	1366	IPC_ALERT_G
1264	MONITOR_TIE_ANS	1370	IPC_ALERT_GD
1266	HOLD_DIAL_TIE_ATT	1372	IPC_ATT_DIAL
1270	HOLD_TIE_THRU	1374	IPC_ATT_DIAL_G
1272	HOLD_MERGE_TIE_ATT	1376	IPC_PHOLD_G_GA
1274	CTR_LN_1	1400	IPC_PHOLD_G_SA
1276	CTR_LN_2	1402	IPC_PHOLD_GA
1300	CTR_GP_1	1404	IPC_PHOLD_SA
1302	CTR_GP_2	1406	IPC_PHOLD_GD_GA
1304	CTR_GP_TIME	1410	IPC_PHOLD_GD_SA
1306	SDL_PAGE_FLASH	1420	IPC_RING_A
1310	ADL_PAGE_DIAL_WAIT	1422	IPC_RING_AG
1312	ADL_PAGE_DC	1424	IPC_STA_DIAL
1314	ADL_PAGING	1426	IPC_TALK_G_GA
1316	AB_DIAL_WAIT	1430	IPC_TALK_G_SA
1320	CFM_WAIT_AB	1432	IPC_TALK_GD_DA
1322	HOLD_AB_RING	1434	IPC_TALK_GD_GA
1324	AB_RING_D_ONLY	1436	PRIORITY CALL
1326	SM_DIAL_4	1440	ALERT_CF
1330	TRK_WAIT_NET_16	1442	TALK_CF
1332	TRK_WAIT_NET_17	1444	DIAL_CF
1334	NT_STN_ST1	1446	TALK_CF_TONE
1336	NT_STA_ST2	1450	MATCH_CF
1340	CO_NITE_ST	1452	DIAL_CODE_CF
1342	TT_DIAL	1454	CODE_MATCH_CF
1344	TT_GOON	1456	WAIT_SEIZE_CF
1346	TT_ST_TR	1460	RING_CF
1350	TT_TR_TR	1462	RING_CF_TALK
1352	DIAL_CCSA_D1	1464	P_HOLD_RING_CF

Table 5-77. (Contd)

PROGRESS MARK OCTAL ENCODES AND DEFINITIONS DISPLAYED IN FIELD 9 OF PROC-962			
OCTAL	**NAME**	**OCTAL**	**NAME**
1466	**TALK_D_CF**	**1506**	**CF_DIAL_TIE**
1470	**P_HOLD_D_CF**	**1510**	**SM_MATCH_12**
1472	**P_HOLD_CF**	**1512**	**SM_MATCH_13**
1474	**TALK_GD_CF_TONE**	**1514**	**CF_DIAL_SMDR**
1476	**DIAL_TRK_CF**	**1516**	**TALK_CF_RETON**
1500	**CF_WAIT_AUTO_TIE_1**	**1520**	**ALERT_TMRCL**
1502	**DIAL_CCSA_CF**	**1522**	**TALK_TMRCL**
1504	**CF_WAIT_DIAL_TIE_1**	**1524**	**HOLD_TMRCL**

PROC 999 - MEMORY WORD DISPLAY



Purpose

PROC 999 is used to access and display the word contents of memory via the software tables.

PROC 999 is a display only maintenance procedure and is provided as an aid in displaying the data contents of a memory address.

Field Definitions and Codes

1. Field 1 is used to enter a memory address (in octal) in order to display the data contents of the memory address.

   Maximum addressable memory location (based on current switch memory configuration) for Field 1 (address) is 37777777 octal which equals 7FFFFF hexadecimal (or 16 megawords).

2. Field 2 (data) can display 0 through 177777 in octal (which equals 0 through FFFF hexadecimal).

Operation of Procedure

PROC 999 is used to determine the data contents of a memory address.

To determine the data contents of a memory address, perform the following:

1. Depress **PROC NO; 999; ENTER**.
2. Depress **DISPLAY**.

   The address fields on the **MAAP** are blanked.

3. Enter the address (in octal) of the word contents to be displayed.

4. Depress **ENTER**.

   The address and word contents are displayed in the address and data fields (Fields 1 and 2).

   NOTE

   The word has bad parity if 999999 is displayed in the data field (Field 2).

5. Once a software table is accessed, the next word in sequence can be displayed by depressing **NEXT DATA**.

   The address is automatically incremented by one, and the data contents of the new address are displayed.

To display the data contents of all memory addresses beginning with memory address **00000001**, perform the following:

1. Depress **PROC NO; 999; ENTER**.
2. Depress **NEXT DATA**.

   The address and word contents are displayed in the address and data fields (Fields 1 and 2).

   NOTE

   The word has bad parity if 999999 is displayed in the data field (Field 2).

3. Depressing **NEXT DATA** repeatedly steps through all memory addresses and displays the data contents of each memory address.

SWITCH COMPONENT REPLACEMENT

GENERAL

This section provides a brief description of the switch cabinets and carriers and contains instructions for replacement of switch components.

Replacement of switch components and other maintenance tasks referenced from maintenance procedures consist of the following:

1. Circuit pack replacements for:
    a. Unduplicated common control carrier circuit packs.
    b. Duplicated common control carrier circuit packs.
    c. TMS or module control carrier circuit packs.
    d. Port carrier circuit packs.
    e. Unduplicated common control DC/DC converter unit and duplicated common control power carrier circuit packs.
    f. Remote carrier group housing unit.
2. Circuit pack switch option settings.
3. High Capacity Mini-recorder (HCMR) circuit pack replacement.
4. Cleaning HCMR tape head and capstan.
5. HCMR replacement.
6. 309A or 310A power supply replacement.
7. Bulk on-line switcher (OLS) power supply replacement.
8. 3965-2 battery charger replacement.
9. Frequency generator replacement.
10. DC fan and fan assembly replacement.
11. TMS/RMI cabinet AC distribution unit replacement.
12. Module control or port cabinet AC distribution unit replacement.
13. DC filter replacement.
14. Console component replacement.
15. Alarm panel replacement.
16. AEH4 alarm board replacement.

EQUIPMENT CONFIGURATION

Overview

The switch consists of various arrangements of the four basic cabinets. One or more auxiliary cabinets may be provided for mounting peripheral equipment. The Station Message Detail Recorder (SMDR) cabinet, when provided and connected to the switch, is also part of the switch.

A typical System 85 equipment configuration (refer to Figure 24) consists of a common control cabinet, one or more module control cabinets, a TMS/RMI cabinet, and one or more port cabinets.

Figure 25 illustrates a typical module/cabinet/carrier numbering scheme for an expanded duplicated multimodule system.

Common Control Cabinet

The common control cabinet can be either an unduplicated common control cabinet or a duplicated common control cabinet.

Unduplicated Common Control Cabinet

An unduplicated common control cabinet contains the common control carrier and up to three port carriers and/or DS-1/MFAT carriers. The common control carrier and a High Capacity Mini-recorder (HCMR) make up the control complex.

An unduplicated common control cabinet (refer to Figure 26) contains the following equipment:

1. An unduplicated alarm panel and thermal assembly (sensor).
2. Up to three port carriers and/or DS-1/MFAT carriers.
3. One common control carrier.
4. A fan assembly and alarm board.
5. One battery reserve unit.

NOTE

When equipped with extended power reserve, the battery reserve unit is not included.

6. A frequency generator.
7. One HCMR.
8. One DC/DC converter unit.
9. A DC filter.

TPA-719549

Figure 6-24. Typical System 85 Equipment Configuration

TPA-747493

Figure 6-25. Module/Cabinet/Carrier Identification for a Typical Duplicated Multimodule System 85

TPA-719559

Figure 6-26. Unduplicated Common Control Cabinet

Duplicated Common Control Cabinet

A duplicated common control cabinet (refer to Figure 27) contains the following equipment:

1. A duplicated alarm panel and thermal assembly (sensor).
2. Two common control carriers.
3. One power carrier.
4. A fan assembly and alarm board.
5. Two HCMRs.
6. Two 334A power units.
7. One battery reserve unit.
8. An AC distribution unit.

NOTE

When equipped with an extended power reserve, the power units and battery reserve unit are not included, and a DC filter replaces the AC distribution unit.

TMS/RMI Cabinet

The TMS/RMI cabinet is used only in multimodule switches and may contain up to four TMS carriers or 4 RMI carriers.

In the unduplicated TMS configuration, there is one basic carrier and up to three growth carriers.

In a duplicated TMS configuration, there may be two basic carriers, a no-carrier adapter, and a RMI carrier.

In the maximum duplicated TMS configuration, two TMS cabinets are provided, each containing one basic carrier and two or three growth carriers. Both TMS cabinets must contain the same number of growth carriers.

The TMS/RMI cabinet (refer to Figure 28) may contain the following equipment:

1. A thermal assembly (sensor).
2. Up to four TMS carriers, or 4 RMI carriers, or a combination of both.
3. A fan assembly and alarm board.
4. One or two 334A rectifiers.
5. One battery reserve unit.
6. An AC distribution unit.

NOTE

When equipped with extended power reserve, the power units and battery reserve unit are not included, and a DC filter replaces the AC distribution unit.

TPA-719536

Figure 6-27. Duplicated Common Control Cabinet

TPA-719537

Figure 6-28. Time Multiplexed Switch (TMS)/Remote Module Interface (RMI) Cabinet

Module Control Cabinet

The module control cabinet may be configured for duplicated or unduplicated module control.

A module control carrier and up to three port carriers (or one port carrier and two DS-1/MFAT carriers, or a combination of both) may be contained in an unduplicated module control cabinet configuration.

Two module control carriers and up to two port carriers (or two DS-1/MFAT carriers or a combination of both) may be contained in a duplicated module control cabinet configuration.

