



A&T

AT&T System 75

System Maintenance

555-200-105
Issue 5, December 1989

TO ORDER COPIES OF THIS MANUAL

Call: AT&T Customer Information Center on 800-432-6600
In Canada Call 800-255-1242

Write: AT&T Customer Information Center
2855 North Franklin Road
P.O. Box 19901
Indianapolis, Indiana 46219-1385

While reasonable efforts were made to ensure that the information in this document was complete and accurate at the time of printing, AT&T can assume no responsibility for errors. Changes or corrections to the information in this document may be incorporated into future reissues.

Contents

CHAPTER 1. INTRODUCTION	1-1
General	1-1
Purpose	1-1
Assumption	1-2
Safety Precautions	1-2
Organization	1-3
CHAPTER 2. GENERAL MAINTENANCE INFORMATION	2-1
General	2-1
System Access Terminal	2-1
Login Procedure	2-9
Logoff Procedure	2-11
Software Configuration	2-12
Hardware Configuration	2-13
Power Control	2-16
Alarms and Indicators	2-18
CHAPTER 3. ROUTINE MAINTENANCE PROCEDURES	3-1
General	3-1
INADS/CPE Alarm Origination—Activation/Deactivation	3-1
Maintenance-Related System Parameters Form	3-1
Handling Port Circuit Packs	3-7
Handling Network Control Circuit Pack	3-9
Removing and Restoring Power	3-9
System 75 Reset and Reboot Indications (VI)	3-14
System 75 Reset and Reboot Indications (V2 and V3)	3-17
System 75 SPE Down Mode Alarm	3-20
System 75 XE Reset	3-21
System 75 XE SPE Down Mode Alarm	3-25
System Backup Procedures	3-27
Software Upgrade Procedures	3-31

CHAPTER 4. TROUBLE-CLEARING AIDS	
Maintenance Commands	
System Feature	
Analog Tie Trunk Back-to-Back Testing	4-43
CHAPTER 5. ACCESSING ERRORS AND ALARMS	5 - 1
General	5 - 1
Error Generation/Tracking	5 - 1
Alarm Log	5 - 2
Error Log	5-16
CHAPTER 6. ERRORS AND ALARMS: REPAIR PROCEDURES	6 - 1
General	6 - 1
Error Generation/Tracking	6 - 2
Error/Alarm Resolution	6 - 3
Test Commands	6 - 3
Maintenance Object Test/Repair Procedures	6-5
CHAPTER 7. REFERENCES	7 - 1
CHAPTER 8. ABBREVIATIONS AND ACRONYMS	8 - 1
CHAPTER 9. GLOSSARY	9 - 1
CHAPTER 10. INDEX	10-1

Figures

Figure 2-1.	513 Business Communications Terminal—Keyboard	2-7
Figure 2-2.	4410 Data Terminal—Keyboard and Display Screen Function Keys	2-8
Figure 2-3.	4425 Data Terminal—Keyboard and Display Screen Function Keys	2-8
Figure 2-4.	610 BCT and 615 BCT—Keyboard and Display Screen Function Keys	2-9
Figure 2-5.	System Fuses—Small Cabinet	2-17
Figure 2-6.	System Fuses—Large Cabinet	2-17
Figure 2-7.	Fuse Replacement	2-18
Figure 2-8.	Maintenance Board Indicators	2-20
Figure 2-9.	Processor Circuit Pack Indicators	2-21
Figure 2-10.	Circuit Pack Indicators	2-24
Figure 3-1.	Maintenance-Related System Parameters Form (V1)	3-3
Figure 3-2.	Maintenance-Related System Parameters Form (V2 and V3)	3-3
Figure 3-3.	Typical System 75 TN-Coded Circuit Pack	3-8
Figure 3-4.	Power Distribution Unit	3-11
Figure 3-5.	Control Cabinet—Power and Grounding	3-12
Figure 3-6.	SPE DOWN MODE Alarm Display	3-26
Figure 4-1.	Typical Busyout Command Results	4-3
Figure 4-2.	Typical Date and Time Form	4-7
Figure 4-3.	Typical Initialization Causes Form (V1)	4-8
Figure 4-4.	Typical Initialization Causes Form (V2 and V3)	4-9
Figure 4-5.	Typical Communication-interface Links Form	4-10
Figure 4-6.	Typical Communication-interface Processor Channels Form	4-11
Figure 4-7.	Typical Port Information Form	4-13
Figure 4-8.	Partial Example of Display Output for “List Configuration All” Command (V1)	4-16
Figure 4-9.	Partial Example of Display Output for “List Configuration All” Command (V2 and V3)	4-17
Figure 4-10.	Typical Software Configuration Report (V1)	4-20
Figure 4-11.	Typical Software Configuration Report (V2 and V3)	4-20

Figure 4-12.	Typical Software Configuration Report (SPE Memory) (V1)	4-21
Figure 4-13.	Typical Software Configuration Report (SPE Memory) (V2 and V3)	4-21
Figure 4-14.	Typical System Status Report Display Output	4-22
Figure 4-15.	Typical Status Command Results (V2)	4-29
Figure 4-16.	Typical Status Command Results (V3)	4-29
Figure 4-17.	Trunk Group Form	4-44
Figure 4-18.	Trunk Group Form (E&M Mode)	4-44
Figure 4-19.	Trunk Group Form (Simplex Mode)	4-49
Figure 5-1.	Hardware Alarm Reports Form	5-3
Figure 5-2.	Typical Alarm Log Display Output	5-8
Figure 5-3.	Hardware Error Reports Form	5-16
Figure 5-4.	Typical Error Log Display Output	5-18
Figure 6-1.	Typical Demand Test Results	6-4
Figure 6-2.	Medium Cabinet Environment Components (Sensors)	6-8
Figure 6-3.	Medium Cabinet Fuse Location and Replacement	6-9
Figure 6-4.	Analog Loop Around and Conference Test	6-24
Figure 6-5.	Analog Loop Around Test	6-48
Figure 6-6.	Medium Cabinet Environment Components (Sensors)	6-100
Figure 6-7.	Medium Cabinet Environment Components (OLS and PDU)	6-110
Figure 6-8.	Medium Cabinet Fuse Location and Replacement	6-111
Figure 6-9.	System 75 631WA or 631WB OLS	6-112
Figure 6-10.	System 75 631AR or 631BR OLS	6-113
Figure 6-11.	Data Channel Control (DATA-CON) and Data Channels (DATA-CHLs)	6-145
Figure 6-12.	Data Channel Control (DATA-CON) and Data Channels (DATA-CHLs)	6-172
Figure 6-13.	DID Trunk Interactions	6-189
Figure 6-14.	Digital Station Interactions	6-204
Figure 6-15.	Hybrid Station Interactions	6-265
Figure 6-16.	SCI Architecture with Interface 1 Circuit Packs	6-290
Figure 6-17.	SCI Architecture with Interface 2 Circuit Pack	6-292
Figure 6-18.	SCI Architecture with Interface 3 Circuit Packs	6-294
Figure 6-19.	MET Line Interactions	6-321

Figure 6-20.	Typical Modem Pool Switched Connection with Integrated Pooled Modem	6-342
Figure 6-21.	Typical Modem Pool Switched Connection with Combined Modem Pool	6-344
Figure 6-22.	R1V3 Communication Interfaces Architecture With One PI Board	6-356
Figure 6-23.	Typical Data Module Application	6-357
Figure 6-24.	Internal Loop Around Test	6-369
Figure 6-25.	Medium Cabinet Environment Components	6-382
Figure 6-26.	R1V2 Communication Interfaces Architecture (SC-INTF)	6-398
Figure 6-27.	R1V3 Communication Interfaces Architecture With Three Interface Boards (SC-INTF)	6-399
Figure 6-28.	R1V3 Communication Interfaces Architecture With One PI Board (SC-INTF)	6-400
Figure 6-29.	R1V2 Communication Interfaces Architecture (SC-LINK)	6-413
Figure 6-30.	R1V3 Communication Interfaces Architecture With Three Interface Boards (SC-LINK)	6-414
Figure 6-31.	R1V3 Communication Interfaces Architecture With One PI Board (SC-LINK)	6-415
Figure 6-32.	Switch Control Connectivity	6-449
Figure 6-33.	Synchronization Timing Loop	6-486
Figure 6-34.	TIE Trunk Interactions	6-507

Tables

Table 2-A.	System Access Terminal Keys	2-3
Table 2-B.	Software Vintages	2-12
Table 2-C.	Replaceable System 75 Circuit Packs and Equipment	2-13
Table 2-D.	System 75 XE Circuit Packs	2-15
Table 2-E.	Circuit Pack Status LEDs	2-25
Table 3-A.	Display Alarms (SPE Down Mode)	3-26
Table 3-B.	Initialization Tests (System Reboot)	3-27
Table 4-A.	Busyout/Release Command Error Codes	4-4
Table 4-B.	Reset Command Error Codes	4-24
Table 4-C.	Dedicated Time Slots for Tones	4-40

Table 4-D.	System Access Tones—Facility Test Calls	4-41
Table 4-E.	Carrier Lead Appearances at 110 Cross-Connect Field	4-45
Table 4-F.	Carrier Lead Appearances at 66-Type Cross-Connect Field	4-47
Table 5-A.	System 75 List of Alarms	5-10
Table 5-B.	System 75 XE List of Alarms	5-13
Table 6-A.	Voltages Supplied by Power Supplies	6-112
Table 6-B.	Tape Unit Aux Data/Error Codes	6-464
Table 6-C.	Tape Unit Aux Data/Error Codes and Repair Strategy (Error Types 1537, 1828, and 2084)	6-469
Table 6-D.	Tape Unit Aux Data/Error Codes and Repair Strategy	6-472

CHAPTER 1. INTRODUCTION

General

This manual provides the information needed to monitor, test, and maintain the AT&T System 75 and System 75 XE. The text covers many faults and troubles that can occur in each system. Because of the modular and self-testing nature of both System 75 and System 75 XE, you will find most maintenance procedures are easy to follow.

Simple, traditional troubleshooting methods still have a valid place in maintaining systems as advanced as System 75 and System 75 XE. Sometimes, those methods are adequate to locate and clear faults. The traditional methods include terminal substitution, visual inspections, continuity checks, and clarification of operating procedures with users.

Purpose

The information in this manual supports System 75 Release 1 Version 1 (R1V1), Release 1 Version 2 (R1V2), Release 1 Version 3 (R1V3), System 75 XE R1V2, and System 75 XE R1V3. This volume is intended for use by:

- A maintenance technician dispatched to a System 75 site in response to a trouble alarm or a user trouble report
- A maintenance technician located at a remote maintenance facility
- The user's assigned maintenance technician.

The technician is expected to have a knowledge of telecommunications fundamentals and of System 75 to the extent that the procedures in this manual can be done without help.

Each installed System 75 or System 75 XE has a user-designated System Manager who is responsible for administration of the system. This person's duties and capabilities with respect to System 75 and System 75 XE are covered in *AT&T DEFINITY™ Communications System and System 75—Administration and Measurement Reports, 555-200-500*. The maintenance technician should work closely with the user's System Manager.

Using the maintenance procedures provided in this manual, the maintenance technician can do the following:

- Observe alarm conditions
- Perform emergency restoration procedures
- Replace system components
- Perform maintenance tests

- Analyze displays of alarms, errors, and test results.

This manual is not intended to solve all levels of trouble. It is limited to troubles that can be solved by using the Alarm Log, Error Log, trouble clearing procedures, maintenance tests, and traditional troubleshooting methods. When the limits of trouble-clearing analysis are reached and the trouble is still not cleared, the maintenance technician must escalate the problem to a higher level of technical support. Escalation should conform to the procedures in the Technical and Administration Escalation Plan.

This issue replaces all previous issues of this manual. The reasons for reissue are as follows:

- To combine System 75 and System 75 XE maintenance information
- To add additional information on Release 1 Version 3 (R1V3) of the 'system
- To reorganize the text to maximize its effectiveness in helping the maintenance technician service the systems.

Assumption

The maintenance procedures in this manual are based on the assumption that the system was initially installed and tested properly and all faults cleared.

Safety Precautions

When performing maintenance or translations procedures on the System 75 or System 75 XE equipment, the maintenance personnel must observe certain precautions. Caution, warning, and danger statements contained within this 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 (EMI) and static electricity must be observed.

Electromagnetic Inteference: 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 in-stalled and used in accordance with the instruction manual, radio interference may result.

Warning: To maintain the EMI integrity of the System 75 or System 75 XE switch, maintenance personnel (after performing any translations or maintenance or activities) must ensure that all cabinet panels, covers, etc., are firmly secured before leaving the customer's premises.

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

Caution: Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICS).

The ESD wrist strap, cable assembly, and spare fuses are packed in a plastic bag and placed in the top of the system cabinet.

The ESD wrist strap is to be used whenever troubleshooting, performing maintenance, or handling any circuit packs associated with the System 75 and System 75 XE.

Organization

The remaining chapters of this manual contain the following information:

- **Chapter 2. General Maintenance Information**—describes the System Access Terminal (SAT), system login/logoff procedures, software configuration, hardware configuration, power controls, fuses, test points, emergency transfer, alarm and indicators.
- **Chapter 3. Routine Maintenance Procedures**—covers circuit pack removal and installation, power removal and restoration, and system reset and reboot.
- **Chapter 4. Trouble-Clearing Aids**—explains maintenance commands and system features.
- **Chapter 5. Accessing Errors and Alarms**—describes maintenance objects (MOs) error generation/tracking, alarm generation thresholds, alarm logs, and error log.
- **Chapter 6. Errors and Alarms: Repair Procedures**—describes the Error Log and the various maintenance tests.
- **Chapter 7. References**—provides a list of additional System 75 manuals.
- **Chapter 8. Abbreviation and Acronyms**—provides a list of definitions of abbreviations and acronyms used in this manual.
- **Chapter 9. Glossary**—provides definitions of terms used in this manual.
- **Chapter 10. Index**—contains an alphabetical subject-to-page number cross-reference for quick access to the text.

CHAPTER 2. GENERAL MAINTENANCE INFORMATION

General

System 75 and System 75 XE allow the maintenance personnel to use the System Access Terminal (SAT) to run maintenance tests. The test results are displayed on the SAT screen. Before running the maintenance tests, the maintenance personnel should be familiar with the SAT, login/logoff procedures, command line, screen forms, system parameters, alarms, and indicators. Therefore, to assist the maintenance personnel performing this task, this chapter describes each SAT and its keyboard, login and logoff procedures, command line, circuit pack's names and codes, power units and their associated circuits, alarms, and circuit pack LEDs in details.

Most information in this chapter is common for both systems (System 75 and System 75 XE). The topic that applies only for one system is identified in the paragraph heading or in the content of each paragraph.

System Access Terminal

The maintenance technician can communicate with System 75 or System 75 XE through the SAT. System 75 and System 75 XE support the following data terminals as SATs:

- 513 BCT (V1, V2, and V3)
- 4410 Data Terminal (V2 and V3)
- 4425 Data Terminal (V2 and V3)
- 610 BCT (V2 and V3)
- 615 BCT (V2 and V3)

In System 75, the SAT is connected to the maintenance circuit pack; in System 75 XE, the SAT is connected to the processor circuit pack. The SAT allows maintenance technicians to perform specific tasks by entering the following maintenance commands:

- Display error and alarm logs
- Test circuit packs
- Test system functions
- Busyout and release system equipment
- Reset the system

- Monitor the system (V2 and V3)
- Check status of maintenance objects and synchronization (V2 and V3)
- Set synchronization (V2 and V3)
- Check system translations.

For more details on these commands, see the Maintenance Commands section in Chapter 4. Most maintenance functions performed at the local SAT can also be done remotely at the Initialization and Administration System (INADS) center.

SAT Keyboard

The SAT keyboard consists of cursor keys, editing keys, and transaction keys. Cursor keys allow the user to obtain data, editing keys allow the user to make change and corrections, and transaction keys allow the user to do certain functions by entering single key stroke. The following paragraphs discuss these three types of keys.

Cursor Keys: Cursor keys are used to move the cursor between fields and pages on a screen form. The cursor must be positioned on a field before the user can add or change information in that field.

Editing Keys: Two editing keys, BACK SPACE and CLEAR, are provided. The BACK SPACE key is used to erase the character at the current cursor position. The cursor moves one position to the left each time the key is pressed. If the cursor is at the first position of the data entry field, it will erase the character at the first position. The CLEAR key is used to clear all data in a field on a screen form. The cursor must be positioned at the field that the user wants to clear before the CLEAR key is pressed.

Transaction Keys: Three transaction keys, CANCEL, ENTER, and HELP, are provided. The CANCEL key is used to erase a form or command. Once the key is pressed, the system returns the user to the command (tasks request) level and asks for a new command. The ENTER key is used to store the data entered on a screen form into the system's memory. The HELP key is used to display information on the type of data that can be entered into the field associated with the current cursor position. The system displays all the permissible entries the user can input for that field. This key can be pressed at the "enter command" level to obtain a list of all System 75 commands.

Table 2-A describes functions and associated keys for each type of SAT supported. Function keys f1 through f8, on the 4410 and 4425 data terminals, are automatically programmed by the system to the key functions indicated on the table.

The keyboards are shown in Figures 2-1, 2-2, 2-3, and 2-4 for the 513 BCT, 4410 Data Terminal, 4425 Data Terminal, and 610 BCT, respectively.

Table, 2-A. System Access Terminal Keys

For This Function	Terminal Type		
	513 610* 615†	4410 610 615‡	4425
	Press Key Below:		
To cancel a screen form or command Once the key is pressed, the system returns the user to the enter command: (tasks request) level. Any data entered on a screen form prior to pressing CANCL (Cancel) or f1 is ignored. For the 4410 or 4425, the associated f1 screen label (CANCEL) is automatically assigned.	CANCL	f1	f1
To clear and redraw a screen form The system redraws the same screen, For the 4410 or 4425, the associated f2 screen label (REFRESH) is displayed when the add, change, or display command is entered and the screen form is displayed.	CLEAR RFRSH	f2	f2
To clear all data in a field The cursor must be positioned at the field the user wants to clear before this key is pressed. For the 4410 or 4425, the associated f4 screen label (CLEAR FIELD) is displayed when the add or change command is entered and the screen form is displayed.	CLEAR RFRSH (SHIFT)	f4	f4

* If a 513 emulation cartridge is used for a 610, the 610 terminal keys will function the same as the 513 terminal keys.