The module control cabinet (refer to Figure 29) contains the following equipment:

1. A thermal assembly (sensor).
2. Up to three port carriers.
3. Up to two DS-1/MFAT carriers.
4. One module control carrier for an unduplicated module control or two module control carriers for a duplicated module control.
5. A fan assembly and alarm board.
6. A frequency generator.
7. One battery reserve unit.
8. A -48 volt rectifier.
9. An AC distribution unit.

NOTE

When equipped with extended power reserve, the battery reserve unit and rectifier are not included, and a DC filter replaces the AC distribution unit.

Port Cabinet

The port cabinet (refer to Figure 30) is equipped with up to four port carriers.

The port cabinet contains:

1. A thermal assembly (sensor).
2. From one to four port carriers.
3. Up to four DS-1/MFAT carriers.
4. A fan assembly and alarm board.
5. A frequency generator.
6. One battery reserve unit.

7. A -48 volt rectifier and AC distribution unit, or a DC filter.

NOTE

When equipped with extended power reserve, the battery reserve unit and rectifier are not included, and a DC filter replaces the AC distribution unit.

The first port cabinet in a duplicated common control switch receives power from the module control cabinet.

TPA-697179

Figure 6-29. Module Control Cabinet

TPA-697192

Figure 6-30. Port Cabinet

Common Control Carrier

The common control carrier provides primary control, memory, and input/output channels for processing, supervising, and coordinating system operations.

Backplane wiring provides connections between circuit packs in the common control carrier. Circuit breakers are provided on the right side of the common control carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers or components associated with each circuit breaker.

Figure 31 identifies the circuit pack type and code for each slot location in the common control carrier.

Unduplicated Common Control DC/DC Converter Unit

The DC/DC converter unit provides operating +5 volts to the unduplicated common control carrier circuit packs.

Circuit breakers are provided on the left side of the unduplicated common control DC/DC converter unit. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 32 identifies the circuit pack type and code for each slot location in the unduplicated common control DC/DC converter unit.

Duplicated Common Control Power Carrier

The common control power carrier provides operating +5 volts to the duplicated common control carrier circuit packs.

Circuit breakers are provided on the right side of a duplicated common control power carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 33 identifies the circuit pack type and code for each slot location in the duplicated common control power carrier.

TMS Carrier

The TMS carrier provides the time multiplexed space division switch that interconnects the modules in a multimodule switch.

Backplane wiring provides connections between circuit packs in the TMS carrier. Circuit breakers are provided on the right side of the TMS carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 34 identifies the circuit pack type and code for each slot location in the TMS carrier.

TPA-757972

Figure 6-31. Common Control Carrier

Module Control Carrier

The module control carrier provides the digital switch and the associated circuits that detect and process requests for service.

Backplane wiring provides connections between circuit packs in the module control carrier. Circuit breakers are provided on the right side of the module control carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 35 identifies the circuit pack type and code for each slot location in the module control carrier.

TPA-757973

Figure 6-32. Unduplicated Common Control DC/DC Converter Unit

Port Carrier

The port carrier connects the switch to peripheral equipment (analog/digital, voice/data, and lines/trunks). The port carrier provides dedicated port circuits determined by the equipment connected.

Backplane wiring provides connections between circuit packs in the port carrier. A fuse panel is provided on the right side of the port carrier. Numbers are stamped adjacent to the fuses to identify the slot numbers associated with each fuse.

Figure 36 identifies the circuit pack type and code for each slot location in the port carrier.

TPA-757974

Figure 6-33. Duplicated Common Control Power Carrier

TPA-757975

Figure 6-34. TMS Carrier

TPA-757976

Figure 6-35. Module Control Carrier

TPA-757977

Figure 6-36. Port Carrier

DS-1/MFAT Carrier

The DS-1/MFAT carrier is a modified port carrier. The DS-1/MFAT carrier provides high-density dedicated interface circuits for DS-1 trunks and/or low-cost hybrid voice terminals. The DS-1/MFAT carrier also provides the same dedicated port circuits as the port carrier.

Backplane wiring provides connections between circuit packs in the DS-1/MFAT carrier. A fuse panel is provided on the right side of the DS-1/MFAT carrier. Numbers are stamped adjacent to the fuses to identify the slot numbers associated with each fuse.

Figure 37 identifies the circuit pack type and code for each slot location in the DS-1/MFAT carrier.

RMI Carrier

The RMI carrier houses the TN456 RMI circuit packs to support remote modules. The RMI carrier is mounted in the TMS/RMI cabinet. A maximum of two RMI carriers are possible for a switch with unduplicated module controls, and four RMI carriers for a switch with duplicated module controls.

Backplane wiring provides connections between circuit packs in the RMI carrier. A circuit breaker panel is provided on the right side of the RMI carrier. Circuit breaker **CB1** is associated with slots 00 through 10 and circuit breaker **CB2** is associated with slots 11 through 22. The **MAAP** connector on the circuit breaker panel allows the user to plug in a **MAAP** to the RMI carrier. Only one RMI carrier per TMS/RMI cabinet is equipped with the **MAAP** connector.

Figure 38 identifies the circuit pack type and code for each slot location in the RMI carrier.

Remote Carrier Group Housing Unit

The remote carrier group housing unit provides the capability to remote digital and analog lines and trunks in a remote group system configuration.

Though not a standard carrier housed in a network cabinet, this self-contained unit houses up to two remoted port groups.

Each port group consists of one controller circuit pack (ANN16) and up to three port interface circuit packs (analog, hybrid, digital, or EIA).

Figure 39 identifies the circuit pack type and code for each slot location in the remote carrier group housing unit.

PRECAUTIONS

When performing maintenance or translation procedures on System 85 switch equipment, certain precautions must be observed by user personnel.

Cautions, warnings, and danger statements contained within the service manual **must** be observed to prevent loss of service, possible equipment damage, and possibility of personnel injury.

TPA-757978

Figure 6-37. DS-1/MFAT Carrier

TPA-757979

Figure 6-38. Remote Module Interface (RMI) Carrier

TPA-757980

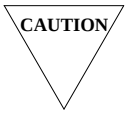
Figure 6-39. Remote Carrier Group Housing Unit

In addition, the following precautions regarding electromagnetic interference and static electricity **must** be observed.

a. **Electromagnetic Interference:** This equipment generates, uses, and can radiate radio frequency energy. Electromagnetic fields radiating from the switch may cause noise to be introduced into the customer's equipment. If the equipment is not installed and used in accordance with the instruction manual, interference to radio communications may be caused.

To maintain the Electromagnetic Interference (EMI) integrity of the System 85 switch, maintenance personnel (after performing any translation or maintenance activities) must ensure that all cabinet panels, covers, etc., are firmly secured in place prior to leaving the customer's premises.

b. **Static Electricity:** To prevent or reduce electrostatic discharge, maintenance personnel **must** always attach wrist grounding straps before working on switch components or handling circuit packs.



Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICs).

CIRCUIT PACK REPLACEMENTS

Overview

When replacing circuit packs in the switch, it is necessary to maintain switch integrity and identify the correct circuit pack, vintage, and series to be replaced. Switch integrity is maintained by taking the appropriate steps when replacing circuit packs in the switch carriers. Circuit packs to be replaced in the digital network can be identified by using **PROC 290, Word 2**.

PROC 290, Word 2 is used to search for all circuit packs installed in module control and port carriers. The prefix, number, suffix, vintage series, and vintage update of each circuit pack is displayed.

Circuit packs should be replaced with circuit packs of the same suffix or later (i.e., SN270 replaced by SN270 or SN270B).

Any circuit pack to be replaced should be unseated and reseated to ensure its connector is making good contact with the mating connector. Retest the circuit pack after reseating. If circuits are still defective, replace the circuit pack.

Precautions

To prevent or reduce electrostatic discharge, maintenance personnel should always attach wrist grounding straps before working on system components or handling circuit packs.

Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICs).

1. The EMC wrist strap and cable assembly (cc900698226) is placed in the bottom of the module control cabinet in a poly bag (cc900492372) next to the AC distribution unit.
2. The EMC wrist strap assembly is used in the following manner:
    a. Attach the wrist strap to either wrist.
    b. Connect the alligator clip to the cabinet frame.
3. A good ground connection for the alligator clip is:
    a. In equipment coded cabinets which have removable sides, attach the alligator clip to any convenient screw head that fasten the hinges to the cabinet or to the screws that fasten the door latch to the frame.
    b. In equipment coded cabinets which have intergrated sides, the alligator clip may be attached to any of the front and rear cabinet formed faces (front door area or back area when viewed in an open position) which are coated with a conductive paint.
    c. In either case, an area close to the vertical center of the cabinet should be selected for the alligator clip allowing a more central position to operate from.

To ensure that the System 85 switch recovers from circuit pack replacement in the switch carriers, certain precautions should be exercised during circuit pack replacement. These precautions consist of busying out circuits, using the **GO/HALT** switch, etc., and are covered in the parts on circuit pack replacements for each type of switch carrier.

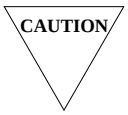
These precautions should also be taken when unseating and reseating circuit packs.

Option Settings

Prior to reseating and/or replacing circuit packs in any of the switch carriers, the option settings on appropriate circuit packs should be checked to determine if the correct option setting is being used for the application required. Refer to **Circuit Pack Switch Option Settings** in this section for circuit packs with option settings.

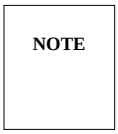
Unduplicated Common Control Carrier Circuit Pack Replacement

When replacing circuit packs in an unduplicated common control carrier, use of the **GO/HALT** switch is required. Placing the **GO/HALT** switch in the **HALT** position before removing any circuit pack in the common control carrier stops any interactions with memory when removing or replacing circuit packs.