† 610 BCT and 615 BCT keyboards are identical.

‡ If a 513 emulation cartridge is not used with a 610, the 610 terminal keys will function the same as the 4410 keys.

Table 2-A. System Access Terminal Keys (Contd)

For This Function	Terminal Type		
	513 610* 615†	4410 610 615‡	4425
	Press Key Below:		
To display the next page of a screen form Used to display the next page of a screen form that has more than one page. For the 4410 or 4425, the associated f7 screen label (NEXT PAGE) appears when the screen form has more than one page.	PAGE	f7	f7
To display the previous page of a screen form Used to display the previous page of a form which has more than one page. For the 4410 or 4425, the associated f8 screen label (PREV PAGE) is displayed only when the screen form has more than one page.	PAGE (SHIFT)	f8	f8
To display the first page of a multiple screen form Used to display the first page of multiple forms when using the command (for example—'display station xxxx count 1-10' '). For the 4410 or 4425, the associated f6 screen label (NEXT FORM) is displayed only when multiple forms are to be displayed.	—	f6	f6

* If a 513 emulation cartridge is used for a 610, the 610 terminal keys will function the same as the 513 terminal keys.

† 610 BCT and 615 BCT keyboards are identical.

‡ If a 513 emulation cartridge is not used with a 610, the 610 terminal keys will function the same as the 4410 keys.

Table 2-A. System Access Terminal Keys (Contd)

For This Function	Terminal Type		
	513 610* 615†	4410 610 615‡	4425
	Press Key Below:		
To display help information for a field or command Used to display help information on the type of data that can be entered into the field associated with the current cursor position. The system displays all the possible entries the user can input for that field. This key can also be pressed at the '(enter command" level to obtain a list of all the system commands. The HELP key can be pressed at other command levels to obtain a list of objects and entries for identifiers. For the 4410 or 4425, the associated f5 screen label (HELP) is displayed when the user logs into the system.	HELP	f5	f5
To move the cursor to the next field on a line If the cursor is in the last field on a line, it moves to the first field on the next line. If the cursor is in the last field on the last line, it moves to the first field on the first line.	> or TAB >	> or TAB	> or TAB
To move the cursor to the previous field on a line If the cursor is in the first field on a line, it moves to the last field of the previous line. If it is in the first field of the first line, it moves to the last field of the last line.	< or TAB < (shift)	< or TAB (shift)	< or TAB (shift)

* If a 513 emulation cartridge is used for a 610, the 610 terminal keys will function the same as the 513 terminal keys.

† 610 BCT and 615 BCT keyboards are identical.

‡ If a 513 emulation cartridge is not used with a 610, the 610 terminal keys will function the same as the 4410 keys.

Table 2-A. System Access Terminal Keys (Contd)

For This Function	Press Key Below:		
To move the cursor to the next line If the cursor is on the last line, it moves to the first line.	ROLL ↓	0 ↓	↓
To move the cursor to the previous line If the cursor is on the first line, it moves to the last line.	ROLL ↑	2 ↑	↑
To store the data entered on a screen form Used to enter the data that is displayed on a screen form into system memory. For the 4410 or 4425, the associated f3 screen label (ENTER) is displayed when the add or change command is entered and the associated screen form is displayed.	ENTER	f3	f3

- * If a 513 emulation cartridge is used for a 610, the 610 terminal keys will function the same as the 513 terminal keys.
- † 610 BCT and 615 BCT are identical.
- ‡ If a 513 emulation cartridge is not used with a 610, the 610 terminal keys will function the same as the 4410 keys.

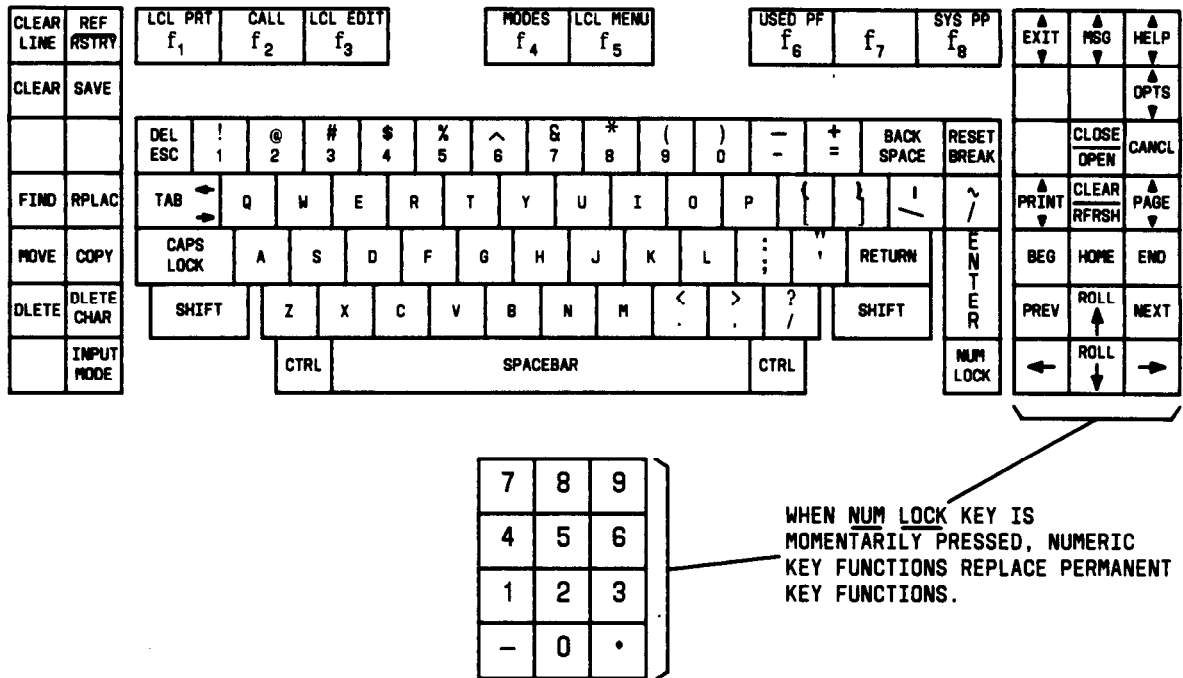


Figure 2-1, 513 Business Communications Terminal--Keyboard

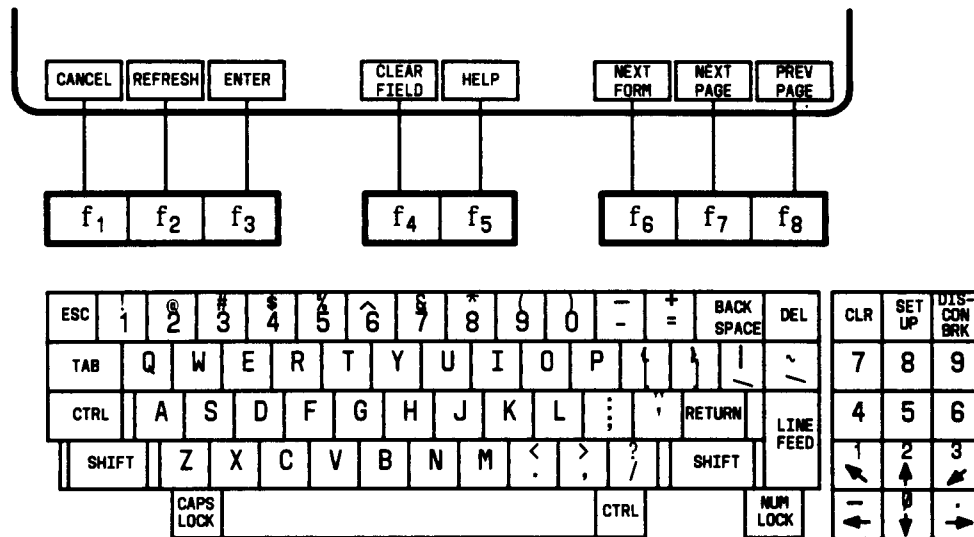


Figure 2-2. 4410 Data Terminal--Keyboard and Display Screen Function Keys

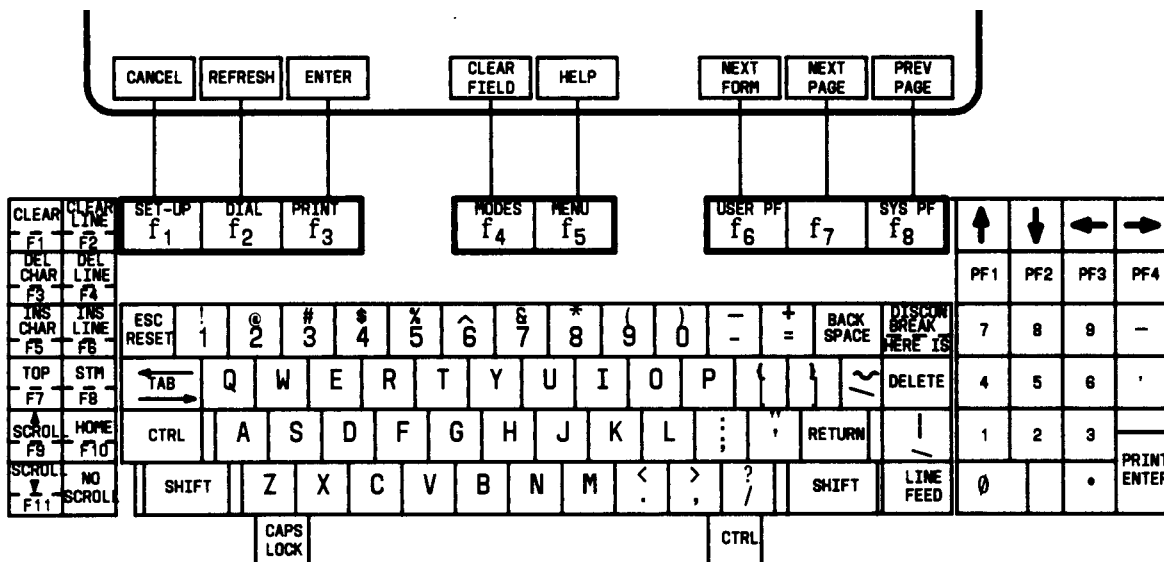


Figure 2-3. 4425 Data Terminal--Keyboard and Display Screen Function Keys

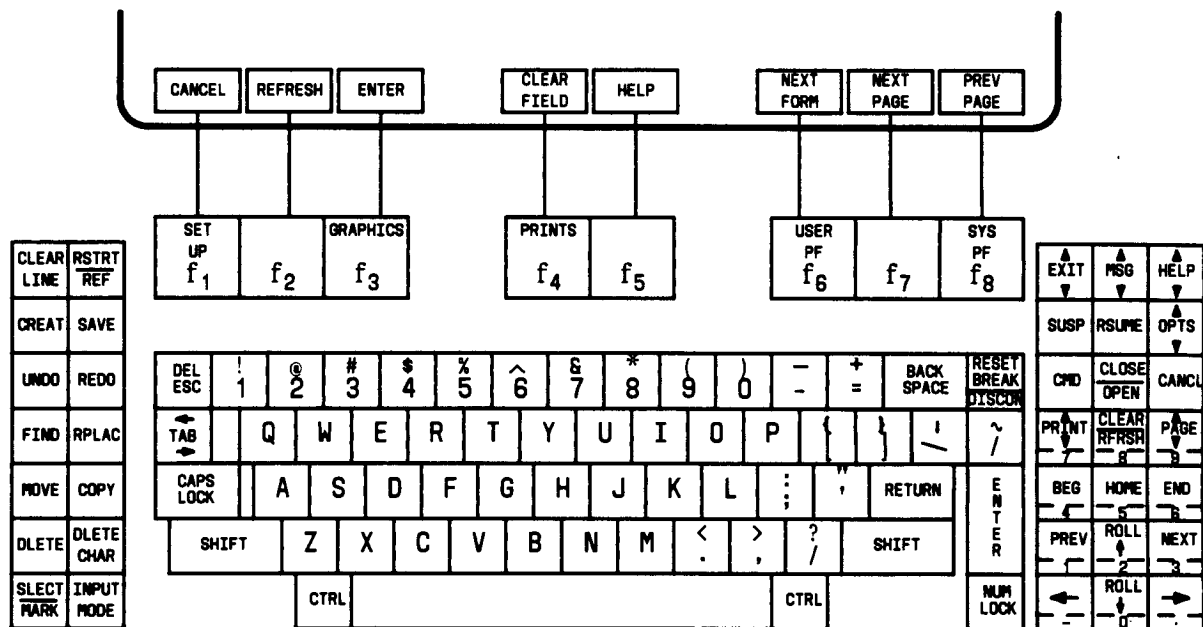


Figure 2-4. 610 BCT--Keyboard and Display Screen Function Keys

Login Procedure

To log into the system, do the following:

1. Turn on the SAT, if required. Verify that the screen displays:

Login:

2. Enter your login name and press the RETURN key. Verify that the screen displays:

password:

3. Enter your password and press the RETURN key.

For security reasons, the password is not displayed as you type it. The system verifies that a valid login and password name were entered. If an invalid login or password name was entered, the screen displays:

login incorrect

and you must repeat the procedure. If the system recognizes the login and password name, verify that the screen displays:

Terminal Type (Enter 513, 4410, or 4425): [513]

Note: The Terminal Type prompt does not appear for a V1 system.

4. For your terminal type, complete one of the following:
 - a. If the SAT is a 513 BCT, press the RETURN key. The 513 in brackets [513] is the system default SAT.
 - b. If the SAT is a 4410 Data Terminal, enter 4410 and press the RETURN key.
 - c. If the SAT is a 4425 Data Terminal, enter 4425 and press the RETURN key. ‘
 - d. If the SAT is a 610 BCT that has a 513 emulation cartridge, press the RETURN key.
 - e. If the SAT is a 610 BCT that does not have a 513 emulation cartridge, enter 4410 and press the RETURN key.
5. Verify that the screen displays:

enter command:

You may enter the desired command, such as “display station xxxx, ” or press the HELP key to obtain the list of permissible commands. (Refer to “Chapter 4. Trouble-Clearing Aids” for a detailed description of the commands available for system maintenance.)

Command Line Details

After a successful logon, the SAT displays enter command: and waits for entry of a command.

A command is made up of multiple words that are typed on the SAT keyboard and that instruct the system to do a task. The system's command structure is made up of an Action, Object, and Qualifier format.

The first word entered is the Action. It specifies the operation to be done (for example, test, display, or reset).

The second word entered is the Object. It specifies the object to receive the action (for example, station, trunk group, or hunt group).

The third word(s) entered is the Qualifier. The Qualifier is one or more words or digits used to further identify or complete the Object. Depending on the Object used, a Qualifier may or may not be used.

An example of a command line used to do a short test twice on a station with the extension number 1212 is:

test station 1212 short r 2

In the preceding example, test is the Action, station is the Object, and 1212 short r 2 is the Qualifier.

Spaces separate the Action, Object, and Qualifier on the command line.

Screen Forms

After the System Manager completes a command line (see Note), the SAT displays the appropriate screen form(s). Screen forms are system-generated forms that are formatted to allow easy entry of translation data.

Note: Command line words do not have to be completely spelled out. All that is required is to type enough letters to make the word unique.

Screen forms enable the System Manager to change the translations of the system by typing parameters on the SAT keyboard.

Each screen form consists of a title, page number, body area, and a help and error message line. Specific screen forms exist for each type of administrable function.

AT&T System 75—implementation, Release 1 Version 1, 555-200-650, or AT&T System 75 and System 75 XE—implementation, Release 1 Version 2, 555-200-651, and AT&T System 75 and System 75 XE—implementation, Release 1 Version 3, 555-200-652, contain detailed information and examples of the screen forms generated by the system. “

Logoff Procedure

The system logoff procedure should be done any time the SAT is not being used. This assures that system translations will not be accidentally corrupted. For V2 and V3 systems, the monitor system command, when canceled, automatically causes a SAT user to be logged off. This prevents unauthorized use of the SAT.

The following procedure is for logging off the system.

1. Verify that the screen displays:

enter command:

2. Enter logoff and press the RETURN key. The screen displays:

login:

Software Configuration

Table 2-B contains all official software (tape) vintage numbers that apply to System 75 and System 75 XE. The information supports Release 1 Version 1 (R1V1), Release 1 Version 2 (R1V2), and Release 1 Version 3 (R1V3). Enter the list configuration software command at the SAT to verify which release is loaded into memory.

Table 2-B. Software Vintages

System 75		System 75 XE R1V2	System 75 and System 75 XE R1V3
R1V1	R1V2		
3427	8215	14346	16643
4126	8218	14347	16675
4358	8224	14351	16962
4363	8326	14356	16966
4416	8389		17026
6144*	8320*		
	16320*		
	16321*		

* Special development software for customers requiring features and/or capabilities not offered in standard releases.

Note: Tape Vintage 4363 was issued as a Class A Change to replace all previous standard releases of V1 software; therefore, all V1 customers should now be upgraded to the 4363 Vintage.

Hardware Configuration

As much as possible, the System 75 hardware is maintained as a group of independent units or maintenance objects. Each maintenance object is normally a separately replaceable unit including circuit packs (see Table 2-C), power units, fans, voice terminals, lines, and trunks. Some of the units apply only to system Versions 1, 2, or 3 (V1, V2, V3). The list configuration command can be entered at the SAT to determine the circuit pack/port configuration.