Reseating or replacing circuit pack TN406 (DCIU processor memory) in Slot 16 of the unduplicated common control carrier without use of the GO/HALT switch causes a partial reload.

Perform the following steps when replacing circuit packs in a unduplicated common control carrier.



The following steps are performed at the alarm panel and at the common control carrier.

1. Determine if the switch is in emergency transfer.

   If the switch is in emergency transfer, set the **EMERGENCY TRANSFER** switch to **ACT** and proceed to Step 3.

2. If the switch is not in emergency transfer, set the **EMERGENCY TRANSFER** switch to **INHIB** and notify the user that no new calls can be processed.

   Proceed to Step 3.

3. Set the **GO/HALT** switch to **HALT**.

4. Remove the circuit pack being replaced.

NOTE

Prior to replacement of circuit pack TN492, ensure that the battery (comcode 844665836) is connected (or connect) to the back side of the circuit pack.

   a. Mark the date of the next battery replacement (month and year) on the **Date Label** that is attached to the battery.

NOTE

The battery replacement date is established by adding 5 years to the date of installation of the TN492 circuit pack and associated battery. Example: TN492 circuit pack replaced July 1987; date to be written on the label is July 1992.

   b. Affix the **Date Label** to the faceplate of the TN492 circuit pack.

NOTE

If the **YELLOW** LED is lighted, after the circuit pack is replaced, the battery is **not** connected or wired correctly.

5. Verify that option settings on the replacement circuit pack are correct (if applicable).

6. Replace the circuit pack.

7. Determine the status of the **EMERGENCY TRANSFER** switch.

   If the **EMERGENCY TRANSFER** switch is in the **INHIB** position, proceed to Step 8.

   If the **EMERGENCY TRANSFER** switch is in the **ACT** position, proceed to Step 10.

CAUTION

In the following step, the GO/HALT switch must be set to GO within 5 seconds after depressing RESET to avoid a major alarm indication.

8. Depress **RESET**, and set the **GO/HALT** switch to **GO** within 5 seconds.

9. Set the **EMERGENCY TRANSFER** switch to **OFF**.

NOTE

Replacement of the circuit pack is complete.

10. Set the **GO/HALT** switch to **GO**.

11. If the system appears to be functioning normally, set the **EMERGENCY TRANSFER** switch to **OFF** and proceed to Step 12.

    If the switch does not appear to be functioning normally, investigate other possible problem areas, using **PROC 600, PROC 612**, and microdiagnostic testing.

12. Notify the customer that emergency transfer service will be interrupted.

13. Depress **RESET**.

NOTE

Replacement of circuit pack is complete.

Duplicated Common Control Carrier Circuit Pack Replacement

When replacing circuit packs in both the on-line and off-line side of a duplicated common control carrier, use of the **GO/HALT** switch is required. Placing the **GO/HALT** switch in the **HALT** position before removing any circuit pack in the common control carrier stops any interactions with memory when removing or replacing circuit packs.

CAUTION

Reseating or replacing circuit pack TN406 (DCIU processor memory) in Slot 16 of the duplicated common control carrier without use of the GO/HALT switch causes a partial reload.

Perform the following steps when replacing circuit packs in a duplicated common control carrier.

NOTE

The following steps are performed at the alarm panel and at the common control carrier.

1. Determine if the circuit pack being replaced is in the on-line or off-line side of the duplicated common control.

   If the circuit pack being replaced is in the on-line side of the duplicated common control, proceed to Step 2.

   If the circuit pack being replaced is in the off-line side of the duplicated common control, proceed to Step 9.

2. Use **PROC 613**, Test 3 to soft switch the on-line common control to the off-line side.

   If the soft switch was successful, proceed to Step 9.

   If the soft switch failed, indicated by a 1 displayed in Field 2 and a failure code of 95 displayed in Field 12 of **PROC 613**, Test 3 or special error code 80 (illegal switch attempt) is displayed in the **MAAP** error code field, proceed to Step 3.

3. After the off-line common control has reloaded (as a result of a switch failure), select Test 2 of **PROC 613** and depress **EXECUTE**.

4. Determine the health of the off-line processor displayed in Fields 6 through 8.

   If the soft switch cannot be performed because the off-line common control is unhealthy, replace circuit pack(s) in the on-line side using the steps for **Unduplicated Common Control Carrier Circuit Pack Replacement** above.

5. If the off-line common control is healthy, use the **MODE** display procedure to ensure that the remote ports and the runtape agent is not active.

   Proceed to Step 6.

6. Depress **MODE**.

   Examine Fields 9 through 13 of the **MODE** display procedure to determine if encodes 0 through 4 are displayed.

7. If encode 0 is displayed, it should be the local **MAAP's** current port that you are using.

   If encode 3 or 4 is displayed, determine from Fields 6 and 7 if the agent encode displayed is 10 (runtape).

8. If any of the encodes are displayed, obtain full release of all remote ports, and the pseudo port performing a **RUNTAPE** by contacting the appropriate users.

   NOTE

   After the soft switch is completed and the necessary repair action is performed, notify the previous users that you have completed your task in order for them to perform their task(s).

   After obtaining full release of all remote ports, proceed to Step 9.

9. Set the **LOCK ON LINE** switch to the active (on-line) CC position; i.e., **CC0** or **CC1**.

10. At the off-line common control, set the **GO/HALT** switch to **HALT**.

11. At the off-line common control, remove the circuit pack being replaced.

    NOTE

    Prior to replacement of circuit pack TN492, ensure that the battery (comcode 844665836) is connected (or connect) to the back side of the circuit pack.

    a. Mark the date of the next battery replacement (month and year) on the **Date Label** that is attached to the battery.

       NOTE

       The battery replacement date is established by adding 5 years to the date of installation of the TN492 circuit pack and associated battery. Example: TN492 circuit pack replaced July 1987; date to be written on the label is July 1992.

    b. Affix the **Date Label** to the faceplate of the TN492 circuit pack.

       NOTE

       If the **YELLOW** LED is lighted, after the circuit pack is replaced, the battery is **not** connected or wired correctly.

12. Verify that option settings on the replacement circuit pack are correct (if applicable).
13. At the off-line common control, replace the circuit pack.
14. At the off-line common control, set the **GO/HALT** switch to **GO**.
15. Set the **LOCK ON LINE** switch to **OFF**.

NOTE

Replacement of circuit pack is complete.

16. Use **PROC 613**, Test 3 to soft switch the off-line common control to the on-line side (if required) for further testing to determine if replacement of the circuit pack corrected the problem.

    If further testing can be accomplished in the off-line common control, do not soft switch until the appropriate test(s) complete with a pass indication.

TMS, Module Control, or RMI Carrier Circuit Pack Replacement

Perform the following steps when replacing circuit packs in the TMS, module control, or RMI carrier.

1. Determine if the TMS or module control carrier is duplicated.

   If the TMS or module control carrier is duplicated, proceed to Step 2.

   If the TMS or module control carrier is unduplicated, proceed to Step 6.
2. Determine if the circuit pack being replaced is in the on-line or off-line side of the TMS, module control, or RMI carrier.
3. If the circuit pack being replaced is in the on-line side of the TMS, module control, or RMI carrier, proceed to Step 5.
4. If the circuit pack being replaced is in the off-line side of the TMS, module control, or RMI carrier, proceed to Step 6.
5. Use **PROC 621**, Test 2 to soft switch the on-line TMS or module control to the off-line side, and proceed to Step 6.

NOTE

If the soft switch cannot be performed, proceed to Step 6.

6. Remove the circuit pack being replaced.
7. Verify that option settings on the replacement circuit pack are correct (if applicable).

8. Replace the circuit pack.

CAUTION

The DC/DC converter handle should not be toggled when replacing circuit packs in the TMS, module control, and/or RMI carriers. If the 494GA power unit in Slot 00B of the module control carrier is reset (toggled), a loopback condition in the fiber link of a duplicated TMS will be forced. If that TMS was on-line, it will be forced off-line. Until the loopback is cleared the newly forced off-line TMS will not be available for back-up in event of another failure.

9. Replacement of circuit pack is complete.
10. If the TMS or module control carrier is duplicated, and a soft switch was performed, use **PROC 621**, Test 2 to soft switch the off-line TMS or module control to the on-line side (if required) for further testing to determine if replacement of the circuit pack corrected the problem.

    If further testing can be accomplished in the off-line TMS or module control, do not soft switch until the appropriate test(s) complete with a pass indication.

Port or DS-1/MFAT Carrier Circuit Pack Replacement

When replacing circuit packs in a port or DS-1/MFAT carrier, multiple circuits associated with the circuit pack being replaced should be busied out.

CAUTION

Busying out port circuits that are in use (indicated by a YELLOW LED on the circuit pack's edge) results in the connection(s) being dropped.

a. **Port Circuit Packs:** When a port circuit pack (i.e., line or trunk) is being replaced, all circuits on the circuit pack should be idle, if at all possible, before removal.
b. **PDI or PCI Circuit Packs:** When a Port Data Interface (PDI) or a Port Control Interface (PCI) circuit pack is replaced, all port circuits served by the PDI (left or right side of the port or DS-1/MFAT carrier) or PCI should be busied out. Busying out the circuits associated with a PDI prevents any interaction to the circuits if the PDI comes up in loop around. Busying out the circuits associated with a PCI prevents the circuits changing to unpredicatable states when removing or replacing the PCI.
c. **DS-1, RCL, or RCC Circuit Packs:** When a DS-1, Remote Carrier Local (RCL), or Remote Carrier Controller (RCC) circuit pack is replaced, all 24 ports of the DS-1, RCL, or RCC circuit pack should be busied out by depressing **BUSY OUT**

Perform the following steps when replacing circuit packs in a port or DS-1/MFAT carrier.