Table 2-C. Replaceable System 75 Circuit Packs and Equipment

Name	Code	Release
Analog Line (8-Port)	TN742	R1V1-R1V3
Analog Line (16-Port)	TN746	R1V2-R1V3
Analog Line With Message Waiting	TN769	R1V3
Announcement	TN750	R1V3
Auxiliary Trunk	TN763	R1V1-R1V2
	TN763B	R1V3
CO Trunk	TN747	R1V1-R1V2
	TN747B	R1V3
Data Line	TN726	R1V2-R1V3
DID Trunk	TN753	R1V1-R1V3
Digital Line	TN754	R1V1-R1V3
DS1/DMI Tie Trunk	TN722/TN722B	R1V2-R1V3
Fan Speed Controller	AHD1	
High Capacity Minirecorder:		
Controller	TN1138	R1V3
Data/Servo	SN505	R1V3
Power	SN503	R1V3
Tape Transport	SN504	R1V3
Hybrid Line	TN762	R1V1
Hybrid Line	TN762B	R1V2-R1V3
Processor Interface	TN765	R1V2 XE, R1V3
Interface 1	TN716B	R1V1-R1V3
Interface 2	TN720	R1V1
	TN738	R1V2-R1V3
Interface 3	TN719	R1V1-R1V3
Maintenance	TN731	R1V1-R1V2
	TN731B	R1V3
Memory	TN734	R1V1-R1V3
	TN761	R1V2 (XE), R1V3

CHAPTER 2. GENERAL MAINTENANCE INFORMATION

Table 2-C. Replaceable System 75 Circuit Packs and Equipment (Contd)

Name	Code	Release
MET Line	TN735	R1V1-R1V3
Neon Power Supply	TN752	R1V3
Network Control	TN727	R1V1-R1V3
Pooled Modem	TN758	R1V1-R1V3
Power Units	TN736	R1V1-R1V3
	631AR/631BR	R1V1-R1V2
	631DA1/631DB1	R1V3
Processor	TN711	R1V1
	TN711B	R1V2-R1V3
RMSS Unit		
Speech Synthesizer	TN725	R1V1
	TN725B	R1V2-R1V3
Tape Control	TN729	R1V1-R1V3
Tie Trunk	TN760	R1V1
	TN760B	R1V2-R1V3
Tone/Clock	TN714	R1V1
	TN741	R1V2-R1V3
Tone Detector	TN748	R1V1-R1V2
	TN748B	R1V3

Table 2-D provides a complete listing of all common control and port circuit packs supported in System 75 XE.

Table 2-D. System 75 XE Circuit Packs

Function	Name	Code
Common Control Circuit Packs (Control Cabinet)	Memory	TN761
	Network Control	TN727
	Processor	TN759
	Processor Interface	TN765
	Tape Drive	TN764
	Tone/Clock	TN741 *
	Tone Detector/Generator	TN756 †
Port Circuit Packs (Control or Port Cabinet)	Analog Line (8-Port)	TN742
	Analog Line (16-Port)	TN746
	Analog Line (V3)	TN769
	Announcement CP (V3)	TN750
	Auxiliary Trunk	TN763B
	CO Trunk	TN747B
	Data Line	TN726
	DID Trunk	TN753
	Digital Line	TN754
	DS1/DMI Tie Trunk	TN722B
	Hybrid Line	TN762B
	MET Line	TN735
	Pooled Modem	TN758
	Power Unit	TN755 ‡
	Speech Synthesizer	TN725B
	Tie Trunk	TN760B
	Tone Detector	TN748B †

* Required when TN722B Tie Trunk is provided (used in place of TN756).

† Normally provided.

‡ The TN755 is required in every cabinet whenever TN746 or TN769 Analog Line circuit pack is used for neon message waiting stations. The TN755 is a wide pack and occupies port slots 13 and 14 when mounted in the Control Cabinet. It occupies only port slot 1 when mounted in a port cabinet.

Power Control

The main circuit breaker (CB1) for the entire System 75 cabinets is located in the center of the power distribution unit. It controls ac power to all carrier power units, the battery charger, and the minirecorder power supply.

The ON/OFF switch on the front of each carrier power unit should be left in the ON position at all times and should not be used for local control of power.

In System 75 XE, each cabinet has its own power supply. The supply controls power to all units in the cabinet and provides ringing current to associated voice terminal port circuits. An amber LED (located on the front panel of the power supply), when lighted, indicates normal operation. An associated circuit breaker (located on rear panel) functions as the power supply ON/OFF switch.

Emergency Transfer

System 75 and System 75 XE have emergency transfer capability in case of total system outage. Emergency transfer will connect several preassigned single-line voice terminals directly to trunks. Emergency transfer is invoked by loss of ac power, by any failure of the system that prevents it from processing calls, or by the system getting into a mode where it is continuously rebooting.

In System 75, the maintenance circuit pack contains an emergency transfer switch. This switch can be used to force the system into emergency transfer mode or to prevent the system from putting itself into emergency transfer mode.

In System 75 XE, the emergency transfer switch is located on the Processor circuit pack.

The EMERGENCY TRANSFER switch has three positions:

- **AUTO**—the normal operating position; if the system fails, emergency transfer will be activated automatically. To move the switch out of the AUTO position, pull it out and push it to either side.
- **ON**—emergency transfer is manually activated.
- **OFF**—the system is locked out of emergency transfer.

Test Point

System 75 provides five test points on the TN736 power unit in each carrier. The test points allow the measurement of backplane dc voltages of -48, -5, and +5.

Fuses

The System 75 power distribution unit contains fuses. These fuses are located on the back of the power distribution unit. A rear panel must be removed to access the fuses. Figures 2-5 and 2-6 show the layout of the fuses and identify the parts of the cabinet each one serves for the small and large cabinets, respectively.

Care must be taken when replacing fuses to assure that they are not installed backwards. The fuse must be positioned so that its tip end is inserted first (see Figure 2-7).

Figure 2-5. System Fuses—Small Cabinet

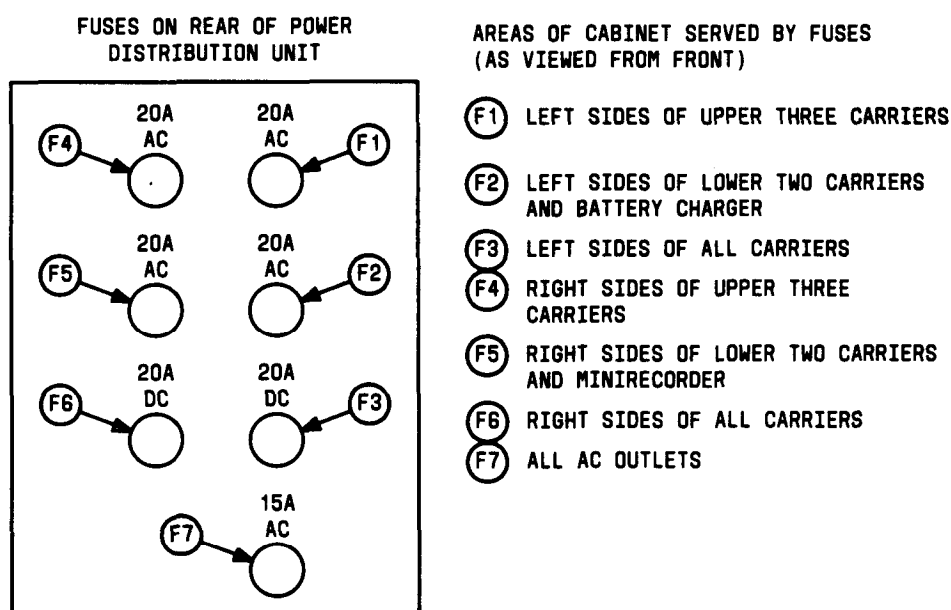


Figure 2-6. System Fuses—Large Cabinet

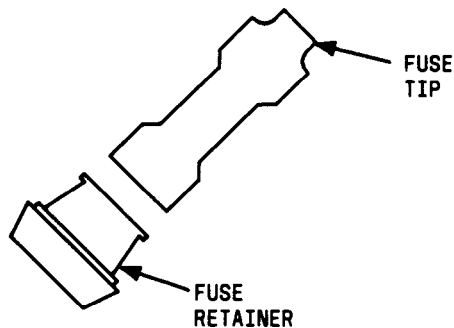


Figure 2-7. Fuse Replacement

Alarms and Indicators

If a maintenance object (MO) in the system begins to fail some of the periodic tests, the system automatically generates an alarm. This alarm indicates to maintenance personnel that action is required to restore the system to a normal condition. The system identifies three levels of alarms which are displayed on the Maintenance circuit pack (System 75) or the Processor circuit pack (System 75 XE) as follows:

- **Major Alarms**—Failures that cause critical degradation of service and require immediate attention.
- **Minor Alarms**—Failures that cause some degradation of service, but do not render a crucial portion of the system inoperable. This condition requires action, but its consequences are not immediate. Problems might be impairing service to a few trunks or stations or interfering with one feature across the entire system.
- **Warning Alarms**—Failures that cause no significant degradation of service or failures in equipment external to the system. Warning Alarms are not reported to the attendant console or INADS.

“Major” alarms should be retired first, “Minor” alarms second, and “Warning” alarms last in the order specified in the List of Alarms table in Chapter 5.

Other maintenance-related LED indicators are located on the Maintenance circuit pack, on the attendant console, on all circuit packs in the switch cabinet and, optionally, on customer-designated voice terminals.

In System 75 XE, the TN759 Processor circuit pack provides two alarm input connections for the customer-provided equipment (CPE) device. These two inputs can raise a minor or major alarm based on associated signal levels from the CPE device.

Maintenance Circuit Pack LEDs (System 75)

The front panel of the Maintenance circuit pack (Figure 2-8) in carrier A has two groups of LEDs. One group indicates the status of the pack and the other group (which includes the Major, Minor, and Warning alarms discussed previously) reflects maintenance conditions in the rest of the cabinet.

- Red (alarm)—the system has detected a fault in this circuit pack
- Green (test)—the system is running tests on this circuit pack
- Amber (busy)—this circuit pack is in use
- MAJOR alarms (red)
- MINOR alarms (red)
- WRNG (warning) alarms (amber)
- TEMP (temperature) alarms (red)—indicates problem related to high cabinet temperature
- ACK (acknowledgement) (green)—indicates Major or Minor alarms have been reported to INADS
- EMERGENCY TRANSFER (red)—indicates emergency transfer has been invoked.

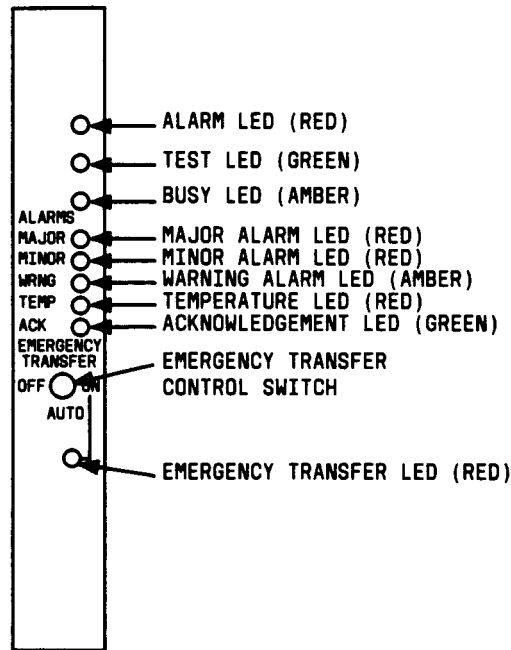


Figure 2-8. Maintenance Board Indicators

Processor Circuit Pack LEDs (System 75XE)

The front panel of the Processor circuit pack (see Figure 2-9) has two groups of LEDs. One group indicates the status of the circuit pack and the other group (which includes Major, Minor, and Warning LEDs) reflects maintenance conditions in the system. The LEDs indicate the following when lighted:

- Red (alarm)—the system has detected a fault in this circuit pack (an on-board alarm will reentered in the Alarm Log for this circuit pack)
- Green (test)—the system is running tests on this circuit pack
- Amber (busy)—this circuit pack is in use
- MAJ (major) alarms (red)
- MIN (minor) alarms (red)
- WRN (warning) alarms (amber)
- ACK (acknowledgment) (green)—indicates Major or Minor alarms have been reported to INADS

- EMER XFER (emergency transfer) (red)—indicates emergency transfer has been invoked.

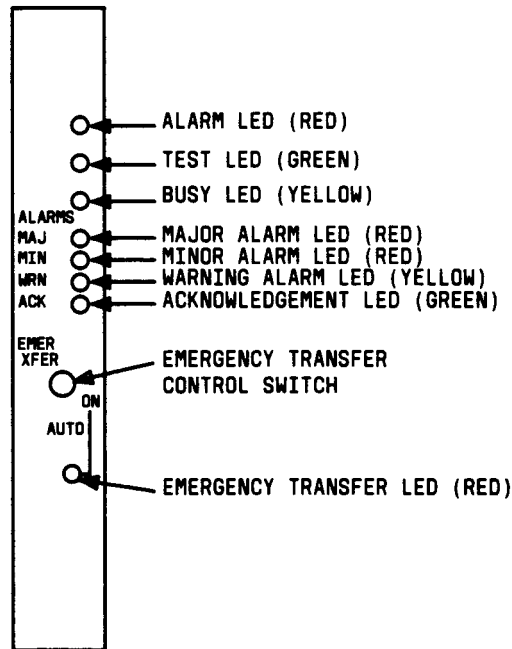


Figure 2-9. Processor Circuit Pack Indicators

Attendant Console LEDs

The attendant console has two red LEDs, labeled ALM and ACK, located on the left side of the console dial pad. The ALM LED lights steadily when there is a Major or Minor alarm at the switch cabinet. The ACK LED lights steadily if the alarm has been successfully reported to INADS. If the system is unable to report the alarm to INADS, the ACK LED flashes; this signals the attendant to call INADS and report the alarm.

Carrier Power Unit LEDs (System 75)

Each carrier power unit has a status LED that can be lighted either green or red. A green LED indicates normal circuit operation. A red LED is an alarm condition that indicates a failure in one of the power supplies.

Power Distribution Unit LEDs (System 75)

The circuit packs of the minirecorder have the same type of LEDs as the carrier circuit packs. The power supply has two green LEDs. When the upper LED is lighted, ac input power is present; when the lower LED is lighted, dc output voltages are within acceptable tolerances. The battery charger has a red LED that lights when trouble occurs in the charger or the backup batteries.

Power Supply LED (System 75 XE)

The Power Supply has an amber LED located on its front panel that lights to indicate that all outputs (+5, -5, +12, and -48 volts) are within limits and that the thermal protection circuitry is within limits.

Warning: Loss of power supply ringing voltage (90 volts ac) is not indicated on the Power Supply LED nor does the loss generate a DC Power error for the Error Log (described in Chapter 5).

Terminal Alarm Notification (V3)

The Terminal Alarm Notification feature (V3) allows for assignment of feature buttons on up to ten multi-appearance voice terminals and attendant consoles that may be used for alarm notification. When an alarm occurs, the green status LED associated with the button will flash. After INADS acknowledges the alarm condition, the LED will change from flashing to a steady-on state.

The LED may be turned off by pressing the feature button associated with it. If the LED is turned off and the alarm has not been resolved by the time maintenance reschedules testing, the LED will start flashing again.

Feature buttons may be assigned the following alarm conditions:

- Major—lighted if a major alarm in the system is active
- Minor—lighted if a minor alarm in the system is active
- PMS Alarm—lighted if the link to the PMS has a major, minor, or warning alarm active
- RS-Alert (V3)—lighted when a System Reset 2 or System Reset 3 is performed
- SCI Link Alarm—the link (1-4) alarm lamps are lighted for links that have a Major, Minor, or Warning alarm active.

Circuit Pack Status LEDs

Each circuit pack in the switch cabinet has three LEDs on the front panel visible at the front of the carrier (see Figure 2-1 O). On all circuit packs except the TN736 Power Unit (System 75) and the Tape Drive circuit pack (System 75 XE), the LEDs indicate the following when lighted:

- **Red (alarm)**—the system has detected a fault in this circuit pack, an on-board alarm for this circuit pack will be displayed in the Alarm Log.

If the circuit pack is communicating with the system, the system has detected a fault in this circuit pack. An on-board alarm for this circuit pack will be displayed in the Alarm Log.

The circuit pack will also turn on this LED when either the circuit pack has not yet initialized communication with the system or when the circuit pack loses contact with the system and therefore stops functioning (circuit pack is said to be “in reset”). In these cases, there may not be an alarm in the Alarm Log. To determine if the red LED is on because the circuit pack is not in contact with the system, issue the list configuration board CSS command, where CSS refers to the slot containing this circuit pack. If the system does not detect the circuit pack, this command will return “Identifier not assigned” or “no board”.

If the circuit pack has just been inserted, the system still could be initializing the circuit pack. If, after 5 minutes, the circuit pack still has not initialized communications with the system, check the maintenance documentation for this MO for any special instructions. If the section you consult does not provide the needed information, follow the recommended maintenance section for reseating circuit packs

Warning: Reseating some circuit packs may be very destructive (for example, control carrier circuit packs.)

If, after reseating the circuit pack and waiting 5 minutes, the result of issuing the list configuration board CSS command indicates that the system still has not registered the circuit pack, check the Hardware Error Log for TONE-BD and TDM-BUS errors. Issue the test tdm command. Issue the test tone-clock command. Follow appropriate maintenance documentation sections for any TONE-BD and TDM-BUS errors. Also, try inserting the circuit pack into a different slot and try inserting a different circuit pack into the suspect slot (provided that the maintenance documentation for this circuit pack does not warn against either of these actions).

If the system seems to be functioning correctly, but the circuit pack will not start communicating with the system, replace the circuit pack.

- **Green (test)**—the system is running tests on this circuit pack.
- **Amber (busy)**—this circuit pack is in use.

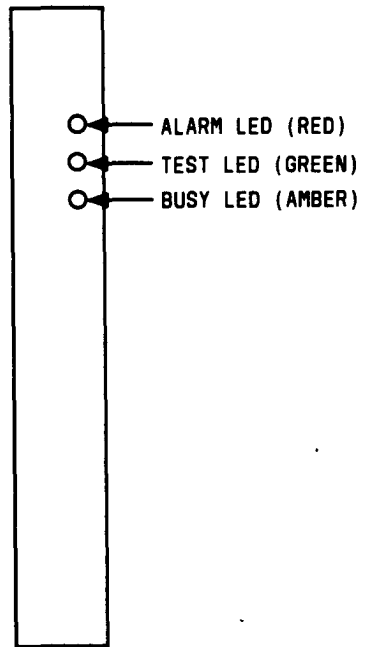


Figure 2-10. Circuit Pack Indicators

During the various states of operation (start-up testing, normal operation, circuit failure, etc.) circuit pack status LED indications appear as shown in Table 2-E.

Table 2-E. Circuit Pack Status LEDs

Equipment Type	LED	Description
Port Circuit Packs	Red	Lighted briefly during power up, circuit pack reseating, and system reset. Lighted steadily if circuit pack fails start-up test or fails while in use. Otherwise, dark during normal operation.
	Green	Lighted briefly during circuit pack testing following power up, circuit pack reseating, and system reset. Also lighted during periodic, scheduled, and craft demand testing. Otherwise, dark during normal operation.
	Amber	Lighted steadily when any port in the circuit pack is in use. Otherwise, dark.
Control Circuit Packs	Red	Lighted briefly during power up and system reset. Lighted steadily if circuit pack fails start-up test or fails while in use. Otherwise, dark during normal operation.
	Green	Lighted briefly during circuit pack testing following power up and system reset. Otherwise, dark during normal operation.
	Amber	Processor—lighted during processor initialization. Otherwise, dark during normal operation. Memory—lighted during system initialization (stays lighted until Emergency Transfer is turned off). Otherwise, dark during normal operation. Network Control—lighted when someone is logged in on one of the data channels. Tone Detector/Generator—slow blinking when clock is in use. Otherwise, dark. Processor Interface—lighted when one (or more) channels (links) is in use. Otherwise, dark.
Tape Drive Circuit Pack	Amber	Lighted steadily when in use. Otherwise, dark.

CHAPTER 3. ROUTINE MAINTENANCE PROCEDURES .

General

The following general purpose procedures are used during normal maintenance activities:

- INADS Alarm Origination—Activation/Deactivation
- Handling Port Circuit Packs
- Ž Handling Network Control Circuit Pack
- Removing and Restoring Power
- System Reset and Reboot indications—V1
- Ž System Reset and Reboot Indications—V2 and V3
- System Reset (XE)
- SPE Down Mode Alarm
- System Backup
- Ž Software Upgrade.

INADS/CPE Alarm Origination—Activation/Deactivation

Before doing any maintenance activity, such as replacing a circuit pack or disconnecting power, the alarm origination to INADS (Initialization and Administration System) and CPE (Customer-Provided Equipment) device should be deactivated. This prevents INADS and the customer from receiving alarms caused by the maintenance activity.

Note No alarms will be reported while the remote maintenance port is in use. Therefore, any alarms generated during a remote maintenance session will not be reported until the session is completed. If any alarms are retired before the session is complete, they will not be reported at all.

After maintenance is completed, the alarm originations should be reactivated.

Maintenance-Related System Parameters Form

The Maintenance-Related System Parameters Form (Figures 3-1 and 3-2) identifies system-related maintenance parameters and displays the default values.

The form is used to select various operations support and scheduled maintenance features. Also, the form is another way to activate or deactivate Alarm Origination.

To activate or deactivate Alarm Origination via the Maintenance-Related System Parameters Form, enter the following command line:

change system-parameters maintenance

Verify that the Maintenance-Related System Parameters form is displayed. Then do one of the following:

A. To deactivate alarm origination:

- If Alarm Origination Activated field = y, change field to “n”.
- If CPE Alarm Activation Level field is “major”, “minor”, or “warning”, note entry for later reinstatement and change field to “none”.
- Press ENTER key and verify screen displays command successfully completed followed by enter command:

B. To activate alarm origination:

- Reinstatement Alarm Origination Activated and CPE Alarm Activation Level fields to entries contained in fields prior to deactivating the alarms.
- Press ENTER key and verify screen displays command successfully completed followed by enter command:

To access the Maintenance-Related System Parameters Form to change information contained in the various fields, enter the following command line:

change system-parameters maintenance

Note: The explanations of the various fields follow Figures 3-1 and 3-2.

change system-parameter maintenance
Page 1 of 1

MAINTENANCE - RELATED SYSTEM PARAMETERS

OPERATIONS SUPPORT PARAMETERS

PBX Identification : _____

OSS Telephone Number : _____

Alarm Origination Activated? n

MAINTENANCE TESTS

Daily Test Start Time: 01 : 00 Save Translation Daily? y

MAINTENANCE THRESHOLDS (Before Notificaiton)

Minimum Threshold for TTRs: 4 Minimum Threshold for CPTRs: 1

Note: # or * not allowed.

Figure 3-1. Maintenance-Related System Parameters Form (V1)

change system-parameters maintenance
Page 1 of 1

MAINTENANCE-RELATED SYSTEM PARAMETERS

OPERATIONS SUPPORT PARAMETERS

Product Identification: _____

OSS Telephone Number: (See Note)

Alarm Origination Activated? n

Test Remote Access Port? n

MAINTENANCE TESTS

Daily Test Start Time: 01 : 00 Save Translation Daily? y

MAINTENANCE THRESHOLDS (Before Notification)

Minimum Threshold for TTRs: 4 Minimum Threshold for CPTRs: 1

TERMINATING TRUNK TRANSMISSION TEST (extension)

TEST TYPE 100: _____ TEST TYPE 102: _____ TEST TYPE 105: _____

Note: #or * not allowed.

Figure 3-2. Maintenance-Related System Parameters Form (V2 and V3)

The fields on the Maintenance-Related System Parameters Form are defined in the following paragraphs. Specific entries must be obtained from the Customer Service Support Operations (CSSO), the Technical Consultant (TC), and/or the customer.

- **Product Identification**—Identifies the switch to an Operations Support System (OSS), for example, INADS. The number must start with 1 and contain ten digits. The last nine digits are the cabinet serial number.
- **OSS Telephone Number**—The number that the switch uses to call INADS for alarm origination. The number must be obtained from the National Customer Support Center (NCSC) or the CSSO.
- **Alarm Origination Activated**—Indicates whether alarm origination is activated or not. If “yes”, all major and minor alarms will result in an automatic call to an INADS. If “no”, alarm origination is not activated. Warning alarms will not be reported to INADS.
- **Test Remote Access Port**—indicates whether to test the remote access port on the Processor circuit pack. If a trunk for remote access and alarm origination is not provided, then running tests on the remote access port (via the test processor or test maintenance command) will result in tests failing. This will cause maintenance to be unnecessarily alarmed and additional, possibly destructive, tests to be run.
- **Start Time**—Indicates the hour and minute the daily scheduled maintenance actions will start. Enter a number from 0 through 23 for hours and 0 through 59 for minutes. The scheduled maintenance actions are: daily maintenance, save translation, control channel interchange, system clocks interchange, SPE interchange, and EXP-Link interchange.
- **Save Translation**—Indicates if the switch translation data should be automatically saved (on tape) on a particular day of the week. Enter one of the following: daily, no, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, or Saturday.
- **Minimum Threshold for TTRs**—Shows the number of touch-tone receivers in the system. If fewer than this number are in service, a warning alarm is raised. Enter a number from 1 through 80.
- **Minimum Threshold for CPTRs**—Shows the number of call progress tone receivers in the system. If fewer than this number are in service, a warning alarm is raised. Enter a number from 1 through 40.
- **TEST TYPE 100**—Defines the extension number assigned to Test Type 100. This test allows a system with originating test line capability to measure far-end to near-end loss and C-message noise. Enter the extension number assigned to Test Type 100.

- **TEST TYPE 102**—Defines the extension number assigned to Test Type 102. This test allows a system with originating test line capability to measure far-end to near-end loss. Enter the extension number assigned to Test Type 102.
- **TEST TYPE 105**—Defines the extension number assigned to Test Type 105. This test allows a system with originating test line capability to measure 2-way loss, gain slope, C-message noise, and C-notch noise. Enter the extension number assigned to Test Type 105.

To access and change the form, do the following:

1. Verify that the System Access Terminal screen displays:

“enter command:

2. Enter change system-parameters maintenance command. Then press RETURN key.
3. Verify that screen displays Maintenance-Related System Parameters Form (Figures 3-1 and 3-2).

Note: Cursor is positioned on Product Identification: line.

4. Position cursor and enter information for each parameter as specified in the customer’s order by pressing RETURN or TAB keys.

Note: An entry must always be made in the Product Identification field and the OSS Telephone Number field.

5. Press ENTER function key.
6. Verify that screen displays:

command successfully completed

enter command:

7. Verify data by entering the display system-parameters maintenance command and pressing the RETURN key.

The Maintenance-Related System Parameters Form is displayed showing all data entered in the above steps followed by:

enter command:

Terminating Trunk Transmission Test

Terminating Trunk Transmission (TTT) (Non-interactive) feature provides extension number access to three tone sequences that can be used for trunk transmission testing from the distant end of the trunks.

The three test types need to have extension numbers assigned on the System-Parameters Maintenance Form:

Test Type 100:_____ Test Type 102:_____ Test Type 105:_____

Test Type 100 provides:

1. 5.5 seconds of 1004 Hz tone at 0 dB
2. Quiet until disconnect; disconnect is forced after 1 minute.

Test Type 102 provides:

1. 9 seconds of 1004 Hz tone at 0 dB
2. 1 second of quiet
3. This cycle is repeated until disconnect; disconnect is forced after 24 hours

Test Type 105 provides:

1. 9 seconds of 1004 Hz at -16 dB
2. 1 second of quiet
3. 9 seconds of 404 Hz at -16 dB
4. 1 second of quiet
5. 9 seconds of 2804 Hz at -16 dB
6. 30 seconds of quiet
7. 0.5 second of Test Progress Tone (2225 Hz)
8. Approximately 5 seconds of quiet
9. Forced disconnect.

Handling Port Circuit Packs

Warning: Electrostatic discharge can destroy or severely damage integrated circuits on circuit packs. Always wear the electrostatic discharge (ESD) wrist grounding strap when handling circuit packs. Connect the wrist strap grounding clip to the frame of the cabinet being worked on before inserting or removing circuit pack.

The following procedures are for port circuit pack unseating, reseating, and replacement and are common to all maintenance activities that involve port circuit packs. Control circuit packs must be handled as described in the Removing and Restoring Power section.

Port Circuit Pack Unseating/Reseating

Caution: Any time a circuit pack is unseated, service will be interrupted if the amber (busy) LED is lighted. For System 75, control circuit packs must not be unseated or reseated unless the common control area of Carrier A has been powered down. For System 75 XE, control circuit packs must not be unseated or reseated unless the Control Cabinet has been powered down. To remove or restore power on System 75 or System 75 XE, see Removing and Restoring Power section.

Each circuit pack has a latch pin and a locking lever on the lower part of its front panel (see Figure 3-3).

To unseat a circuit pack:

1. Slide the latch pin upward to unlock the locking lever.
2. Pull down on the locking lever until the pack is disconnected from its socket.
3. Pull the circuit pack just enough to break contact with the backplane connector but do not remove it from the cabinet.

To reseat a circuit pack:

1. Push the unseated pack back into the backplane connector.
2. Lift the locking lever until the pin engages.

Port Circuit Pack Replacement

Before replacing any circuit pack, unseat and reseat it to ensure that a bad contact with the backplane connector is not causing the trouble. If the trouble is not cleared, continue as follows:

Note: Unseating/reseating a circuit pack temporarily clears any associated alarms; however, if the trouble still exists the alarm(s) will reappear.

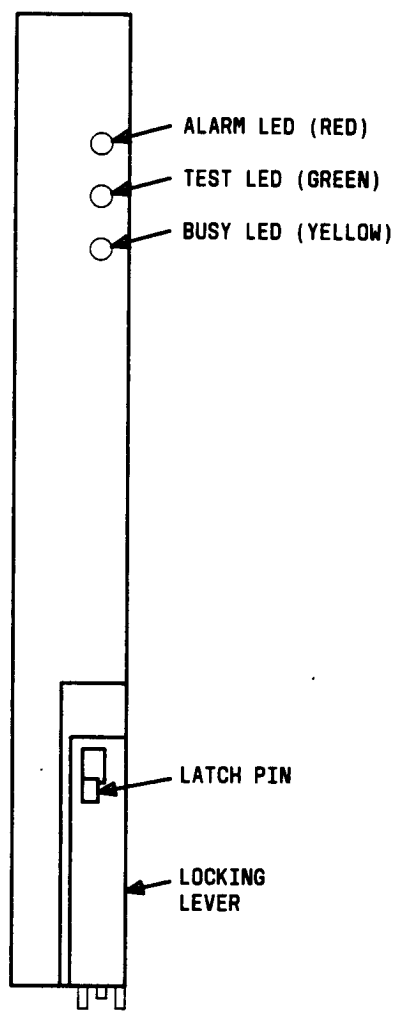


Figure 3-3. Typical System 75 TN-Coded Circuit Pack

1. Unseat the circuit pack.
2. Slide the circuit pack out of the slot.
3. Inspect the connectors at the back of the circuit pack. If any of the contacts are dirty, it may be possible to clean them per prescribed procedures and then return the circuit pack to service. If any contacts are damaged or corroded, however, replace the circuit pack.

Note: If a new circuit pack does not correct the problem, install the original circuit pack.

To install a new circuit pack, or return the original one to service:

1. Carefully insert the circuit pack and push it all the way into its mounting slot.
2. Lift the locking lever until the latch pin engages.
3. Verify that the circuit pack LED indications are correct.

Handling Network Control Circuit Pack

Warning: Whenever a TN727 Network Control (Netcon) circuit pack is reseated or replaced, the correct date and time setting must be manually entered and verified.

To reset the date and time, issue the set time command at the SAT. After carefully entering the desired information, issue the display time command to verify the accuracy of the date and time.

Removing and Restoring Power.

Before any common control circuit pack is removed from the common control area of carrier A, the cabinet must be powered down.

Warning: When the system is powered down, rebooted, or reset at levels 3, 4, or 5 (see reset command descriptions in Chapter 4), some voice terminal and attendant console features are adversely affected. Users should be advised of services that may be lost and have to be reactivated.

If a save translations command is not entered at the SAT when the system is powered down, all messages stored by the Leave Word Calling feature are lost and all lighted Message Waiting lamps go dark.

The following features, if activated, are deactivated:

- Attendant Trunk Group Control
- Automatic Callback
- Call Park
- Make Busy for Direct Department Calling and Uniform Call Distribution.

The numbers stored by the Last Number Dialed feature are lost. In addition, any translation data entered since the last translation save will be lost. This includes Abbreviated Dialing list entries that were programmed by users, Call Forwarding All Calls, Send All Calls, and Ringer cutoff.

Removing Power

Warning: If a Tape Alarm is present or a tape problem is suspected, do not save translations on either of the two tapes provided with the system (current tape and backup tape). An attempt to save translations could destroy all data on the tape. Obtain a spare third tape or do not save translations.

To remove power, complete the following:

1. Check that the tape cartridge is in the Tape Transport.
2. At the SAT, enter the save translations command, unless a tape drive problem is active.
3. For System 75, at the Maintenance circuit pack, set the EMER XFER (Emergency Transfer) switch to ON. For System 75 XE, at the Processor circuit pack, set the EMER XFER switch to ON. This locks the system in the transfer mode until the trouble is cleared.

Note: When removing power, Error Log information will be lost. If the data is to be retained, enter the reset system 4 command. This command restarts the system and may take several minutes (wait for the login prompt before proceeding).

4. For System 75, at the Power Distribution Unit (see Figure 3-4), set the circuit breaker to OFF. For System 75 XE, at the Control Cabinet power supply (see Figure 3-5), set the circuit breaker to OFF.