All circuits associated with the port circuit pack, PDI, PCI, DS-1, RCL, or RCC circuit pack being replaced should be busied out before the circuit pack is removed from the port or DS-1/MFAT carrier.

CAUTION

Busying out a circuit when the circuit is in use (lighted YELLOW LED on the circuit pack) results in the connection being dropped. Busying out a DS-1, RCL, or RCC circuit pack disrupts calls in progress on all 24 ports of the DS-1, RCL, or RCC circuit pack.

1. Using **PROC 632**, Test 3 (carrier busy), busy out the circuit(s) affected by the circuit pack being replaced.

   To busy out port circuits, display the circuit or circuit pack in **PROC 632**, Test 3 and depress **BUSY OUT**.

   Repeat the sequence until all circuits affected by the port circuit pack being replaced are busied out.

2. Remove the circuit pack being replaced.

   CAUTION

   Removal of the circuit pack, when any circuit on the circuit pack is in use (indicated by a lighted YELLOW LED on the circuit pack's edge) results in the connection(s) being dropped.

3. Verify that option settings on the replacement circuit pack are correct (if applicable).

4. Replace the circuit pack.

   After replacement, the port circuits associated with the port circuit pack, PDI, PCI, DS-1, RCL, or RCC circuit pack replaced should be released from busy.

5. Use **PROC 632**, Test 3 to release from busy the circuits busied out in Step 1.

   To release busy out port circuits, display the circuit or circuit pack in **PROC 632**, Test 3 and depress **RLS BUSY OUT**.

   Repeat the sequence until all circuits busied out in Step 1 are released from busy.

Unduplicated Common Control DC/DC Converter Unit or Duplicated Common Control Power Carrier Circuit Pack Replacement

Perform the following steps when replacing circuit packs in the unduplicated common control DC/DC converter unit or duplicated common control power carrier.

1. Set the circuit breaker associated with the circuit pack to be replaced to **OFF**.

2. Remove the circuit pack by releasing the lever and pulling outward.

NOTE

Do not pull out the circuit pack by using the lever.

3. Install the replacement circuit pack by sliding inward and then pushing the lever forward.
4. Set the circuit breaker associated with the circuit pack replaced to **ON**.

Remote Carrier Group Circuit Pack Replacement

Perform the following steps when replacing circuit packs in the remote carrier group.

NOTE

There is no **MAAP** at the remote carrier group location.

1. Remove the remote group housing front cover.
2. Except for circuit pack CAL1 which is mounted vertically, circuit packs in the remote carrier group are mounted horizontally.

NOTE

Circuit packs in slots 00 through 05 mount component side up; circuit packs in slots 06 through 08 mount component side down.

a. Port circuit packs are removed the same as the port circuit packs in the network cabinets.

NOTE

If circuit pack CAL1 is being replaced, power down the remote carrier group housing unit. Circuit pack CAL1 should only be replaced in periods of low traffic if at all possible.

b. Perform the following steps to remove circuit pack CAL1:

Remove the housing cover (one piece, front and side) by turning the remote group housing so that the bottom is accessible.

Remove the front and middle pair of screws. The two rear screws should be loosened only.

Slide the cover off toward the front.

Disconnect the cable that connects to the CAL1 circuit pack.

3. Remove the circuit pack being replaced.

CAUTION

Removal of the circuit pack, when any circuit on the circuit pack is in use (indicated by a lighted **YELLOW** LED on the circuit pack's edge) results in the connection(s) being dropped.

NOTE

The **YELLOW** LED on the general purpose port (SN270 or SN271) circuit pack in the remote carrier group is not used.

4. Verify that option settings on the replacement circuit pack are correct (if applicable).
5. Replace the circuit pack.

CAUTION

When replacing circuit pack CAL1, ensure that after the cable is reconnected to the circuit pack that the cable is placed in the cable trough so it will not interfere with the operation of the fan.

6. Replace the housing cover (if removed) and/or the remote group housing front cover.

CIRCUIT PACK SWITCH OPTION SETTINGS

Overview

Prior to reseating and/or replacing circuit packs in any of the switch carriers, the option settings on appropriate circuit packs should be checked to determine if the correct option setting is being used for the application required.

Option settings by means of rocker-type switches use the following convention:

D - Down (switch contacts are closed).

U - Up (switch contacts are open).

X - Don’t care (switch contacts are not used and may be set in either position).

NOTE

Switches are set down (closed) when the rocker end adjacent to the number is depressed and up (open) when the rocker end away from the number is depressed.

The following paragraphs list the circuit packs that have option settings in the switch carriers.

Common Control Carrier Circuit Pack Option Settings

The following circuit packs in the common control carrier have circuit pack option settings. Use the referenced figure to determine if the option setting is correct for the application being used.

TN513 (Slot 15 in common control carrier), Figure 40.

TN403 (Slots 23 through 26 in common control carrier), Figure 41.

TPA-757981

Figure 6-40. TN513 DCIU Test Support Option Settings

TPA-757982

Figure 6-41. TN403 Dual Speed Data Channel Option Settings

Module Control or RMI Carrier Circuit Pack Option Settings

The following circuit pack in the module control or RMI carrier has option settings. Use the referenced figure to determine if the option setting is correct for the application being used. Carrier position 25 in the module control carrier and carrier positions 00 through 08 and 13 through 21 in the RMI carrier house the TN456 circuit pack.

TN456 (Slot 15 in common control carrier), Figure 42.

Port Carrier, DS-1/MFAT Carrier, or Remote Carrier Group Circuit Pack Option Settings

The following circuit packs in the port carrier, DS-1/MFAT carrier, or remote carrier group have circuit pack option settings. Use the referenced figure to determine if the option setting is correct for the application being used. Carrier positions 00 through 03, 05 through 08, 13 through 16, and 18 through 21 in the port or DS-1/MFAT carriers are universal port positions which can accept any port circuit pack.

ANN11B or ANN11C (DS-1/MFAT Carrier Only), Figure 43.

ANN15, Figure 44.

ANN16 (Remote Carrier Group), Figure 45.

CAL1 (Remote Carrier Group), Figure 46.

SN221, Figure 47.

SN224B, Figure 48.

SN228 and SN228B, Figure 49.

SN230 and SN230B, Figure 50.

SN231 (Vintage 4 Circuit Packs and Earlier), Figure 51.

SN231 (Vintage 5 Circuit Packs and Later), Figure 52.

SN232B, Figure 53.

SN233C, Figure 54.

SN238, Figure 55.

SN243B, Figure 56.

SN253B, Figure 57.

SN270, Figure 58.

TPA-757983

Figure 6-42. TN456 Remote Module Interface Option Settings

TPA-757984

Figure 6-43. ANN11B and ANN11C DS-1 Interface Option Settings

TPA-757985

Figure 6-44. ANN15 Remote Carrier Local (RCL) Option Settings

TPA-757986

Figure 6-45. ANN16 Remote Carrier Controller (RCL) Option Settings

TPA-757987

Figure 6-46. CAL1 Frequency Generator/Alarm Option Settings

TPA-757988

Figure 6-47. SN221 Off Premises Station (OPS) Option Settings

TPA-757988

Figure 6-48. SN224B MFET Line Port Option Settings and Fuses

TPA-757989

Figure 6-49. SN228 and SN228B Off Premises Station (OPS) Option Settings

SMDR COMPONENT REPLACEMENT

GENERAL

This section provides a brief description of the Station Message Detail Recorder (SMDR) and contains instructions for replacement of SMDR components.

Replacement of SMDR components, as determined by performing maintenance procedures, consist of the following:

1. SMDR carrier circuit pack replacements.
2. SMDR formatter circuit pack replacements.
3. SMDR tape drive circuit pack replacements and adjustments.
4. SMDR power supply replacement.
5. SMDR formatter replacement.
6. SMDR tape drive replacement.
7. SMDR clock/calendar display unit replacement.

SMDR CABINET

The SMDR cabinet (refer to Figure 76) contains the following:

1. A Kennedy 9800 tape drive.

   Drives a 9-track magnetic tape.

2. A 9-track magnetic tape.

   Stores information for approximately 330,000 calls (a readable form of the tape can be provided through machine processing).

3. A clock/calendar display.

   Provides a means for setting the time and date to be recorded onto the tape.

4. A call information display.

   Displays detailed call information for one call at a time.

5. A control panel.

   Provides a user interface to the 9-track tape operation for functions such as changing the tape, dumping memory, and clearing the display.

6. An SMDR carrier.

   Contains the circuit packs that control SMDR operations.

7. A fan assembly.

   Maintains interior cabinet temperature.

TPA-758013

Figure 7-50. Station Message Detail Recorder (SMDR) Cabinet

8. A Kennedy 9217 tape formatter.

   Records data on a standard 9-track magnetic tape.

9. An AC distribution unit.

   Distributes AC power throughout the cabinet.

SMDR CARRIER CIRCUIT PACK REPLACEMENT

To replace circuit packs in the SMDR carrier (refer to Figure 77), proceed as follows:

TPA-758014

Figure 7-51. SMDR Carrier

1. At the SMDR power supply, set power switch to **OFF**.
2. At the SMDR carrier, replace the circuit pack.
3. At the SMDR power supply, set power switch to **ON**.
4. At the SMDR control panel, depress the system **ON LINE** button.
5. If the **ON LINE** lamp on the tape drive is not lighted, depress the **ON LINE** button.

SMDR FORMATTER CIRCUIT PACK REPLACEMENT

To replace circuit packs in the SMDR formatter (refer to Figure 78), proceed as follows:

1. Remove two screws from the front of the SMDR formatter to remove the front cover.
2. At the SMDR formatter, replace the circuit pack.
3. Replace the front cover on the SMDR formatter using two screws.
4. At the SMDR control panel, depress the system **ON LINE** button.
5. If the **ON LINE** lamp on the tape drive is not lighted, depress the **ON LINE** button.

TPA-758015

Figure 7-52. Replacing SMDR Formatter Circuit Packs

SMDR TAPE DRIVE CIRCUIT PACK REPLACEMENT

Circuit Pack Replacement

To replace circuit packs in the SMDR tape drive (refer to Figure 79), proceed as follows:

1. At the SMDR tape drive (behind dust cover), set power **ON/OFF** switch to **OFF**.
2. At top rear of the SMDR tape drive, replace the circuit pack.
3. Refer to Table BX and perform adjustments required for the circuit pack replaced.
4. At the SMDR tape drive, set power **ON/OFF** switch to **ON** (if off).
5. At the SMDR control panel, depress the **SYSTEM ON LINE** button.
6. If the **ON LINE** lamp on the tape drive is not lighted, depress the **ON LINE** button.

TPA-758016

Figure 7-53. Replacing SMDR Tape Drive Circuit Packs

Table 7-78.

TAPE DRIVE ADJUSTMENTS		
CIRCUIT PACK CODE	**CIRCUIT PACK POSITION(S)**	REQUIRED **ADJUSTMENT(S)**
3645	11	TAPE SPEED
		RAMP TIME
3844	12	PHOTOSENSOR
4139	4 AND 5	READ SKEW
4306	13	CAPSTAN ZERO OFFSET
		BUFFER ARM TRAVEL

Adjustments for Tape Drive Circuit Packs

Tape Speed Adjustment:

This adjustment is performed on the SMDR tape drive ramp generator circuit board 3645 as follows:

1. At the SMDR tape drive (behind dust cover), set power **ON/OFF** switch to **OFF.**
2. Remove circuit board 4139 from position 4, (refer to Figure 80) and insert a Kennedy card extender in its place.
3. Insert circuit board 4139 into the card extender.
4. At the SMDR tape drive, set power **ON/OFF** switch to **ON.**
5. Load the master skew tape.
6. Connect the test panel to the test connector on circuit board 4843 (refer to Figure 81).
7. At the test panel, depress the **STOP** button.
8. At the test panel, depress the **TEST MODE** button.
9. At the test panel, depress the **FORWARD RUN** button to advance the tape beyond load point and then depress the **STOP** button.
10. Connect an oscilloscope to pin H on the extender card.
11. At the test panel, depress the **FORWARD RUN** button while observing the signal on the oscilloscope.

TPA-758017

Figure 7-54. SMDR Tape Drive Test Points and Adjustments

TPA-758018

Figure 7-55. Test Panel Connection to Circuit Pack 4843

12. If necessary, adjust potentiometer R14 on circuit board 3645 (refer to Figure 80) for a signal with a period (T) of 100 usec as displayed on the oscilloscope (refer to Figure 82).

TPA-758019

Figure 7-56. Waveform for Tape Speed Adjustment

Ramp Time Adjustment:

This adjustment is performed on the ramp generator circuit board. With the test conditions as in Step 12 of **Tape Speed Adjustment** above, proceed as follows:

1. Connect a test lead from pin Y on card extender to the external trigger input on the oscilloscope.
2. Condition the oscilloscope to trigger on a high going external signal.
3. Connect the oscilloscope probe to point A on circuit board 3645 (refer to Figure 80).
4. At the test panel, depress the **FORWARD RUN** button and observe trace of ramp-up signal (refer to Figure 83).

   This signal appears each time the tape starts to run forward.

TPA-758020

Figure 7-57. Ramp-Up Signal

5. Alternately depress the **FORWARD RUN** and **STOP** buttons to cause the signal to repeat.
6. Adjust the start ramp potentiometer R3 on circuit board 3645 (refer to Figure 80) if necessary, for a ramp-up time (tr) of 15 ms (refer to Figure 83).

7. Condition the oscilloscope to trigger on a low going external signal.
8. At the test panel, alternately depress the **FORWARD RUN** and **STOP** buttons while observing the ramp-down signal (refer to Figure 84) on the oscilloscope.
9. If necessary, adjust stop ramp potentiometer R4 on circuit board 3645 for a ramp-down time (tr) of 15 ms (refer to Figure 84).

TPA-758021

Figure 7-58. Ramp-Down Signal

10. At the SMDR tape drive, set power **ON/OFF** switch to **OFF**.
11. Remove the test panel from circuit board 4843.
12. Remove circuit board 3645 from the card extender.
13. Remove the card extender and insert circuit board 3645 in its place.
14. Disconnect the oscilloscope probe and test cable.
15. At the SMDR tape drive, set power **ON/OFF** switch to **ON**.
16. Unload master skew tape, and load original 9-track tape.

Photosensor Adjustment:

This adjustment is performed on sensor amplifier driver circuit board 3844 as follows:

1. Load the master skew tape (or standard 9-track tape) and advance the tape to the load point.
2. Connect the test panel to test connector on circuit board 4843 (refer to Figure 81).
3. At the test panel, depress the **STOP** button.
4. At the test panel, depress the **TEST MODE** button.

NOTE

Do not operate the **FAST FORWARD** or **FAST REVERSE** buttons on the test panel when using a master skew tape.

5. Connect a voltmeter between test points E and F on circuit board 3844 (refer to Figure 80) and adjust potentiometer R16 to 0 volts on the voltmeter.
6. Disconnect the voltmeter and test panel.
7. Unload master skew tape and load original 9-track tape.

Read Skew Adjustment:

This adjustment is performed on the quad phase encoded read detector circuit board 4139 as follows:

1. Load master skew tape on tape drive and advance tape to the load point.

NOTE

Tape drive must be off-line.

2. Connect the test panel to test connector on circuit board 4843 (refer to Figure 81).
3. At the test panel, depress the **STOP** button.
4. At the test panel, depress the **TEST MODE** button.
5. At the test panel, depress the **FORWARD RUN** button.
6. When the tape reaches end-of-tape marker, depress the **REVERSE RUN** button and observe the **SKEW** indicator lamp on the test panel. The **SKEW** lamp when illuminated, indicates excessive skew.
7. If the **SKEW** lamp lights while tape is running forward, adjust skew adjusting screw (refer to Figure 85) until **SKEW** lamp is extinguished.
8. Disconnect the test panel from circuit board 4843.
9. Unload master skew tape and load original 9-track tape.

Capstan Servo Zero Offset Adjustment:

This adjustment is performed on the servo preamplifier circuit board 4306 as follows:

1. At the SMDR tape drive (behind dust cover), set power **ON/OFF** switch to **OFF**.

NOTE

Tape must be loaded.

2. Remove circuit board 4306 and insert the card extender in its place.
3. Insert circuit board 4306 into the card extender.
4. At the SMDR tape drive, set power **ON/OFF** switch to **ON**.
5. Connect a voltmeter to test point A on circuit board 4306 to observe the voltage output of the capstan servo amplifier stage.
6. With tape at load point, adjust potentiometer R56 to 0 volts on voltmeter.
7. Observe that capstan does not rotate.

Buffer Arm Travel Adjustment:

This adjustment is performed on the servo preamplifier circuit board 4306 to prevent excessive travel of the supply and take-up buffer arms during ramp-ups and ramp-downs. With the test conditions as in Step 7 of **Capstan Zero Offset Adjustment** above, proceed as follows.

TPA-758022

Figure 7-59. Read Skew Adjustment

1. Connect the test panel to test connector on circuit board 4306 (refer to Figure 81).
2. With the tape drive off-line, depress the **STOP** button on the test panel.
3. At the test panel, depress the **TEST MODE** button.
4. At the test panel, alternately depress the **FORWARD RUN** and **REVERSE RUN** buttons while observing supply buffer arm travel.
5. Adjust R57 on circuit board 4306 for minimum travel of the supply buffer arm during ramp-ups and ramp-downs.
6. Adjust R58 on circuit board 4306 for minimum travel of the take-up buffer arm during ramp-ups and ramp-downs.
7. At the SMDR tape drive, set power **ON/OFF** switch to **OFF**.
8. Remove circuit board 4306 from card extender.
9. Remove card extender from tape drive and install circuit board 4306 in its place.
10. At the SMDR tape drive, set power **ON/OFF** switch to **ON**.
11. Remove test panel from circuit board 4843.

SMDR 207B POWER SUPPLY REPLACEMENT

To replace the SMDR 207B power supply (refer to Figure 86), perform the following removal and installation steps.

Removal Steps:

1. Set switch on SMDR power supply to **OFF**.
2. Disconnect SMDR power cord from AC receptacle.
3. Tag and disconnect leads from rear of power supply.
4. Remove four mounting screws securing power supply to cabinet.
5. Remove power supply from cabinet.

Installation steps:

1. Install the replacement power supply into the cabinet and secure with four mounting screws.
2. Connect leads (disconnected in Step 3 of removal steps) to rear of replacement power supply.
3. Connect SMDR power cord to AC receptacle.
4. Set switch on power supply to **ON**.

TPA-758023

Figure 7-60. Replacing SMDR 207B Power Supply

SMDR FORMATTER REPLACEMENT

To replace the SMDR formatter (refer to Figure 87), perform the following removal and installation steps.

Removal Steps:

1. At rear of the SMDR cabinet, disconnect formatter power cord.
2. Tag and disconnect cables at rear of formatter.
3. Remove two mounting screws from formatter front cover and remove front cover.
4. Remove four mounting screws securing formatter to brackets.
5. Remove formatter from cabinet.