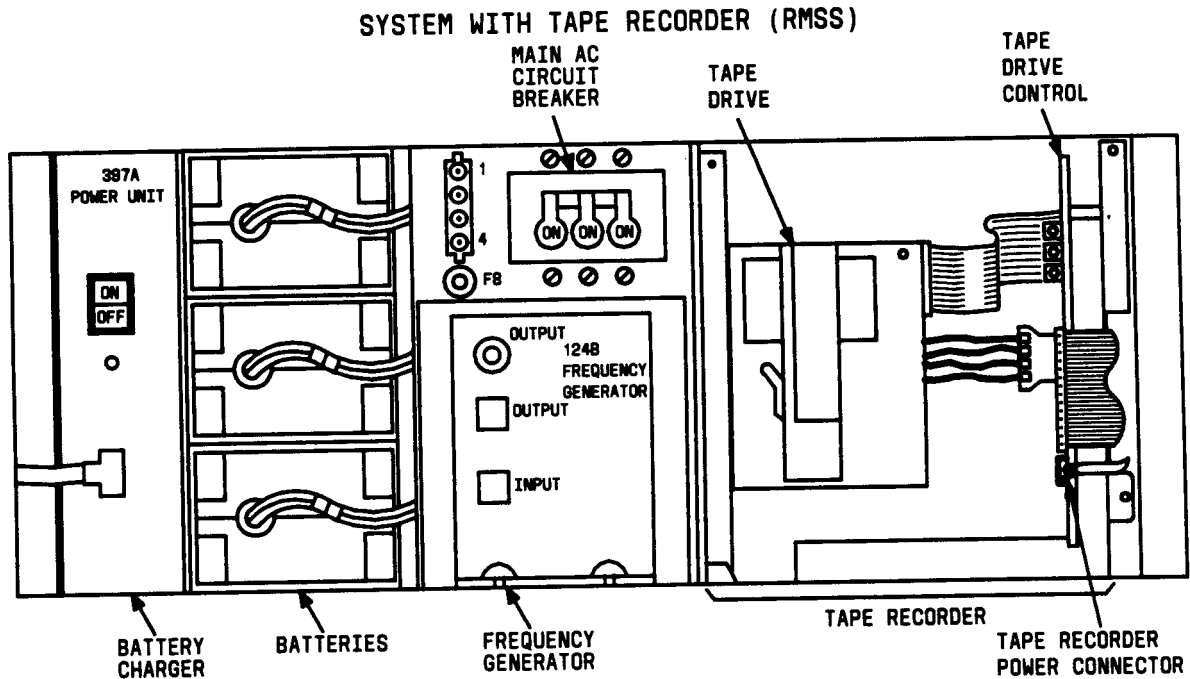
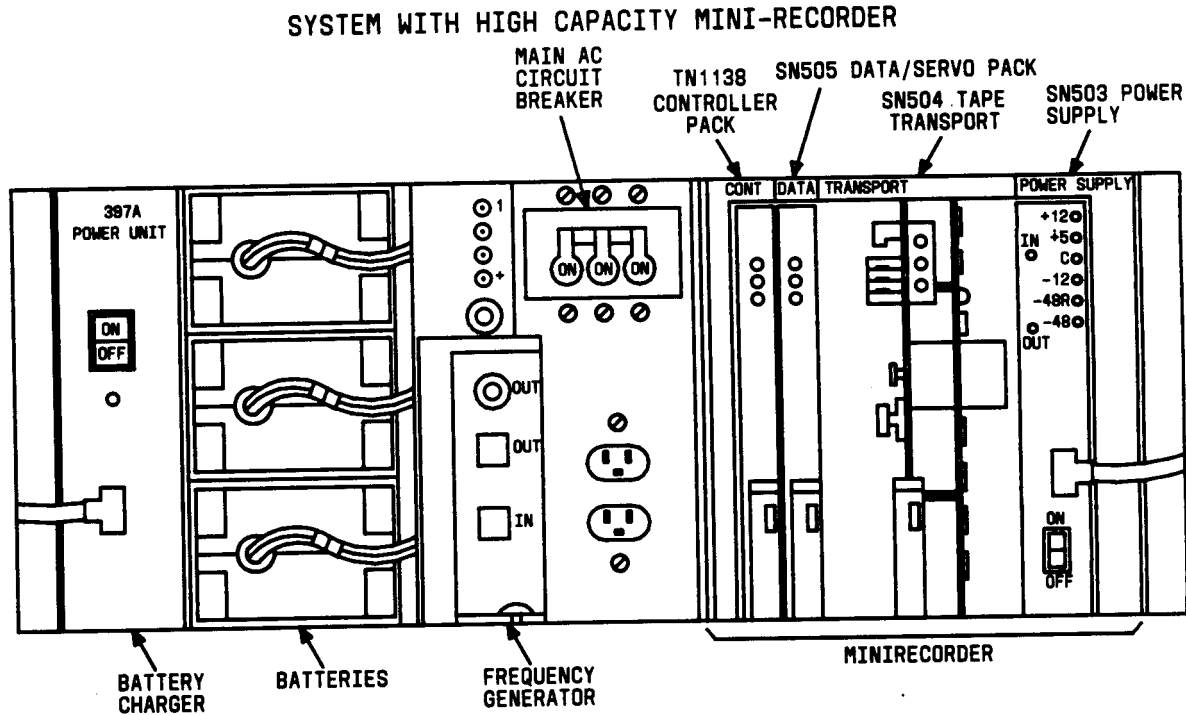


Figure 3-4. Power Distribution Unit

CHAPTER 3. ROUTINE MAINTENANCE PROCEDURES

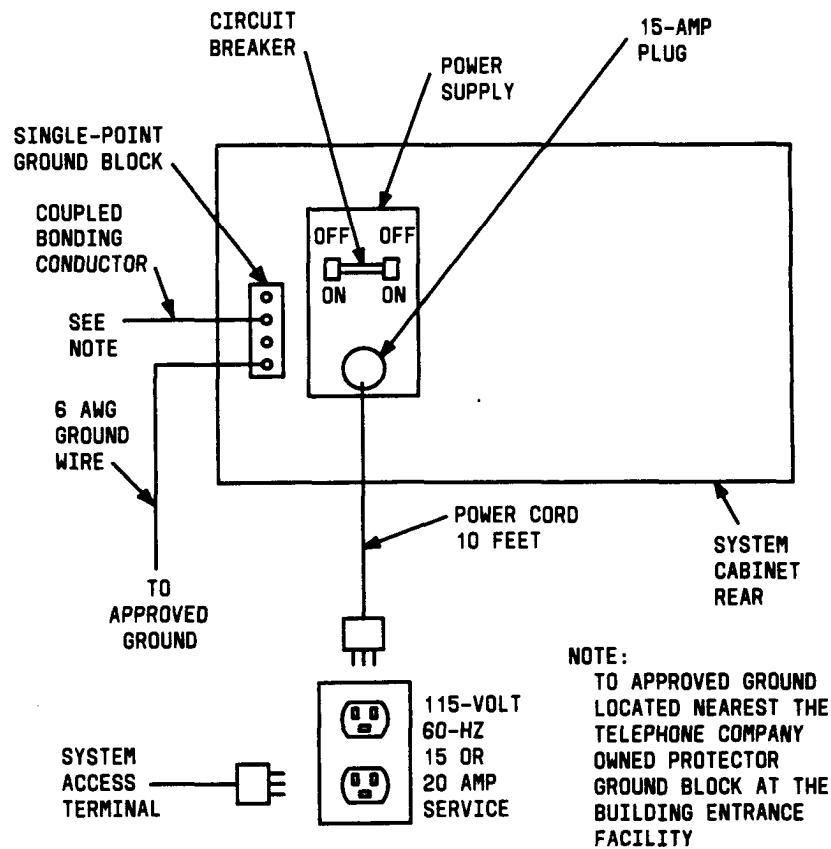


Figure 3-5. Control Cabinet—Power and Grounding

Restoring Power on System 75

After the removed circuit pack or anew circuit pack has been installed, to restore power on System 75, complete the following procedure:

1. Set the main circuit breaker to ON.
 - . The system now goes through the rebooting process, loading the system program and translations from the tape. Rebooting requires several minutes.

- When system power is restored, the following typical display is shown on the SAT.

KEYBOARD LOCKED, WAIT FOR LOGIN
LMM VERSION # 1c5.18dr
POWER UP ENTRY

(Rest of display is the same as a reset system 4 that is covered in the System 75 Reset and Reboot Indications section.)

2. After the system reboot is finished and all trouble is cleared, return the EMER XFER (Emergency Transfer) switch to AUTO. This restores the system to the normal operating mode.

Note: If power has been off for several minutes (10 to 20 minutes, for example), make sure that the date and system time are still accurate. (Enter display time command to verify.)

Restoring Power on System 75 XE

After the removed circuit pack or a new circuit pack has been installed, to restore power on System 75 XE, complete the following procedure:

1. Set the Control Cabinet power supply circuit breaker to ON.

The system now goes through the rebooting process, loading the system program and translations from the tape. Rebooting requires several minutes.

Following power up, the following typical display is shown on the SAT:

LMM VERSION 1.2 XE
POWER UP ENTRY

(remainder of display same as reset system 4 display
which is covered in System 75 XE Reset)

2. After the system reboot is finished and all trouble is cleared, set the EMER XFER (Emergency Transfer) switch to AUTO (center position). This restores the system to the normal operating mode.
3. Display system date and time using the set time command. Update date and time if required.

System 75 Reset and Reboot Indications (V1)

After reset commands are entered at the SAT or system power is restored, SAT displays and circuit LEDs indicate the progress of the reset or reboot process. The SAT displays are slightly different for V1, V2, and V3 systems because of a hardware change in the Processor circuit pack. Hexadecimal numbers shown in parenthesis such as (=BD9F) are examples only and will change.

Warning: When the system is rebooted or reset at levels 3, 4, or 5, some voice terminal and attendant console features are adversely affected. Users should be advised of services that may be lost and have to be reactivated. The affected services are described in the Removing and Restoring Power section.

The system can reset itself from its maintenance software. This process depends on errors detected by the software. The SAT displays are the same whether reset from the system or manually reset. Typical SAT displays for successful resets at each level for V1 systems are as follows:

System Warm Start (Reset System 1) .

WARM START PERFORMED

Login:

System Cold Start Without Translations Loading (Reset System 2)

SOFT INT TEST PASSED

MM/SD TEST PASSED

STACK OVERFLOW / SCRATCH PAD TEST PASSED ! !

NMI TEST PASSED (If test fails, see NMI Test failure section)

COLD II IS PERFORMED

Login:

System Cold Start With Translations Loading (Reset System 3)

SOFT INT TEST PASSED

MM/SD TEST PASSED

STACK OVERFLOW / SCRATCH PAD TEST PASSED ! !

NMI TEST PASSED (If test fails, see NMI Test failure section)

COLD I IS PERFORMED

Login:

System Reboot (Reset System 4)

INVOKING EMERGENCY TRANSFER
CHECKSUM = 276F ROM CHECKSUM TEST PASSED
SOFT INT TEST PASSED
MM/SD TEST PASSED
STACK OVERFLOW/SCRATCH PAD TEST PASSED !!
NMI TEST PASSED (If test fails, see NMI Test failure section)
READ ALL MEMORY BOARD # 0000 PASSED
SLOT 0000 DATA BIT TEST PASSED !!
SLOT 0000 CHECK BIT TEST PASSED !!
SLOT 0000 MEE SING BIT ERROR TEST PASSED !!
SLOT 0000 MEE DOUB BIT ERROR TEST PASSED !!
MEMORY FUNCTIONAL TEST PASSED .
TAPE INTERFACE TEST PASSED
READING TAPE
TEXT =63FC TEXT CHECKSUM PASSED !!
DATA =C6EC DATA CHECKSUM PASSED !!
REBOOT PERFORMED
Login:

System Reboot and Run all 24-Hour Tests (Reset System 5)

INVOKING EMERGENCY TRANSFER
CHECKSUM = 276F ROM CHECKSUM TEST PASSED
SOFT INT TEST PASSED
MM/SD TEST PASSED
STACK OVERFLOW / SCRATCH PAD TEST PASSED !!
NMI TEST PASSED (If test fails, see NMI Test failure section)
READ ALL MEMORY BOARD # 0000 PASSED
SLOT 0000 DATA BIT TEST PASSED !!
SLOT 0000 CHECK BIT TEST PASSED !!
SLOT 0000 MEE SING BIT ERROR TEST PASSED !!
SLOT 0000 MEE DOUB BIT ERROR TEST PASSED !!
MEMORY FUNCTIONAL TEST PASSED
TAPE INTERFACE TEST PASSED
READING TAPE
SOFT INT TEST PASSED
MM/SD TEST PASSED
STACK OVERFLOW / SCRATCH PAD TEST PASSED !!
NMI TEST PASSED (If test fails, see NMI Test failure section)
SLOT 0000 DATA BIT TEST PASSED !!
SLOT 0000 CHECK BIT TEST PASSED !!
SLOT 0000 MEE SING BIT ERROR TEST PASSED !!
SLOT 0000 MEE DOUB BIT ERROR TEST PASSED !!
MEMORY FUNCTIONAL TEST PASSED
TAPE INTERFACE TEST PASSED
READING TAPE
TEXT =63FC TEXT CHECKSUM PASSED !!
DATA =C6EC DATA CHECKSUM PASSED !!
EXTENDED REBOOT PERFORMED
Login:

System 75 Reset and Reboot Indications (V2 and V3)

After reset commands are entered at the SAT or system power is restored, SAT displays and circuit pack LEDs indicate the progress of the reset or reboot process. The SAT displays are slightly different for V1, V2, and V3 systems because of a hardware change in the Processor circuit pack and the additional Memory circuit pack (Memory 2). Hexadecimal numbers shown in parenthesis such as (=BD9F) are examples only and will change.

Warning: When the system is rebooted or reset at levels 3, 4, or 5, some voice terminal and attendant console features are adversely affected. Users should be advised of services that may be lost and have to be reactivated. The affected services are described in Removing and Restoring Power section.

The system can reset itself from its maintenance software. This process depends on errors detected by the software. The SAT displays are the same whether reset from the system or manually reset. Typical SAT displays for successful resets at each level for V2 and V3 systems are as follows:

Note: In the following displays, "MEMORY 1" is the Memory circuit pack and "MEMORY 2" is the Memory 2 circuit pack.

System Warm Start (Reset System 1)

WARM START PERFORMED

Login:

System Cold Start Without Translations Loading (Reset System 2)

SOFT INT TEST.	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST (If test fails see NMI Test failures section)	PASSED
COLD II IS PERFORMED	

Login:

System Cold Start With Translations Loading (Reset System 3)

SOFT INT TEST	PASSED
MM/SD TEST	PASSED
STACK OVERFLOW / SCRATCH PAD TEST	PASSED
NM I TEST (If test fails see NM I Test failures section)	PASSED
COLD I IS PERFORMED	

Login:

System Reboot (Reset System 4)

INVOKING EMERGENCY TRANSFER	
ROM CHECKSUM TEST (=BD9F)	PASSED
SOFT INT TEST	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST (If test fails see NMI Test failures section)	PASSED
MEMORY BOARD 1 READ TEST	PASSED
MEMORY BOARD 1 DATA BIT TEST	PASSED
MEMORY BOARD 1 CHECK BIT TEST	PASSED
MEMORY BOARD 1 MEE SING BIT TEST	PASSED
MEMORY BOARD 1 MEE DOUB BIT TEST	PASSED
MEMORY BOARD 2 READ TEST	PASSED
MEMORY BOARD 2 DATA BIT TEST	PASSED
MEMORY BOARD 2 CHECK BIT TEST	PASSED
MEMORY BOARD 2 MEE SING BIT TEST	PASSED
MEMORY BOARD 2 MEE DOUB BIT TEST	PASSED
MEMORY FUNCTIONAL TEST	PASSED
TAPE INTERFACE TEST	PASSED
READING CORE	
READING UPDATE	
TEXT CHECKSUM TEST (=FCCB)	PASSED
DATA CHECKSUM TEST (=23CA)	PASSED
REBOOT PERFORMED	

Login:

System Reboot and Run all 24-Hour Tests (Reset System 5)

INVOKING EMERGENCY TRANSFER	
ROM CHECKSUM TEST (=BD9F)	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST (If test fails see NMI Test failures section)	PASSED
MEMORY BOARD 1 READ TEST	PASSED
MEMORY BOARD 1 DATA BIT TEST	PASSED
MEMORY BOARD 1 CHECK BIT TEST	PASSED
MEMORY BOARD 1 MEE SING BIT TEST	PASSED
MEMORY BOARD 1 MEE DOUB BIT TEST	PASSED
MEMORY BOARD 2 READ TEST	PASSED
MEMORY BOARD 2 DATA BIT TEST	PASSED
MEMORY BOARD 2 CHECK BIT TEST	PASSED
MEMORY BOARD 2 MEE SING BIT TEST	PASSED
MEMORY BOARD 2 MEE DOUB BIT TEST	PASSED
MEMORY FUNCTIONAL TEST	PASSED
TAPE INTERFACE TEST	PASSED
SOFT INT TEST	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST (If test fails see NMI Test failures section)	PASSED
MEMORY BOARD 1 READ TEST	PASSED
MEMORY BOARD 1 DATA BIT TEST	PASSED
MEMORY BOARD 1 CHECK BIT TEST	PASSED
MEMORY BOARD 1 MEE SING BIT TEST	PASSED
MEMORY BOARD 1 MEE DOUB BIT TEST	PASSED
MEMORY BOARD 2 READ TEST	PASSED
MEMORY BOARD 2 DATA BIT TEST	PASSED
MEMORY BOARD 2 CHECK BIT TEST	PASSED
MEMORY BOARD 2 MEE SING BIT TEST	PASSED
MEMORY BOARD 2 MEE DOUB BIT TEST	PASSED
MEMORY FUNCTIONAL TEST	PASSED
TAPE INTERFACE TEST	PASSED
READING CORE	
READING UPDATE	
TEXT CHECKSUM TEST (=FCCB)	PASSED
DATA CHECKSUM TEST (=23CA)	PASSED
EXTENDED REBOOT PERFORMED	
Login:	

System 75 SPE Down Mode Alarm

Within the common control group, the circuit packs that control the digital switch and process calls are known as the Switch Processing Element (SPE). SPE failure is critical and is displayed at the SAT as SPE DOWN. This condition must be cleared immediately using the following procedure. During SPE failure, the system will accept only two commands, d (for display alarms) and r (for reset system 4).

Warning: When a Common Control circuit pack is replaced, main ac power must be turned off as described in Removing and Restoring Power.

1. At the SAT, enter display alarms.
2. If the alarms displayed include a TAPE alarm, do the following; otherwise, go to Step 3.
 - a. At the SAT, enter reset system 4.
 - b. After reboot, if the system again displays SPE DOWN MODE, and TAPE INTERFACE TEST PASSED is displayed (see System Reset and Reboot Indications section), reboot system (reset system 4) with back up tape.
 - c. If reboot is successful, the system tape is bad and should be replaced. If reboot is not successful, go to Step 3.
3. If a PROCR (Processor) Major alarm is listed on the Alarm Log, go to Step 6. Otherwise, replace the Common Control circuit pack associated with the highest level alarm as listed in List of Alarms table (Table 5-A) in Chapter 5.
4. At the SAT, observe power up. (See System Reset and Reboot Indications section.)
5. Determine if the system is operating again (EMERGENCY TRANSFER LED dark, some other LEDs lighted, voice terminals active). If it is operating, the procedure is completed. If it is not operating, go to Step 6.
6. Replace the TN711 or TN711B Processor circuit pack.
7. At the SAT, observe power up. (See System Reset and Reboot Indications section.)
8. Determine if the system is operating again (EMERGENCY TRANSFER LED dark, some other LEDs lighted, voice terminals active). If it is operating, the procedure is completed. If it is not operating, replace the TN734 Memory circuit pack.
9. At the SAT, observe power up. (See System Reset and Reboot Indications section.)
10. Determine if the system is operating again. If it is operating, the procedure is completed. If it is not operating, go to Step 14 for a V1 system or go to Step 11 for a V2 or V3 system.
11. Replace the TN734 Memory 2 circuit pack.