Installation steps:

1. Remove two mounting screws from front cover on replacement formatter and remove front cover.
2. Install the replacement formatter into the cabinet and secure to the brackets with four mounting screws.
3. Secure front cover on the replacement formatter using two mounting screws.
4. Connect cables (disconnected in Step 2 of removal steps) to rear of replacement formatter.
5. Connect formatter power cord.
6. At the rear of replacement formatter, set voltage switch to 115 volts.
7. At the SMDR control panel, depress the **SYSTEM ON LINE** button.
8. If the **ON LINE** lamp on the tape drive is not lighted, depress the **ON LINE** button.

SMDR TAPE DRIVE REPLACEMENT

To replace the SMDR tape drive (refer to Figure 88, Sheets 1 and 2), perform the following removal and installation steps.

Removal Steps:

1. At the SMDR control, depress the **TAPE UNLOAD** button.
2. Rewind tape onto supply reel either manually or by depressing the **ON LINE** and **REWIND** buttons on the tape drive.
3. Remove supply reel from the tape drive.
4. Set tape drive power switch to **OFF**.
5. Disconnect power cord from AC voltage source.
6. Tag and disconnect cables at rear of the tape drive.
7. Remove eight mounting screws at front of tape drive.

TPA-758024

Figure 7-61. Replacing SMDR Formatter

8. At rear of the tape drive, remove two mounting screws securing bracket to tape drive.
9. Remove tape drive from the control panel.

TPA-758025

Figure 7-62. Replacing SMDR Tape Drive (Sheet 1 of 2)

TPA-758026

Figure 7-63. Replacing SMDR Tape Drive (Sheet 2 of 2)

Installation steps:

1. Install the replacement tape drive into the control panel and secure the tape drive to the control panel using eight mounting screws.
2. Secure bracket to tape drive using two mounting screws.
3. Verify (or set) voltage switch at rear of tape drive is set to 115 volts.
4. Connect cables (disconnected in Step 7 of removal steps) to rear of the tape drive.

5. Connect power cord to AC voltage source.
6. At the tape drive, raise the quick release latch.
7. Install the supply reel on supply hub with the write enable ring side next to the tape transport deck.
8. Hold supply reel flush against the butt flange and secure the supply reel by depressing the quick release latch.
9. Thread tape and wind a few turns clockwise around the take up reel until the slack in the tape is removed.
10. Set the tape drive power switch to **ON**.
11. Close the dust cover and depress the **LOAD BUTTON**.
12. At the SMDR control panel, depress the **SYSTEM ON LINE** button.
13. At the SMDR tape drive, depress the **ON LINE** button.
14. At the SMDR control panel, depress the **DUMP MEMORY** button.

SMDR CLOCK/CALENDAR DISPLAY REPLACEMENT

To replace the SMDR clock/calendar display (refer to Figure 89), perform the following removal and installation steps.

TPA-758027

Figure 7-64. Replacing SMDR Clock/Calendar Display

Removal Steps:

1. At rear of the SMDR cabinet, disconnect connector **CLK1** from **CD01** jack on the SMDR carrier.
2. At inside front door of the SMDR cabinet, remove four screws securing clock/calendar display assembly.
3. Remove clock/calendar display assembly from the door.

Installation steps:

1. Install the replacement clock/calendar display assembly into the inside front door of the SMDR cabinet, and secure the clock/calendar display assembly to the door using four screws.
2. At rear of the SMDR cabinet, connect connector **CLK1** to **CDO1** jack on SMDR carrier.
3. At the clock/calendar display, set display switch to **TIME**.
4. Depress the **TIME SET HRS** button until correct hours digit is displayed.
5. Depress the **TIME SET MIN** button until correct minutes digit is displayed.
6. Set display switch to **DATE**.
7. Depress the **DATE SET** button until correct date is displayed.
8. Depress the **DATE PRINT** button.

AUXILIARY CABINET COMPONENT REPLACEMENT

GENERAL

This section provides a brief description of the auxiliary cabinet and contains instructions for replacement of auxiliary cabinet components.

Replacement of auxiliary cabinet components, as determined by performing maintenance procedures, consist of the following:

1. Frequency generator replacement.
2. DC fan and fan assembly replacement.
3. AC distribution unit replacement.
4. Rectifier replacement.

AUXILIARY CABINET

The auxiliary cabinet (refer to Figure 90) contains System 85 auxiliary equipment required by the customer.

This cabinet can contain:

1. A fuse panel.

   Provides mounting for circuit fuses which protect auxiliary equipment.

2. A sensor.

   Monitors the cabinet temperature.

3. Auxiliary equipment.

   Provides features such as radio paging access, recorded telephone dictation access, recorded announcement, etc.

4. A fan assembly.

   Maintains interior cabinet temperature.

5. A -48 volt rectifier.

   Provides DC power to the auxiliary cabinet.

6. An AC filter for the -48 volt rectifier.

   NOTE

   When equipped with extended power reserve a DC filter replaces the AC filter (AC distribution unit).

7. An auxiliary alarm unit and alarm distribution panel.

   Detects and reports equipment malfunctions.

8. A DC filter.

   Provides extended power reserve.

TPA-697181

Figure 8-65. Auxiliary Cabinet

124B, 124B1, or 124B2 FREQUENCY GENERATOR REPLACEMENT

To replace the 124B, 124B1, or 124B2 frequency generator (refer to Figure 91 or Figure 92) in the auxiliary cabinet, perform the following removal and installation steps.

TPA-758028

Figure 8-66. Replacing Auxiliary Cabinet 124B Frequency Generator

TPA-764500

Figure 8-67. Replacing Auxiliary Cabinet 124B1 or 124B2 Frequency Generator

Removal Steps:

1. Remove the -48 volt fuse associated with the frequency generator.
2. Disconnect the connectors from **PFG IN** and **PFG OUT** (124B frequency generator) or from **OUTPUT** and **INPUT** (124B1 or 124B2 frequency generator).
3. Remove four mounting screws (two from each side) securing the frequency generator to the front panel of the auxiliary cabinet.
4. Remove the frequency generator.

Installation steps:

1. Install the replacement frequency generator into the auxiliary cabinet and secure the frequency generator to the front panel using four mounting screws.
2. Connect the connectors to **PFG IN** and **PFG OUT** (124B frequency generator) or to **OUTPUT** and **INPUT** (124B1 or 124B2 frequency generator).
3. Replace the -48 volt fuse associated with the frequency generator.

DC FAN AND FAN ASSEMBLY REPLACEMENT

DC Fan Replacement

To replace a DC fan (refer to Figure 93), in the auxiliary cabinet, perform the following removal and installation steps.

Removal Steps:

1. Remove the fuse (F1 or F2) associated with the fan to be replaced.

NOTE

Fuse F1 controls all the fans in the upper fan assembly and Fuse F2 controls all the fans in the lower fan assembly.

2. Disconnect the plug from the fan to be replaced.
3. Remove two mounting screws.
4. Remove the fan from the fan assembly.

Installation Steps:

1. Mount the replacement fan on the fan assembly and secure with the two mounting screws.
2. Install the fan plug to the replacement fan.
3. Install the fuse (F1 or F2) associated with the fan replaced.

TPA-758003

Figure 8-68. Replacing Auxiliary Cabinet DC Fans

DC Fan Wire Replacement

To replace a fan wire suspected of failing in the auxiliary cabinet, perform the following removal and installation steps.

Removal Steps:

1. Remove the fuse (F1 or F2) associated with the fan wire to be replaced.

NOTE

Fuse F1 controls all the fans in the upper fan assembly and Fuse F2 controls all the fans in the lower fan assembly.

2. Disconnect the fan wire (plug) to be replaced.
3. Thread the fan wire through the fan assembly toward the rear.
4. Disconnect the fan wire from **TB1** at the rear of the fan assembly.
5. Remove the fan wire from the fan assembly.

Installation Steps:

1. Connect the replacement fan wire to **TB1** at the rear of the fan assembly.
2. Thread the fan wire through the fan assembly toward the front.
3. Install the replacement fan wire (plug) to the appropriate fan.
4. Replace the fuse (F1 or F2) associated with the fan wire replaced.

DC Fan Assembly Replacement

To replace the DC fan assembly in the auxiliary cabinet, perform the following removal and installation steps.

Removal Steps:

1. At the rear of the fan assembly:

   Disconnect four ground straps at the top of the fan assembly.

   Tag and disconnect the alarm leads from AEH4.

   Disconnect two bus bar ground cables.

   Disconnect the JTMP connectors in two places.
2. At the front of the fan assembly:

   Remove four mounting screws (two on the left and right sides) securing the fan assembly to the cabinet.

   Remove the fan assembly from the cabinet.

Installation Steps:

NOTE

When the DC fan assembly is shipped loose, attach 900658329 vinyl plastic tape (approximately 60 inches) to the top and bottom edges of the unit before installing the DC fan assembly into the cabinet.

1. At the front of the cabinet, mount the replacement fan assembly and secure with the four mounting screws.

2. At the rear of the fan assembly:

   Connect the JTMP connectors in two places.

   Connect two bus bar ground cables.

   Connect the alarm leads to AEH4.

   Connect four ground straps at the top of the fan assembly.

AC DISTRIBUTION UNIT REPLACEMENT

To replace the AC distribution unit (refer to Figure 94) in the auxiliary cabinet, perform the following removal and installation steps.

Removal Steps:

1. Set circuit breakers **CB1** through **CB5** on the AC distribution unit to be replaced to **OFF**.
2. Disconnect the power cord from the AC source.
3. Tag and disconnect the two wires from the grounding block on the left rear side.