12. At the SAT, observe power up. (See System Reset and Reboot Indications section.)
13. Determine if the system is operating again. If it is operating, the procedure is completed. If it is not operating, go to Step 14.
14. Replace the TN729 Tape Control circuit pack.
15. At the SAT, observe power up. (See System Reset and Reboot Indications section.)
16. Determine if the system is operating again. If it is operating, the procedure is completed. If it is not operating, escalate the problem.

System 75 XE Reset

The System 75 XE can reset itself from its maintenance software. This process depends on errors detected by the software. The SAT displays are the same as those shown for manual resets. Typical SAT displays for successful manual resets are shown in A through E as follows. Hexadecimal numbers shown in parenthesis such as (=BD9F) are examples only and will change.

After a successful completion of a system reset command, the SAT screen is cleared and Login is displayed at the top left corner of the screen.

System Warm Start

enter command: reset system

SAT displays the following:

WARM START PERFORMED

System Cold Start Without Translations Loading

enter command: reset system 2

SAT displays the following:

DUAL PORT RAM TEST	PASSED
SOFT INT TEST	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST	PASSED
COLD II IS PERFORMED	

System Cold Start With Translations Loading

enter command: reset system 3

SAT displays the following:

DUAL PORT RAM TEST	PASSED
SOFT INT TEST	PASSED
MM/SD TEST	PASSED
STACK OVERFLOW / SCRATCH PAD TEST	PASSED
NMI TEST	PASSED
COLD I IS PERFORMED	

System Reboot

enter command: reset system 4

SAT displays the following:

INVOKING EMERGENCY TRANSFER	
ROM CHECKSUM TEST (=BD9F)	PASSED
DUAL PORT RAM TEST	PASSED
SOFT INT TEST	PASSED
MM/SD RAM TEST	PASSED .
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST	PASSED
MEMORY 1 BOARD READ TEST	PASSED
MEMORY 1 BOARD DATA BIT TEST	PASSED
MEMORY 1 BOARD CHECK BIT TEST	PASSED
MEMORY 1 BOARD MEE SING BIT TEST	PASSED
MEMORY 1 BOARD MEE DOUB BIT TEST	PASSED
MEMORY FUNCTIONAL TEST	PASSED
TAPE INTERFACE TEST	PASSED
READING CORE	PASSED
READING UPDATE	PASSED
TEXT CHECKSUM TEST (=FCCB)	PASSED
DATA CHECKSUM TEST (=23CA)	PASSED
REBOOT PERFORMED	

System Reboot and Run All 24-Hour Tests

enter command: reset system 5

SAT displays the following:

INVOKING EMERGENCY TRANSFER	
ROM CHECKSUM TEST (=BD9F)	PASSED
DUAL PORT RAM TEST	PASSED
SOFT INT TEST	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST	PASSED
MEMORY 1 BOARD READ TEST	PASSED
MEMORY 1 BOARD DATA BIT TEST	PASSED
MEMORY 1 BOARD CHECK BIT TEST	PASSED
MEMORY 1 BOARD MEE SING BIT TEST	PASSED
MEMORY 1 BOARD MEE DOUB BIT TEST	PASSED
MEMORY FUNCTIONAL TEST	PASSED
TAPE INTERFACE TEST	PASSED
SOFT INT TEST	PASSED
MM/SD RAM TEST	PASSED
STACK OVERFLOW/SCRATCH PAD TEST	PASSED
NMI TEST	PASSED
MEMORY BOARD READ TEST	PASSED
MEMORY BOARD DATA BIT TEST	PASSED
MEMORY BOARD CHECK BIT TEST	PASSED
MEMORY BOARD MEE SING BIT TEST	PASSED
MEMORY BOARD MEE DOUB BIT TEST	PASSED
MEMORY FUNCTIONAL TEST	PASSED
TAPE INTERFACE TEST	PASSED
READING CORE	PASSED
READING UPDATE	P A S S E D
TEXT CHECKSUM TEST (=FCCB)	PASSED
DATA CHECKSUM TEST (=23CA)	PASSED
EXTENDED REBOOT PERFORMED	

NMI Test Failure

An NMI (Non-Maskable Interrupt) Test failure during a reset or reboot operation provides some clues to clearing troubles in the Common Control area. A hardware register on the Processor circuit pack latches any detected exception conditions for the nonmaskable interrupts during a reset or reboot.

The contents of the register are 16 bits wide (0 through 15) in hexadecimal format. Bit 0 is the least significant bit and Bit 15 is the most significant bit. The bits are mutually exclusive, so any number of bits may be set when the contents are read.

The contents of the register are displayed on the SAT as a 4-digit decimal number. To obtain useful information, the decimal number must be interpreted to find which bits are set. For example, if the SAT displays NMI=1085, Bits 0, 2, 7, and 12 are set. The following table shows the conversion from the decimal number to binary and how the relationship indicates which bits of the 16-bit register are set.

Decimal Number	1				0				8				5			
Binary	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	1
16-Bit Hex Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit Set	12								7				2 0			

The following is a listing of the probable candidates for component replacement with relation to set bits:

Warning: When any Common Control circuit pack is replaced, main ac power must be turned off as described in Removing and Restoring Power.

Bit Set	Primary Candidates
15	Processor
14	Processor
13	Processor
12	Processor, Memory, Memory 2
11	Processor, Memory, Memory 2
10	Processor, Memory, Memory 2
9	Processor, Memory, Memory 2
8	Processor, Memory, Memory 2
7	Memory, Memory 2
6	Interface 1
5	Any Common Control pack
4	Processor, Memory, Memory 2
3	Processor, Memory, Memory 2
2	Processor, Memory, Memory 2
1	Processor, Memory, Memory 2
0	Processor, Memory, Memory 2

System 75 XE SPE Down Mode Alarm

Within the common control group, the circuit packs that control the digital switch and process calls are known as the Switch Processing Element (SPE). SPE failure is critical and is displayed on the SAT as SPE DOWN MODE. This condition must be cleared immediately using the following procedure. During SPE failure, no SAT commands can be entered.

Warning: When any common control circuit pack is replaced, the Control Cabinet ac power must be controlled as described in Removing and Restoring Power.

1. Verify that the EMER XFER (Emergency Transfer) LED on the Processor circuit pack is lighted.
2. If the Processor or Memory circuit pack red status LED is lighted, power down the Control Cabinet and replace appropriate circuit pack. If the Processor or Memory red status LED is dark, go to Step 5.
3. Restore power and observe the power up initialization test data on the SAT.
4. Determine if the system is operating (all initialization tests pass, EMER XFER LED dark, some circuit pack amber LEDs on, voice terminals active). If it is operating, go to Step 10. If it is not operating, go to the next step.
5. Power down the Control Cabinet.

When an SPE Down Mode occurs, certain initialization tests fail, such as memory tests or reading core file from tape. The pass/fail test information up to the point where the SPE Down Mode occurred should be displayed on the SAT along with "DISPLAY ALARMS" information when the failed maintenance object can be identified.

Figure 3-6 is a typical SAT display for an SPE DOWN MODE alarm.

6. If "DISPLAY ALARMS" information is available on the SAT, perform strategy for the displayed "LOGICAL NAME" as shown in Table 3-A.
7. Restore power and observe the power up initialization test data at the SAT.
8. Determine if the system is operating: If the system is not operational, escalate the problem. If the system is operational, enter a test tape command and ensure that the SAT does not display test tape errors. If there are no errors, the procedure is completed.

```
LMM - VERSION 1.2 XE
INVOKING EMERGENCY TRANSFER
ROM CHECKSUM TEST ( = F370 )      PASSED
DUAL PORT RAM TEST                PASSED
SOFT INT TEST                     PASSED
MM/SD RAM TEST                    PASSED
STACK OVERFLOW/SCRATCH PAD TEST  PASSED
NMI TEST                          PASSED
MEMORY BOARD 1 READ TEST          PASSED
MEMORY BOARD 1 DATA TEST         PASSED
MEMORY BOARD 1 CHECK BIT TEST     PASSED
MEMORY BOARD 1 MEE SING BIT TEST  PASSED
MEMORY BOARD 1 MEE DOUB BIT TEST  PASSED
MEMORY FUNCTIONAL TEST            PASSED
TAPE INTERFACE TEST               PASSED
READING CORE                      FAILED NO TAPE

*****SPE DOWN MODE*****
ATTEMPTING TO PLACE SERVICE CALL

DISPLAY ALARMS:

Physical Logical On Alternate Alarm Date Date
Name      Name   Board? Name      Type   Alarmed Resolved
_____ NO-TAPE _____ MAJOR _____
```

Figure 3-6. SPE DOWN MODE Alarm Display

Table 3-A. Display Alarms (SPE Down Mode)

Logical Name	Strategy
M-BUS	Any common control circuit pack may be at fault. Alternately replace each common control circuit pack to determine the faulty board.
MAINT	Replace TN759 Processor circuit pack.
MEM-BD	Replace TN761 Memory circuit pack.
NO-TAPE	No tape in drive, bad cartridge, or flip lever on tape drive not down.
PROC-BD	Replace TN759 Processor circuit pack.
TAPE/UNIT	Replace TN764 Tape Drive circuit pack.

- 9. If a circuit pack has been replaced, go to Step 9; otherwise, go to next step.
- 10. If the trouble is not resolved in Step 6, perform the strategy listed in Table 3-B for the test that failed.

Table 3-B. Initialization Tests (System Reboot)

Test	Strategy for Failed Test
ROM Checksum Dual Port RAM Soft Int MM/SD RAM Stack Overflow/Scratch Pad NMI	Replace TN759 Processor circuit pack.
Memory Board Read Memory Board Data Bit Memory Board Check Bit Memory Board Mee Sing Bit Memory Board Mee Doub Bit Memory Functional	Replace TN761 Memory circuit pack.
Tape Interface	Replace TN759 Processor or TN764 Tape Drive circuit pack.
Reading Core Reading Update	Replace Tape Cartridge, TN759 Processor circuit pack, or TN764 Tape Drive circuit pack.
Text Checksum Data Cheksum	Replace Tape Cartridge, TN764 Tape Drive, TN761 Memory circuit pack, or Processor circuit pack.

11. Restore power and observe the power up initialization test data at the SAT.
12. Determine if the system is operating. If the system is not operational, escalate the problem. If the system is operational, enter a test tape command and ensure that the SAT does not display test tape errors. If there are no errors, the procedure is completed.

System Backup Procedures

If a power failure of 10 minutes or more occurs for multi-carrier cabinet systems, or 2 minutes or more for single-carrier cabinet systems, the system translations can be restored using the data on the system or backup tape.

Save Translation

To ensure that the tape drive cassette tape contains the most recent copy of the translation data, the system can automatically save the translation data onto the cassette tape every 24 hours..

Note: Automatic daily backup of the system translation data is controlled by an entry in the system parameters that is defaulted to “daily”, which means the system will automatically save translation every 24 hours.

If many translation data changes are made, it is recommended that the translation data be saved by using the save translation command. This will save the new changes on the cassette tape without having to wait for the next automatic daily translation backup. If extensive changes, additions, or deletions are made, translations should be saved more frequently, alternating the two tapes. Then, in case of a power outage, only the data entered since the last "save" will be lost. See the following sections on tape backup.

Warning: It is recommended that save translations be performed after business hours so dial tone delays will not be encountered.

Warning: Save translations should not be performed if alarm conditions occur or if the system is having problems.

Save Recorded Announcements

The recorded announcements in the system can be saved on the system cassette tape by entering the save announcements spe active command. These commands should only be used after business hours or when the system is operating during a low usage period. The system takes about 45 minutes to 1 hour to transfer the recorded announcements from the Announcement circuit pack to the system tape. During this time period, the Manager I terminal cannot be used to administer the system until the transfer is complete.

Tape Backup

Two cassette tapes are provided with the system. It is recommended that a backup copy of the translation data be made weekly, or after many changes have been made to the translation data. This will minimize the loss of recent translation data changes if the cassette tape in the system becomes damaged.

The following procedure can be used to make a backup tape.

1. Remove the cassette tape from the tape drive.
2. Insert the other cassette tape into the tape drive.
3. Log in to the terminal.
4. Verify screen displays:

enter command:

5. Enter save translation and press the RETURN key. This command instructs the system to take all translation information in memory and write it onto the cassette tape.

6. Screen displays:

Save Translation

Processor	Command Completion Status	Error Code
SPE*	success/specific error message	n1

- The SPE's status is always displayed first.

The list of possible error codes for the save translation command is provided below:

Save Translation Command Error Codes

Code	Interpretation
0	The save operation was a complete success; both copies of tape translation data were updated.
1	The save operation was a partial success: only one of the two copies of tape translation data was updated. The tape drive should be repaired before any further save translation operation should take place.
2	The save operation failed completely; no translation was saved to either tape copy of translation data. The tape drive should be repaired before any further save translation operation should take place.

7. Remove cassette tape from the tape drive and insert the other cassette tape into the tape drive.
8. Label the backup cassette tape with the date and time it was created. A special notation may be put on the tape to clearly distinguish it from other cassette tapes.
9. Store the backup tape in a secure place.

Tape Errors

Since the tape drive is a mechanical device, tape related failures may occur. When these failures occur, the system responds with "tape error messages". The following is a list of the "tape error messages" and recommended responses to each. Check for proper operation after each response is done.

1. Tape access failure: no tape cartridge or device failure—implies that the cassette tape is missing or improperly seated. This error can also occur if the tape drive has a hardware problem.

Response: Check tape drive for missing or improperly seated cassette tape.

Check cassette tape to determine if write-protect indicator points to "SAFE." If so, turn pointer away from "SAFE" to allow "write" capability.

Check for “alarm” at attendant console. If alarm is present, follow normal maintenance procedures to repair tape drive.

Warning: Check for damaged or worn cassette tape. If cassette tape is damaged, do not insert the backup tape. If the backup tape is inserted, it may also be destroyed.

2. Tape currently in use—implies that the system is currently accessing the tape for administration or maintenance purposes,

Response: Wait a few minutes and repeat command that generated tape error message.

3. Tape write failure: cartridge or device failure—implies that there was a failure in writing to the tape.

Response: Refer to the procedures in message 1.

4. Tape read failure: cartridge or device failure—implies there was a failure reading from the tape.

Response: Refer to the procedures in message 1.

5. Internal system error—implies that the system software requires reset procedures.

Response: Follow normal maintenance procedures for resets. Refer to “System Reset and Reboot Indications.”

6. Internal translation data is corrupted—implies that the translation data is inconsistent and the translation was not saved on tape.

Response: Replace cassette tape with system backup tape.

Enter the reset system 3 command. After command completes, remove the backup tape and install the original tape, and then repeat the command that generated the error message. If the same error message is displayed again, escalate the problem.

7. Translation file is too large to fit on the tape—implies that the system software has malfunctioned.

Response: Follow normal escalation procedures.

8. Cannot save data on standby at this time—implies that the Standby SPE on a Duplication Option system is not accessible. To determine state of the SPE, issue the status system command. If the Standby SPE is in Maintenance Mode, try again later.

9. Tape translation data corrupted—implies error encountered in saving translation. If error occurs again, escalate the problem.

10. Error encountered, can't complete request—implies error encountered in saving translation. If error occurs again, escalate the problem.

Software Upgrade Procedures

The software upgrade feature permits a System 75 to upgrade its software to include new features and to fix software problems. Performing an upgrade on a system requires a reset system 4 (reboot) and thus causes a service disruption (refer to “System Reset and Reboot Indications”).

Warning: No administration changes should be entered during the following software upgrade procedure. There can be substantial time gaps between steps and, since the system cannot prevent administration changes, it is up to the system technician to make sure that none are attempted during the entire software upgrade process.

Performing a Software Upgrade

1. Issue the save translations command to all copies of the old software.

Note: This step ensures that the old tapes can be relied on for backup if the new software is unsatisfactory.

2. Replace the old tape with the new tape that contains the new software.

3. Save translations to the new tape using the save translations command.

4. Enter reset system 4 to load in and run the new software.

Note: This step does not have to be performed immediately after the previous step. It can be performed remotely later at a more convenient time.

5. Issue the save translations command to other copies of the new software.

CHAPTER 49 TROUBLE-CLEARING AIDS

This chapter provides additional trouble-clearing information for resolving both system alarms and user-reported alarms. This chapter supplements the information found in “Chapter 6. Error and Alarms: Repair Procedures. ”

Maintenance Commands: The maintenance commands are used to control, test, and obtain information associated with maintenance objects. Requires use of the System Access Terminal (SAT) or remote Initialization and Administration System (INADS) interface (a valid login and password to do maintenance is required).

System Features: Used to troubleshoot certain system resources utilizing an attendant console or voice terminal. Features covered are as follows:

- **Automatic Circuit Assurance (ACA)**—used to monitor possible trunk failures. Requires use of a display-equipped voice terminal (may be non-display type if the Voice Message Retrieval feature is provided) or an attendant console. Also requires an “ACA activate/deactivate” button (one per system) on the voice terminal or attendant console.
- **Busy Verification of Terminals and Trunks**—used to make test calls to check the apparent busy status of a resource. Requires use of a multi-appearance voice terminal or attendant console equipped with a “verify” button.
- **Trunk Group Busy/Warning Indicators to Attendant**—used to provide an indication of trunk usage. Requires use of an attendant console.
- **Trunk Identification by Attendant**—used to specifically identify a trunk where trouble is encountered. Requires use of a display-equipped voice terminal or an attendant console equipped with a “trunk id” button.
- **Facility Test Calls**—used to make test calls to specific trunks, touch-tone receivers, time slots, and system tones to ensure the facility is operating properly. Requires use of a touch-tone voice terminal (an INADS user can make test calls over a trunk).