   NOTE

   One wire is connected to the rectifier, and the other wire is connected to terminal **TS1**.

4. Tag and disconnect the remaining cables from the AC distribution unit to be replaced.
5. At the rear of the auxiliary cabinet, remove two screws from the mounting foot at left side of the AC distribution unit.
6. At the front of the auxiliary cabinet, remove two screws from the mounting bracket.
7. Remove the AC distribution unit from the auxiliary cabinet.

Installation steps:

1. Set circuit breakers **CB1** through **CB5** on the replacement AC distribution unit to **OFF**.
2. Install the replacement AC distribution unit into the auxiliary cabinet and secure the unit to the cabinet using four mounting screws (two in the mounting bracket and two in the mounting foot).
3. Connect the cables (disconnected in Step 4 of removal steps) to the replacement AC distribution unit.
4. Connect the two wires (disconnected in Step 3 of removal steps) to the replacement AC distribution unit grounding block.
5. Connect the power cord of the replacement AC distribution unit to the AC source.
6. Set circuit breakers **CB1** through **CB5** on the replacement AC distribution unit to **ON**.

TPA-758029

Figure 8-69. Replacing Auxiliary Cabinet AC Distribution Unit

RECTIFIER REPLACEMENT

To replace the rectifier (refer to Figure 95) in the auxiliary cabinet perform the following removal and installation steps.

Removal Steps:

1. At the front of the rectifier:

   Set the **ON/OFF** switch to **OFF**.

   Remove the connector from the **AC** input jack.
2. At the rear of the rectifier, remove the connectors from the **ALARMS** and **OUTPUT** jacks.
3. At the front of the auxiliary cabinet, remove two hex nuts securing mounting clip to shelf.

   Remove the mounting clip from the shelf.
4. Slide the rectifier forward and remove from the auxiliary cabinet.

Installation steps:

1. At the front of the replacement rectifier, set the **ON/OFF** switch to **OFF**.
2. Install the replacement rectifier into the auxiliary cabinet.
3. At the front of the auxiliary cabinet, replace the mounting clip to the shelf and secure with the two hex nuts.
4. At the rear of the replacement rectifier, connect the two connectors to the **ALARMS** and **OUTPUT** jacks.
5. At the front of the replacement rectifier:

   Connect the connector to the **AC** input jack.

   Set the **ON/OFF** switch to **ON**.

TPA-758030

Figure 8-70. Replacing Auxiliary Cabinet Rectifier

MAINTENANCE AND ADMINISTRATION PANEL (MAAP)

DESCRIPTION OF MAAP

Overview

The various components of the **MAAP** (refer to Figure 96), are described in the following paragraphs.

TPA-757954

Figure 9-71. MAAP

LED Indicators

The Light Emitting Diode (LED) indicators (refer to Figure 97), function as follows.

TPA-758031

Figure 9-72. LED Indicators

a. The **MAJOR** and **MINOR** alarm lamps (in parallel with the alarm panel) display the existence of alarm conditions.

b. The **O** or **1** lamp denotes which common control (processor) in a duplicated system is on-line.

c. The **IN USE** lamp denotes that a circuit selected for testing is in use and cannot be tested.

d. The **BUSY OUT** lamp is lighted at all times when any circuit in the switch is maintenance or software busied out.

e. The **SEE NOTE** lamp serves as a reminder that translation changes have been made in memory and **must** be transferred to the tape.

f. The **WAIT** lamp is lighted when the tape is in motion selecting the requested procedure or when a maintenance procedure is being run.

Key Pad

The key pad (refer to Figure 98), is used to enter data into the procedure fields.

TPA-758032

Figure 9-73. Key Pad

a. The **CLEAR ENTRY** button clears existing data if depressed before the **ENTER** button. Depressing the **ENTER** button after depressing **CLEAR ENTRY** places a dash (-) in the blinking field.

b. The **ENTER** button is depressed when a number entered in a field is complete; when a number already displayed is to be used as it appears; or to advance to the next higher numbered field.

Flipcharts

Each maintenance procedure is represented by one or more flipcharts. Each flipchart is used to:

a. Identify the fields required for display or entry purposes.

b. Identify information unique to that particular maintenance procedure.

Flipcharts are identified by the function of the procedure (procedure name) and a 3-digit procedure number. The 25-digit data portion of each flipchart is segmented into fields identified by a number and a name.

Many maintenance procedures require that data be entered in specific field(s). These fields are called **entry** fields and are identified by black triangles on the flipchart.

All data entered into a maintenance procedure is displayed at the moment it is entered. The display may be used to denote all data contained in memory for a particular flipchart.

Flipchart field boundaries are delineated in the data display by a dot (decimal point) located in the bottom right-hand corner of each field. The decimal point for a particular field flashes as an indication that the field is ready for data entry.

LED Data Display

The LED data display field is an operational display which functions with a flipchart. The display consists of 28-digits which correspond to the 25-digit locations of a flipchart and the 3-digit number of the procedure.

Error Display

A 2-digit display (refer to Figure 99), allows the display of error codes informing the user that an invalid operation was attempted or that invalid data is entered in a field.

Field Identification

A 2-digit display (refer to Figure 99), which denotes the number of the **MAAP** field which is ready for data entry.

TPA-758033

Figure 9-74. Error Display and Field Identification

Error Code Listing

The error code listing (refer to Figure 100), is an abbreviated listing of the most common error codes that may be displayed when performing procedures.

TPA-758034

Figure 9-75. Error Code Listing

Control Keys

The control keys in the center of the **MAAP** are used to select the various modes and functions. They are identified as translation, common, and maintenance keys and are color-coded. Figure 101 illustrates the key designations and color coding of the control keys.

a. The translation (blue) keys are used with the common (white) keys to execute translation procedures.

b. The common keys are used with both translation and maintenance procedures.

c. The maintenance (yellow) keys are used in conjunction with the common keys to execute maintenance procedures.

Use of Control Keys When Performing Maintenance Procedures

The control keys allow maintenance personnel to use and control the **PROCs**. Many of the control keys work basically the same in every situation (e.g., **NEXT TEST, STOP**, etc.) but some produce different responses depending upon the procedure being used and the function being performed.

The maintenance control keys, those common control keys required for maintenance functions, and some of their uses are described in the following paragraphs.

TPA-758035

Figure 9-76. Control Keys

1. **MODE** is used to display or set a port's current mode(s) at any time. Depressing **MODE** will immediately give a status display.
    a. Operationally, activating the **MODE** button is equivalent to calling in a new procedure, although no procedure source code is required.
    b. The **MODE** display button will interrupt any current MAAP task in the same way that depressing **PROC** does.
    c. The mode status display may be exited by calling in another procedure.
2. **BUSY OUT** is used to place a circuit location in maintenance busy out status. It can be used either during a maintenance procedure which allows a circuit to be busied out (not all procedures allow this capability) or in one of the following three busy out **PROCs**.
    a. **PROC 630** - Busy out/release busy out.
    b. **PROC 631** - Trunk group busy out.
    c. **PROC 632** - Carrier busy.
3. **CHANGE FIELD**: If a data entry field must be changed but is not currently selected by the maintenance procedure for entry, **CHANGE FIELD** is used to change it. **Data entry field** means any display field in which the procedure allows or requires digit entry.
4. **CLEAR DATA**: The control key sequence **CLEAR DATA; EXECUTE** can be used to clear the alarm sent bits in the error log without clearing the record itself.
    a. Clearing the alarm sent bit of an error record in PMIDS causes the associated alarm indication on the alarm panel to turn off.

b. In **PROC 600** and **PROC 612**, the **CLEAR DATA; EXECUTE** sequence is used to clear (zero) error records in PMIDS. This is the only method available to clear PMIDS records.

5. **ENTER** is used to indicate that a number which is entered in a field is complete or that a number already displayed in a field is used as is. A typical entry sequence would be the specification of an equipment location for display or testing.

   a. If the location is required, the first field (usually the module field) is blinked to indicate that an entry is necessary or can be done.

   b. If the field is blank, the entry is mandatory. If the field is occupied, it can be accepted as is or changed.

   c. To accept the data as is, depress **ENTER** with no data number entry.

6. **EXECUTE**: There are two main uses of **EXECUTE**.

   a. One use is with **CLEAR DATA** (see above) in clearing failure history, resolving alarmed entries, and turning off fault indicators.

   b. The second use causes the procedure being used to start the selected test. The test could be a hardware test, a test call, or a failure history snapshot and sort for display, etc.

   c. When testing multiple circuits, the **STOP; EXECUTE** key sequence works in two ways depending upon which maintenance procedure is being performed.

      1. The first method is for the test to begin again from the first appropriate circuit (circuit of the correct type for the maintenance procedure and test being run) in the switch.

      2. The second method is for the test to start from a displayed location (the last circuit which was tested) and cycle to the end of the range of circuits being tested.

7. **NEXT CIRCUIT** causes a new circuit location to be selected and displayed by the maintenance procedure. There are two uses of **NEXT CIRCUIT**: to display stored circuit information or to select a circuit location for testing.

   a. To display test results or failure history one circuit location at a time, **NEXT CIRCUIT** is depressed once for each new circuit location.

   b. If maintenance personnel wish to test a single circuit location, **NEXT CIRCUIT** allows the appropriate circuit locations to be stepped through and displayed one at a time until the circuit to be tested is displayed.

8. **NEXT DATA** is used to display demand test results, periodic failure history data, and call processing failure history data which are arranged by circuit location in records, one location per record. Successive uses of **NEXT DATA** allow data records to be displayed one part at a time.

9. **NEXT FAULT** is used to step through error records, which have different fault codes, one at a time.