Analog Tie Trunk Back-to-Back Test: Used to verify operation of the Analog Tie Trunk ports.

Maintenance Commands

Maintenance commands entered at the System Access Terminal (SAT) or by the INADS center provide a means of demand testing, monitoring, or controlling maintenance objects in the system. The commands are classified as follows:

- **Busyout/Release**
- **Clear Errors**

- Display
- List
- Monitor (V2 and V3)
- Recycle
- Reset
- Set/Enable/Disable Synchronization (V2 and V3)
- Status (V2 and V3)

Error codes are provided in the test results for test, reset, busy out, and recycle commands.

Note: Any maintenance command keyword (action/object/qualifier) can be abbreviated as long as enough letters are present in the command word to distinguish that word from all other legal possibilities. For example, “r,” “re,” and “rep” are all legal abbreviations for “repeat” as used in test commands.

Busyout/Release Commands

The busyout/release commands are used to busy out (and return to operation) the following maintenance objects:

- Data Channel (VI)
- Data Module (V2 and V3)
- Journal Printer (V3)
- Links (V2 and V3)
- Modem Pool (V2 and V3)
- PMS-Link (V3)
- Pooled Modem (VI)
- Port Circuit Pack (Port)
- Port Circuit Pack (Board)
- Trunks/Trunk Group
- Voice Terminal Extension (Station)

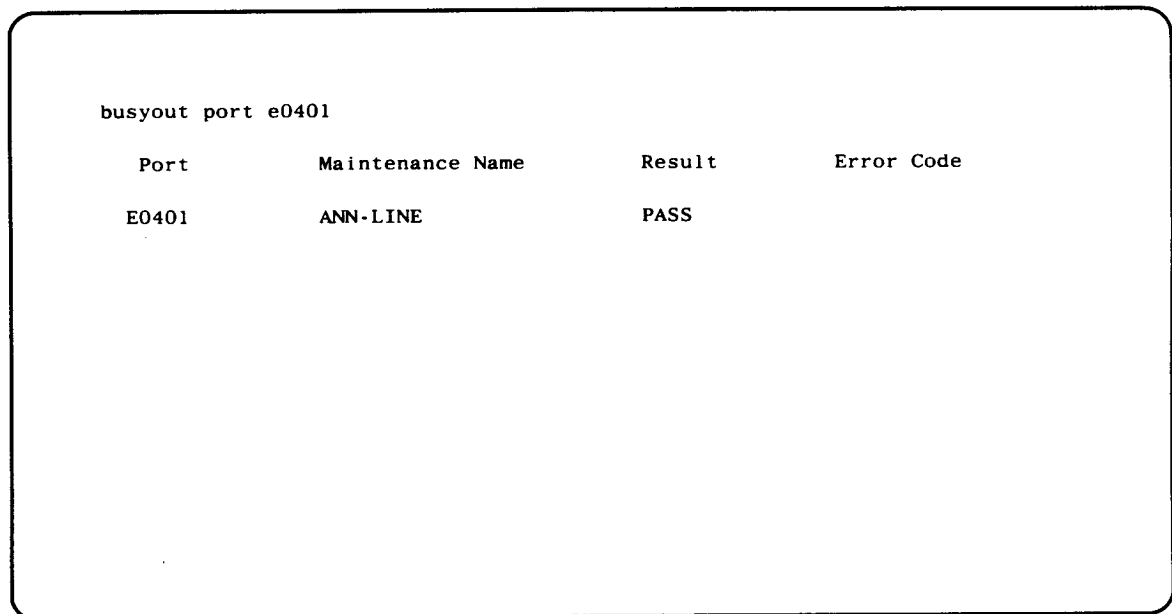
Busyout Commands: Any of the preceding maintenance objects that are administered can be busied out, even those that are not installed. The result is that the maintenance object is placed in a maintenance busy state until it is released by the release command. This will

prevent call processing software from using the busied-out resource. In addition, a warning alarm is logged to indicate the busied-out status.

Note: All busied out maintenance objects can be displayed by entering error type 18 in the “Error Type” field of the Hardware Errors Report Form.

The results of a busyout command are displayed at the SAT or at the INADS center. Figure 4-1 is an example of typical busyout command results.

Release Commands: These commands are used to release the maintenance objects busied out by the busyout command. The results of a release command are displayed at the SAT or at the INADS center. If the maintenance object is not installed, “NO BOARD” is displayed. Otherwise, the results are the same as those for the busyout command discussed previously. The warning alarm generated by the busyout command is resolved.



```
busyout port e0401
```

Port	Maintenance Name	Result	Error Code
E0401	ANN-LINE	PASS	

Figure 4-1. Typical Busyout Command Results

The following information is contained in the busyout command results:

- Port Maintenance object’s physical location—carrier, slot number, port number for ports, and channel number for data channels.

Note: All port numbers busied out are listed.

- Maintenance Name: Maintenance object’s logical name.

- **Result** The results of the command for each port busied out—"PASS" or "FAIL."
- **Error Code:** A system generated number that tells why a busyout or release command failed. See Table 4-A for busyout/release command error codes.

Table 4-A. Busyout/Release Command Error Codes

Error Code	Command Result	Description/Recommendation
0	ABORT	Internal system error. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If command still aborts, escalate the problem.
1010	ABORT	Attempt was made to busy out an object that was already busied out.
1011	ABORT	Attempt was made to release an object that was not first busied out.
1026	ABORT	Cannot busy out the TDM Bus because control channel or system tones are present.
2012	ABORT	Internal system error. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If command still aborts, then escalate the problem.
2100	ABORT	System resources unavailable. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If command still aborts, then escalate the problem.
NO BOARD	ABORT	Circuit pack has been removed. Cannot busy out/release object.
	FAIL	Object could not be busied out or released.
	PASS	Object is successfully busied out or released.

Data Channel/ (V1)

Command: busyout (or release) data-channel "qualifier"

Qualifier: Data channel number (1, 2, 3, or 4).

Data Module (V2 and V3)

Command: busyout (or release) data-module "qualifier"

Qualifier: Data Module extension number (for example, 3277).

Note: When you busy out the digital data module (DTDM), the station is also busied out; and vice versa, if you busy out a digital station, the DTDM is also busied out. The reason for this is that the DTDM and the station are maintained as one object. When you busy out either DTDM or station, the warning alarm will only appear for the station.

Journal-Printer (V3)

Command: busyout (or release) journal-printer

Link (V2 and V3)

Command: busyout (or release) link "qualifier"

Qualifier: Link number (1, 2, 3, or 4).

Modem Pool (V2 and V3)

Command: busyout (or release) modem-pool "qualifier"

Qualifier: Modem pool group number (1, 2,3,4, or 5).

PMS-Link (V3)

Command: busyout (or release) pros-link

Pooled Modem (V1)

Command: busyout (or release) pooled-modem

Note: This command is used to busy out all administered Pooled Modems in the system. A specific Pooled Modem can be busied out using the busyout board command.

Port

Command: busyout (or release) port “qualifier”

Qualifier: Location of port on port circuit pack (for example, bOI01) .

Port Circuit Pack

Command: busyout (or release) board “qualifier”

Qualifier: Circuit pack location for port circuit pack (for example, bOI)

Trunk/Trunk Group

Command: busyout (or release) trunk “qualifier”

Qualifier: Trunk group number followed by a slash and the member number (for example, 40/3). If the trunk group number is entered, all trunks in the group are busied out (maximum of four).

Voice Terminal Extension (Station)

Command: busyout (or release) station “qualifier”

Qualifier: Terminal extension number (for example, 3277).

Clear Errors Command

This command removes all Errors in the Error Log that do not have an associated active alarm.

Command: clear errors

Display Command

The display command is used to display the Alarm Log, Error Log, current time, initialization causes, communication-interface (links or processor channels), and port information. The display command is described separately for the initialization causes and port information.

Alarms/Errors/Time**Command:** display alarms/errors/time

alarms: Alarm log is displayed.

errors: Error Log is displayed.

time: Set Time Form is displayed (see Figure 4-2).

```

display time                                     Page 1 of 1

                                DATE AND TIME

DATE

    Day of the Week: Friday                      Month: March
    Day of the Month: 24                         Year: 1989

TIME

    Hour: 13                                     Second: xx
    Minute: 51
  
```

Figure 4-2. Typical Date and Time Form

Initcause**Command:** display initcauses

This command displays the Initialization Causes Form. The form for V1 systems is shown in Figure 4-3. The form for V2 or V3 systems shown in Figure 4-4 provides some additional information not included in the V1 form. Also, some information is slightly different. For these reasons, the forms are described separately.

display initcauses

Initialization Causes	
Cause	Action
Craft reboot request	Reboot

Figure 4-3. Typical initialization Causes Form (VI)

The "Cause" statement on the initialization Causes Form tells why the low-level maintenance software initiated the restart. Only the seven most recent restart occurrences are available at any one time. A power up will cause all previous occurrences to be lost. The following "Cause" statements are possible:

- Sanity time reset
- Maint board reset
- Power up reset
- OIP request
- Craft reboot request
- Craft extended reboot request
- NMI (memory) count request
- BP count exceeded
- SS count exceeded

Note: The last two statements listed indicate a bad Central Processing Unit (CPU) chip set in the Processor circuit pack.

The "Action" statement tells the action taken by the low-level maintenance software as a result of the "Cause." The following "Action" statements are possible:

- Warm start performed
- Level II cold start
- Level I cold start
- Reboot
- Extended reboot
- INADS called

```

display initcauses

Initialization Causes

Cause           Action           Escalated?           Time
Craft reboot request  Reboot                no                  03/21 13:00

```

Figure 4-4. Typical initialization Causes Form (V2 and V3)

The “Cause” statement on the Initialization Causes Form tells why the low-level maintenance software initiated the restart. Only the seven most recent restart occurrences are available at any one time. A power up will cause all previous occurrences to be lost. The following “Cause” statements are possible:

- Sanity timer reset
- Maintenance board reset
- Power up reset
- Software request (O/P request)
- Craft reboot request
- Memory excess errors above threshold

The “Action” statement tells the action taken by the low-level maintenance software as a result of the “Cause.” The following “Action” statements are possible:

- Warm start performed
- Level II cold start
- Level 1 cold start
- Reboot
- Extended reboot
- INADS called

The “Escalated?” statement tells whether or not the restart was escalated to by the high-level maintenance software.

The “Time” is the month/day and hour: minute the restart occurred.

Communication-Interface Links

Command: display communications-interface “qualifier”

Qualifier: links

Interface Links form is displayed (Figure 4-5).

display communication-interface links						
INTERFACE LINKS						
Link	Enabled	Establish Connection	Interface-3 Extension	Destination Number	DTE/DCE	Identification
1:	y	y	36705	121	DTE	DCS to Sys #1
2:	n	n	36706	36715	DTE	CMS
3:	y	y	36707	36709	DTE	AUDIX
4:	y	y	36708	126	DTE	DCS to Sys #2

Figure 4-5. Typical Communication-interface Links Form

The following fields are on the Interface Links form (Figure 4-5):

- **Link:** Identifies the physical layer link number.
- **Enabled:** A “y” (yes) indicates that the link has been enabled.
- **Establish Connection:** (yes) is used to establish a connection for the link. An “n” (no) indicates that the link is used for remote access.
- **interface-3 Extension:** Indicates the extension number assigned to the Interface 3 circuit pack.
- **Destination Number:** Indicates the extension number of the TDM, PDM, or the Trunk Access Code (TAC) of the DS1 Tie Trunk group if DS1 is used for DCS.
- **DTE/DCE:** Indicates “DTE” (Data Terminal Equipment) or “DCE” (Data Communications Equipment) which defines the physical interface type. If one endpoint of a link is DTE, then the other must be DCE, and vice versa. Endpoint Switch Links are generally DTE and Tandems are generally DCE. If both endpoints are of the same type, then DTE/DCE assignment is arbitrary.

- Identification: Indicates a 15-character name for the link. This field may be left blank.

Communication-Interface Processor Channels

Command: display communication-interface “qualifier”

Qualifier: processor channels

Processor Channel Assignment form is displayed (Figure 4-6).

display communication-interface processor channels

Page 1 of 4

PROCESSOR CHANNEL ASSIGNMENT

Proc Chan	Interface Link	Chan	Priority	Remote Proc Chan	Appl.	PBX-ID
1:						
2:	3	2	1	2	AUDIX	
3:						
4:						
5:	3	5	1	5	CMS	
6:						
7:						
8:						
9:	1	16	h	9	DCS	15
10:						
11:						
12:	4	24	h	12	DCS	3
13:						
14:	4	34	h	14	DCS	1
15:	4	35	h	15	DCS	2
16:	4	36	h	16	DCS	5

Figure 4-6. Typical Communication-Interface Processor Channels Form

The following fields are on the Processor Channel Assignment form (Figure 4-6):

Proc Chan: Indicates one of the 64 processor channels in the session layer. This field is display only.

interface Link: Indicates a number from 1 through 4 to identify the interface link/channel pair that establishes a network channel to one of the remote switches. (This field is associated with the Interface Chan field and is assigned as a pair or both are blank.)

- **Interface Chan:** Indicates a number from 1 through 64 to identify the interface link/channel pair that establishes a network channel to one of the remote switches. (This field is associated with the Interface Link field and is assigned as a pair or both are blank.)
- **priority:** An “h” (high) or “l” (low) indicates if this processor channel is high or low priority. Assignments are made based on the operational speed of the links and the number of hops in the network channel.
- **Remote Proc Chan:** Indicates the processor channel number (1 through 64) of the remote switch that connects to the local processor channel.
- **Appl.:** Indicates the type of application from the “Entry” column that connects to this processor channel as follows:

<u>Entry</u>	<u>Application</u>	<u>APIA</u>	<u>Priority</u>
apmcs	AP Message Center Service	1	high
aphlwc	AP High Priority Leave Word Calling	2	high
apllwc	AP Low Priority Leave Word Calling	3	low
apamwl	AP Automatic Message Waiting Lamp	4	low
apsmdr	AP Station Message Detail Recording	7	low
apclk	Switch/AP Clock Synchronization	8	high
dcs	Distributed Communications System		high
mis	Management Information System		low
apmis	AP Management Information System		low
audix	Audio Information Exchange		high

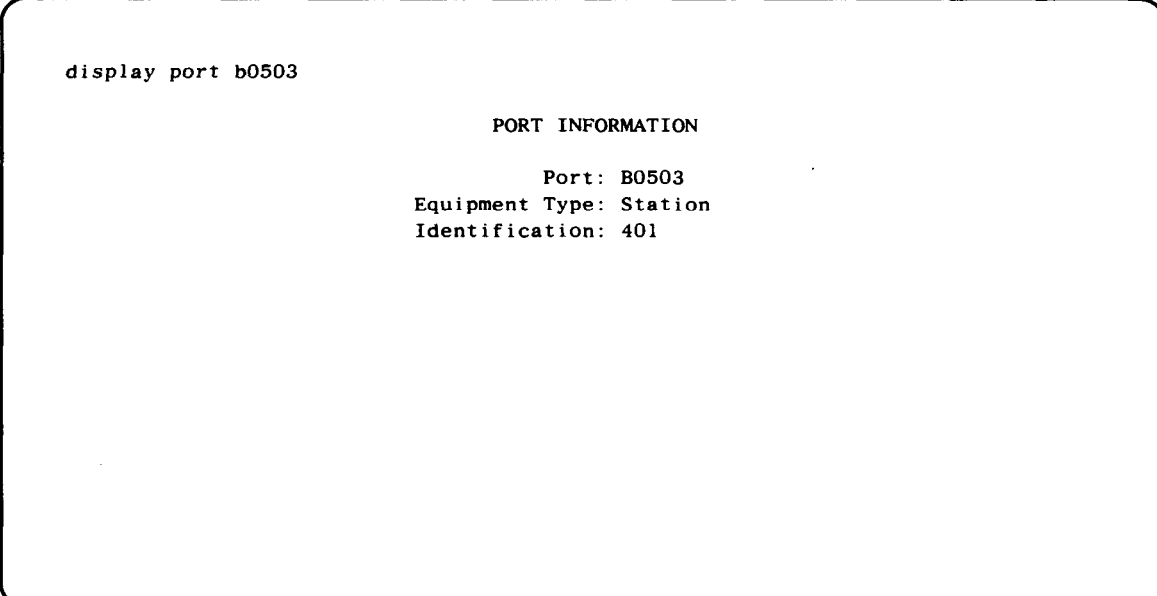
- **PBX-ID:** Indicates the PBX-ID number associated with the port if the application is “dcs;” otherwise, this field is left blank. PBX-IDS are administered as part of the Uniform Dial Plan (UDP). Valid entries are 1 through 63.

Port

Command: display port “qualifier”

Qualifier: Location of port on port circuit pack (for example, b0503)

Port Information Form is displayed (Figure 4-7).



```
display port b0503

PORT INFORMATION

Port: B0503
Equipment Type: Station
Identification: 401
```

Figure 4-7. Typical Port information Form

The following information is contained on the Port Information Form (Figure 4-7):

- **Port** The port number displayed is the port number specified in the command line. The only exception is that when the port number for an integrated pooled modem is specified, only the carrier and slot number are displayed.

- **Equipment Type:** This field identifies the equipment type (or object) that has been assigned to the port. The following types are possible:

Announcement
Attendant
Data Module (see Note below)
External Alert
Music on Hold
PCOL (Personal Central Office Line) Group
Paging
Pooled Modem
Speech Synthesizer

Note:

1. The Data Line ports are listed as Data Modules.
2. To see Data Line Circuit (DLC) problems, you must use display errors/alarms on *ALL, port, or board*.
3. To see DTDM problems, you must use display station. This is because the DTDM is linked to the station; therefore, if the alarm is required, you should busy out the station, not just the DTDM.