10. **NEXT TEST** causes the procedure to automatically advance to the next test that can be run. If the current test displayed is the last test the procedure can run, the test selected is test number 1. The new test selected will not start until **EXECUTE** is depressed.

11. **NEXT UNIT**: When a hardware test is selected, **NEXT UNIT** causes the next unit type to be selected and displayed for testing. The first circuit of that unit type can be selected and displayed for testing by depressing **NEXT CIRCUIT**. When displaying failure history or test results, **NEXT UNIT** is used to look at the first circuit location recorded for the next unit type (numerically) in the failure history list.
12. **PROC NO** is used to call in a maintenance procedure. The default test (Test number 1) is automatically selected.
13. **RESET**: When **RESET** is depressed, the maintenance procedure executing or ready to be executed is returned to its initial nominal start configuration (e.g., Test number 1, initial display).
14. **RLS BUSY OUT**: Prior to maintenance personnel leaving the customer's premises all busied out circuits should be released from busy after corrective action is performed to restore the circuit to operation.
    a. Whenever the **BUSY OUT LED** is lighted on the **MAAP**, **RLS BUSY OUT** is used to release a circuit location from maintenance busy status.
    b. When the **BUSY OUT LED** remains lighted after all circuits are released from busy using individual maintenance procedures and the three busy out/release busy maintenance procedures **(i.e., PROCs 630, 631**, and **PROC 632), PROC 621, PROC 650, PROC 651**, and/or **PROC 652** should be used to determine the cause of the **BUSY OUT LED** remaining lighted.
15. **STOP**: The use of **STOP** halts test execution when a test is running.

HOW TO USE THE MAAP

Overview

This section describes how the **MAAP** is used to perform maintenance procedures, port contention (blocking), and how to respond to error displays in the **MAAP** error code field.

Connect MAAP

1. Remove the **MAAP** from the common control cabinet, module control cabinets housing module control carriers in a multi-module switch, or a remote module control cabinet.
2. Connect the **MAAP** to the appropriate connector.

   Connectors are designated **MAAP** for an unduplicated common control switch and **ON LINE, CC0**, or **CC1** for a duplicated common control switch. Connectors are also designated **MAAP** for module control cabinets housing module control carriers in a multi-module switch or a remote module control cabinet.
3. When the **MAAP** is connected, the **MODE** status procedure is displayed.
   a. The **MODE** procedure displays the status of the current port and determines which activities can be performed at that port.

b. Only one port may be active on a given mode at one time. This means that only one **active** port may run maintenance at a time, only one **active** port may run administration at a time, etc.

Modes Required to Perform Maintenance

The MAINT mode (Field 2) on the current port is required to be set to perform all maintenance procedures.

In addition, the ADMIN mode (Field 1) on the current port is required to be set when performing **PROCs** 642, 643, 644, 646, and 647.

The TAPE mode (Field 3) on the current port is required to be set when performing **PROCs** 610, 614, 999 and RUNTAPE.

NOTE

The ADMIN mode (Field 1) and the TAPE mode (Field 3) **should not be set** until the mode is required to perform maintenance tasks. If the ADMIN and TAPE modes are prematurely set, other facilities would be blocked from using these modes.

Some indication of when to set the modes on the current port are:

1. When the **MAAP** is first connected and the **MODE** procedure is displayed.
2. After a tape reload and the **MODE** procedure is displayed.

NOTE

The MODE status display indicates whether another agent has control of the mode required to perform maintenance tasks.

3. During maintenance tasks, when standard error code 76 **(MODE** required by **PROC** in use) is displayed as soon as the maintenance procedure is called in.
4. During administration tasks, when standard error code 76 **(MODE** required by **PROC** in use) is displayed when **EXECUTE** is depressed after an Add, Change, Display, or Remove operation.

NOTE

If standard error code 76 **(MODE** required by **PROC** in use) is displayed in the **MAAP** error code field, it indicates that the **MAAP** port is being utilized by another facility for the mode requested.

Setting Required Mode(s)

Ports may attempt to change modes at any time, based on planned task activity. Requests are blocked if another port currently has control of a mode requested.

A port may display or set its current mode(s) by depressing **MODE**.

1. Current port is defined as the port **(local or remote)** that **activated** the **MODE** button.

NOTE

For example, if the craft is using the local MAAP, the current port fields (Fields 1 through 3) provide information on the local MAAP modes.

2. Current port fields (Fields 1 through 3) display a 1 if the mode is active and 0 if it is inactive for the current port.
3. The current port fields (Field 1 = ADMIN, Field 2= MAINT, Field 3 = TAPE) can be set by activating the corresponding field number (1 through 3) on the key pad.

NOTE

If a mode switch is not allowed, standard error code 76 **(MODE** required by **PROC** in use) is displayed in the **MAAP** error code field.

Local MAAP Port Contention Blocks

The local **MAAP** may be blocked when a mode switch is attempted. This results in standard error code 76 being displayed.

1. Tasks may also be blocked when they attempt to do things that require modes which are not available to the port.
2. This blocking is done at the time of the **EXECUTE** button being depressed for administration procedures and at the time of procedure entry (calling in the procedure); i.e., **PROC NO.; 6XX; ENTER** for maintenance procedures.
3. Examples of blocking are:
    a. Trying to enter a maintenance procedure when the maintenance mode is not active.
    b. Trying to Add, Change, Display, or Remove in an administration procedure when the administration mode is not active.
    c. Trying to perform a task requiring the tape when the tape mode is not active.

Steps To Perform When Blocking Occurs

Any time blocking occurs, determine from the current **MODE** status display which port and agent has control of the mode.

1. When the **MODE** display is active, fields **other** than the current port fields (first three fields in the display) are display only of status and are not controllable.
2. Fields 9 through 13 display an encode that tells which port has control of the given mode.
3. Fields 4 through 8 display an encode that tells which agent has control of the given mode.
4. The MODE status display is continuously updated when the display is active.

NOTE

If the **MAAP** is left connected when inactive, the MODE display continues to show current mode status.

Wait for a few minutes to determine if the required mode changes on the MODE display. If the mode is released, activate the required mode for maintenance by depressing the appropriate number on the key pad.

If the required mode does not change after a few minutes, refer to local records and determine the contact point for the agent having control of the mode required for maintenance.

NOTE

If Fields 9 through 11 display a 0 indicating the local MAAP has control of the mode, it indicates that the SMT is connected and has the port blocked out.

Request the agent having control of the mode to release the mode in order that maintenance of the switch can be performed.

As soon as the mode is released, activate the required mode(s) for maintenance by depressing the appropriate number on the key pad.

Duplication

Soft Switch:

1. Demand procedure **PROC 613 must not** perform a soft switch if any of the following ports are active (other than the access point **PROC 613** itself is using).
    a. Local **MAAP**.
    b. Remote Ports.
    c. Run Tape.
2. If **PROC 613**, Test 3 attempts a soft switch without the port contentions being release, special error code 80 (illegal switch attempt) is displayed in the **MAAP** error code field.
3. When **PROC 613** invokes a soft switch, the port it is using to perform the soft switch is dropped.
4. A new port must be activated by using the **MODE** status display in the new on-line side of the common control.

Off-line Processor Maintenance:

When maintenance in the on-line common control is completed and it is desired to check the off-line common control in a duplicated system, the local MAAP must be connected to the off-line common control and the mode(s) required for maintenance must be activated using the **MODE** status display procedure.

NOTE

Mode information is **not** carried across from one common control to the other.

Call Up Procedures

1. Turn the flipcharts to the procedure to be used.
2. Depress the **PROC NO** button.

   The procedure number fields go blank and dashes appear in the data fields.
3. Enter the procedure number using the data entry pad. All three digits must be entered.

   The entered procedure number is displayed in the procedure display field.
4. Depress the **ENTER** button.

   When the **WAIT** lamp goes off, the procedure is ready to be used.
5. Field indicator decimal points displayed in the data display should correspond to the field identifiers on the flipchart. Deviations may indicate that the flipchart issue is not compatible with the tape issue.

Responding to Error Displays

An error code is displayed in the 2-digit error code display field if an invalid operation is attempted or if invalid data is entered into a field on the **MAAP**.

Standard error codes common to all procedures are displayed on the decal on the faceplate of the **MAAP**. The error codes encompass three basic areas.

1. If standard error code 76 **(MODE** required by **PROC** in use) is displayed in the **MAAP** error code field, it indicates that the **MAAP** port is being utilized by another facility for the mode or required task to be performed by craft personnel (i.e., maintenance, administration, tape) requested.
2. Operator error: Invalid button operation for the procedure involved. The error code decal identifies the invalid operation and the necessary corrective action.
3. Input data incompatible with existing translations or program tape. Corrective action requires a review of the input data and the service requirements of the customer.

Special error codes 80 through 98 are unique to the particular procedure being used. The codes are explained by notes on the flipchart associated with the procedure. The error codes identify problems with maintenance procedure operation. Resolution of these errors requires a review of the maintenance procedure being performed.

Disconnecting the MAAP

When maintenance activities are completed, the **MAAP** should be unplugged to allow other facilities access to the maintenance mode (or any other mode being used to perform maintenance activities). The **MAAP** should **not** be left in mode status display or with dashes or a **PROC** displayed.

If the **MAAP** is left connected or in mode status display, other facilities are blocked out for the following time intervals.

1. **Ten Minutes:** When in mode status display, the **MAAP** will default current port mode status to all zeros (display only) **only after 10 minutes** of inactivity.
2. **24 Hours:** If the **MAAP** is not left in mode status display (dashes or a procedure displayed), the **MAAP** display will default current port mode status to all zeros (display only) **only after 24 hours** of inactivity (no buttons depressed).

If the **MAAP** is disconnected, the local modes are immediately deactivated.

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