- **Identification:** This field specifies the particular object type for the equipment associated with the port as follows:

Equipment	Identification
Announcement	Announcement number
Attendant	Attendant number
Data Module	Data extension number
External Alert	Hunt Group number or Attendant number
Music on Hold	"blank"
PCOL Group	Group number
Paging	"blank"
Pooled Modem	"blank" (VI)
	Group number (V2 and V3)
Speech Synthesizer	"blank"
Station	Extension number
Tone Detector	"blank"
Trunk Grp/Mbr No	Trunk group number/Member number

List Configuration Commands

The list configuration commands are used to display various hardware and software configuration reports. The configuration reports are displayed at the SAT or at the INADS center.

Hardware Configuration Reports

The following command provides the hardware configuration reports:

Command: list configuration “qualifier”

Qualifier: The following qualifiers are allowable:

- all—All circuit packs installed are listed.
- stations—All Analog Line, Hybrid Line, Digital Line, and MET Line circuit packs installed are listed.
- trunks—All CO Trunk, DID Trunk, Tie Trunk, and Auxiliary Trunk circuit packs installed are listed.
- control—All fixed-position circuit packs are listed.
- board “xyy”—Circuit pack installed in location xyy is listed (x = carrier and yy = slot number; for example, b0l).

Figure 4-8 (V1) and Figure 4-9 (V2 and V3) are examples of typical hardware configuration reports.

list configuration all				Page 1
Board Number	Board Type	Vintage	Assigned Ports	
A01	DIGITAL LINE	000021	01	03 04
A02	ANALOG LINE	000004	02 03 04	
B03	CO TRUNK	000100	01 02 03 04 05 06 07 08	
B04	TIE TRUNK	no board	01 02	
E20	AUXILIARY TRUNK	000001		
C	MAINTENANCE	000005		
C	PROCESSOR	006913		
C	INTERFACE 1	000001		
C	MEMORY 1	000005		
C	MEMORY 2	no board		
C	MEMORY 3	no board		
C	TAPE CONTROL	000001		
C	NETWORK CONTROL	000001	01 02 03 04	
C	INTERFACE 2	000001		
C	INTERFACE 3	000001		
C	TONE/CLOCK	000004		
G	HCMR ROM	000774		
G	TRANSPORT	000012		
G	CONTROLLER	000013		
G	DATA/SERVO	000007		

Figure 4-8. Partial Example of Display Output for “List Configuration All” Command (VI)

list configuration all				Page 1
Board Number	Board Type	Code	Vintage	Assigned Ports
A01	TONE DETECTOR	TN748B	000002	01 02 03 05 06 07
902	ANALOG LINE	TN742	000004	02 03 04
B03	CO TRUNK	TN747	000100	01 02 03 04 05 06 07 08
904	TIE TRUNK	TN760	000004	01 02
914	SPEECH SYNTHESIZER	TN725	000009	01 02 03 04 05
915	DID TRUNK	TN753	000006	01 02 03 04 05
916	DATA LINE	TN726	000004	
B17	AUXILIARY TRUNK	TN763B	000003	01 02 03
918	DIGITAL LINE	TN754	000021	01 03 04
919	DIGITAL LINE	TN754	000021	01 03 04
A	MAINTENANCE	TN731	000012	
A	PROCESSOR	TN711B	000007	
A	MEMORY 1	TN734	000002	
A	MEMORY 2	TN734	000002	
A	TAPE CONTROL	TN729	000004	
A	NETWORK CONTROL	TN727	000013	
A	TONE/CLOCK	TN741	000007	
TAPE	CONTROLLER		000007	

Figure 4-9. Partial Example of Display Output for "List Configuration All" Command (V2 and V3)

The following information is contained in the reports (Figures 4-8 and 4-9):

- **Board Number:** Physical location of the circuit pack—carrier and slot number

Note: This information does not apply to fixed-position circuit packs. Only the carrier position is listed for these circuit packs.

- **Board Type:** Circuit pack name.
- **Code:** Circuit pack number (V2 and V3).
- **Vintage:** Vintage of ROM on circuit pack (000000 through 065535 or no board).

Note: If the vintage is “no board, ” the circuit pack is administered but is not installed.

- **Assigned Ports:** Port numbers of all administered ports on circuit packs 01 through 08 (V1) and 01 through 24 (V2 and V3).

Software Configuration Reports

The following command provides the software configuration report:

Command: list configuration software-vintage “qualifier”

Qualifier: The qualifier can be entered as Memory-resident or leave it blank. If the qualifier is blank, the system will read the software vintages from the tape. Figure 4-10 (V1) and Figure 4-11 (V2 and V3) are examples of typical software configuration reports that are read from the tape.

If the qualifier is entered as memory-resident, the system will read the software vintages from the SPE memory. Figure 4-12 (V1) and Figure 4-13 (V2 and V3) show a *typical software* . configuration report that is read from the SPE memory.

The following information is contained in the V1 report (Figure 4-1 O):

- **Date of Update File:** Date and time that translations were last read from tape into memory.
- **Update File old vintage:** Software vintage that a downloaded update file applies to.
- **Memory-resident Software vintage:** Software vintage that is in the SPE memory.
- **Tape-resident Software vintage:** Software vintage stored on tape.
- **Last tape backup of Translation Data:** Date and time that the last backup tape was made.

Note: The Memory-resident Software Vintage number and the Tape-resident Software Vintage Number should be the same. If they are not the same, the tape may be out-of-date or the latest tape version has not been loaded into memory.

The following information is contained in the V2 and V3 report (Figure 4-11):

- **Date of Update File:** Date and time that translations were last read from tape into memory.
- **Update File old vintage:** Software vintage that a downloaded update file applies to.
- **Memory-resident Software vintage:** Software vintage that is in the SPE memory.
- **Tape-resident Software vintage:** Software vintage stored on tape.
- **Memory-resident Translation Date:** Date and time on the tape when the tape was last read into memory. This date and time are stored in SPE memory and are not modified by updates to translations.
- **Tape-resident Translation Date:** Date and time that the last backup tape was made.

Note: The Memory-resident Software Vintage number and the Tape-resident Software Vintage Number should be the same. If they are not the same, it could mean that the tape is out of date or the latest tape version has not been loaded into memory.

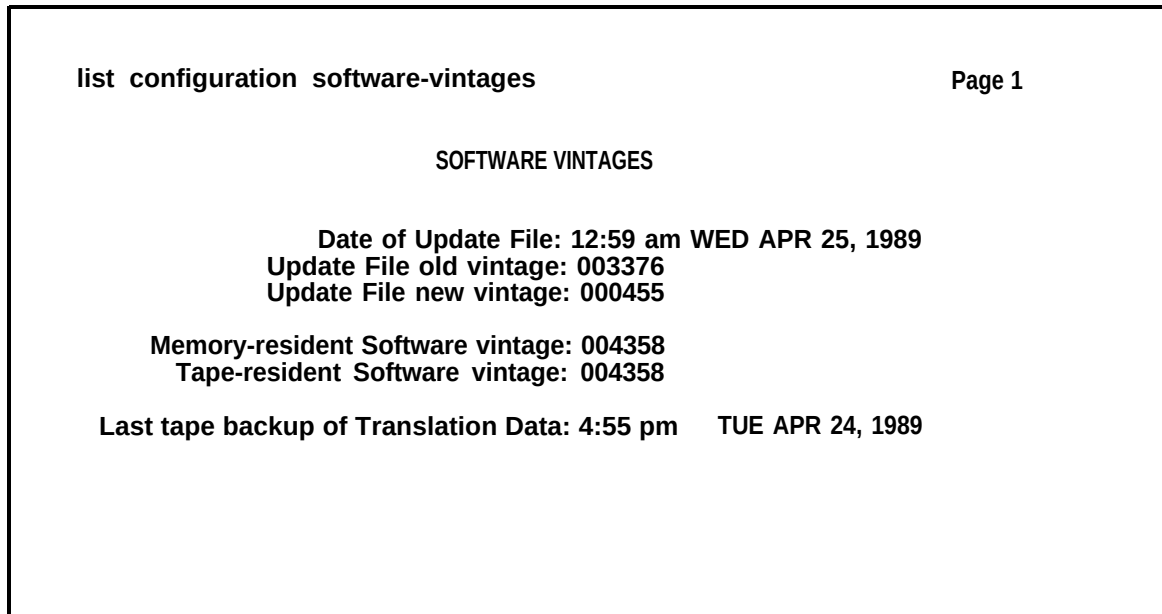


Figure 4-10. Typical Software Configuration Report (Vi)

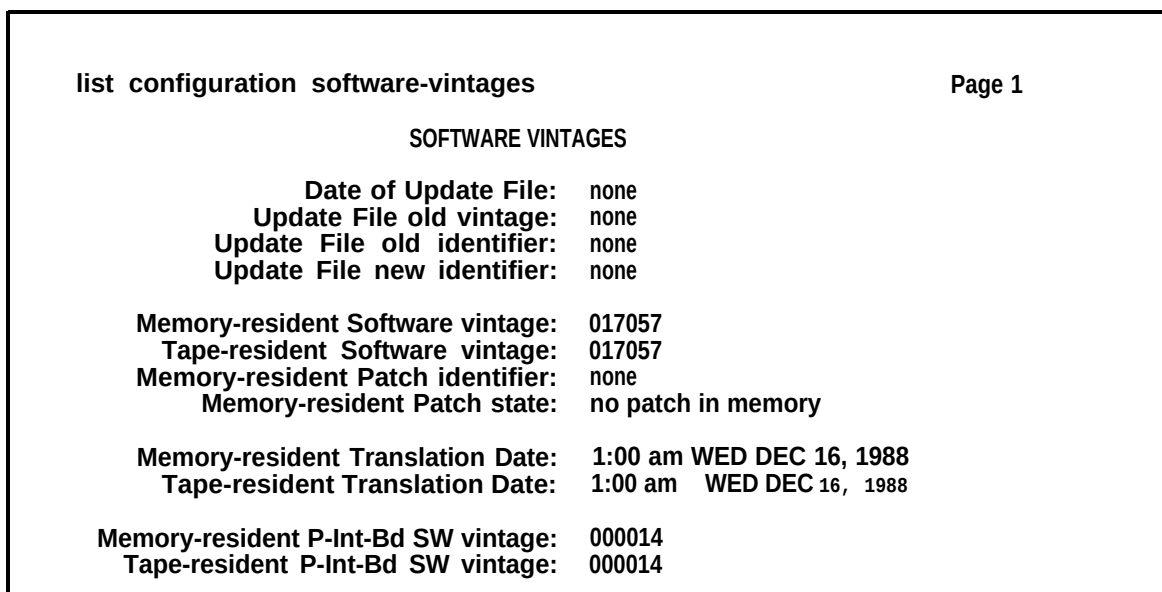


Figure 4-11. Typical Software Configuration Report (V2 and V3)

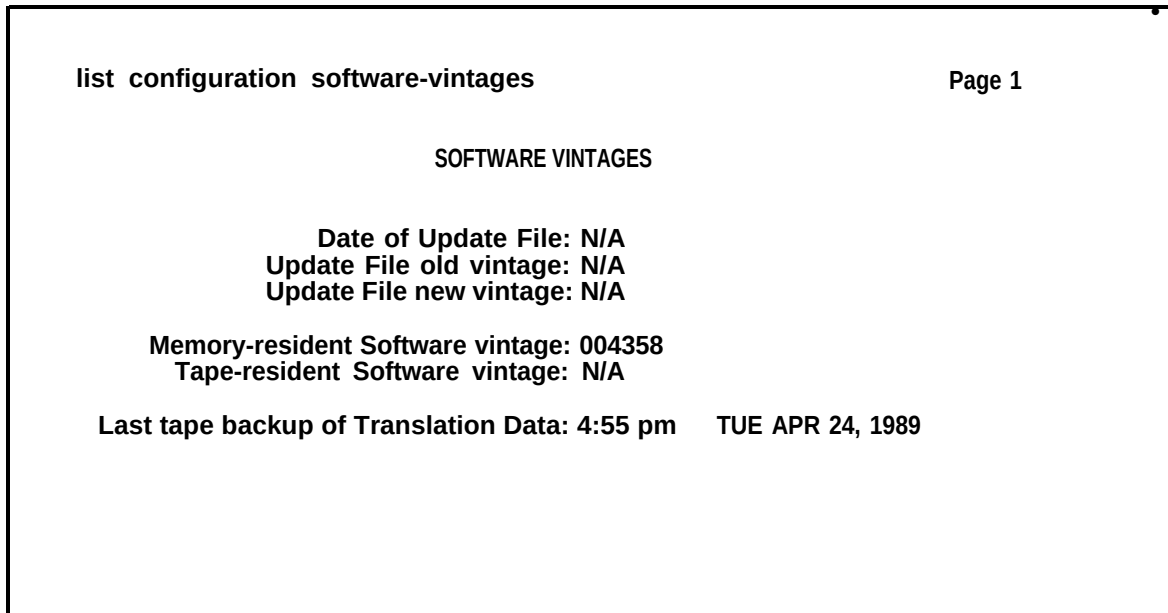


Figure 4-12. Typical Software Configuration Report (SPE Memory) (Vi)

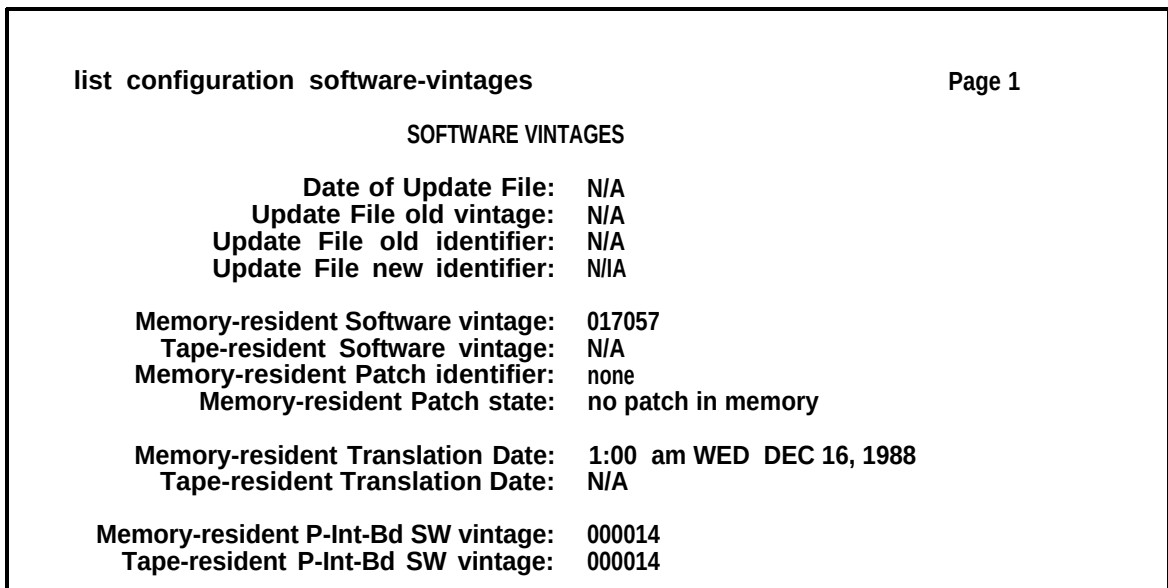


Figure 4-13. Typical Software Configuration Report (SPE Memory) (V2 and V3)

Monitor System Command (V2 and V3)

The monitor system command provides an on-line System Status Report that is continuously updated. The status report is displayed until the command is canceled. If the command is canceled, the user is logged off automatically. This prevents unauthorized use of the SAT when it is left unguarded. This command is not available to the “inads” login.

Command: monitor system view1/view2

view1: System Status Report is displayed (Figure 4-12). As shown in Figure 4-12, the System Status Report shows attendant, maintenance, and traffic status. The attendant status and maintenance status are updated every minute. The traffic status is updated once every hour.

view2: System Status Report is displayed (Figure 4-12). The System Status Report for “view2” contains everything that the “view1” report contains except hunt group measurements are not provided.

```
monitor system view1

                ATTENDANT STATUS                MAINTENANCE STATUS

      Console no.      # of alarms for trunks: 2
Activated: 1           # of alarms for stations: 0
Deactivated:          # of alarms for other res: 4
                        INADS has been informed?

                TRAFFIC STATUS
      Measurement Hour: 0
Trunk Group Measurement      Hunt groups Measurement
(4 grps with highest % time ATB) (4 grps with highest # of qued calls)
  Grp no:                   Grp no:
  Grp dir:                  Calls qued:
Calls qued:                 Calls aban:
  % Out blkg :              Attendant Group Measurement
  % Time ATB:               Calls qued: 0    Calls aban: 0

                                0:00 TUE SEPT 19 1989

                        - press CANCEL to quit -
```

Figure 4-14. Typical System Status Report Display Output

Information contained on the System Status Report is as follows:

- **ATTENDANT STATUS**—Shows the activated and deactivated attendant console numbers.
- **MAINTENANCE STATUS**—Shows the number of major and minor alarms in the system by category (trunks, stations, and other resources). Other resources are all maintenance objects in the system that are not classified as stations or trunks. The report also indicates whether or not INADS has been informed.

- **TRAFFIC STATUS**—Shows the call-handling status of trunk groups, hunt groups (“view1” only), and the attendant group. The “Measurement Hour” is the starting time for the time period that the measurements were taken. For example, if the measurement hour shown is 1800, the traffic status’ data displayed is for the time period from 6:00 pm to 7:00 pm.

Recycle Carrier Command

This command recycles the power on one specific carrier. When a power unit is replaced in a carrier, this command must be entered to recycle the power on that carrier.

Note: This command is not an option on the System 75 XE model because XE cabinet power supply does not provide this option.

Command: recycle carrier “qualifier”

Qualifier: Letter identifying the carrier to be recycled (a, b, c, d, or e).

Warning: If the control carrier is recycled, service is interrupted for the entire system. If a port carrier is recycled, service is interrupted only for that port carrier.

Reset Command

The reset command is used to reset the system, port circuit packs (V2 and V3), and the Interface 2 circuit pack.

System

The reset system commands are used to restart the system at various levels, depending upon required test activity.

No results for a reset command are displayed on the dedicated SAT or at INADS. The dedicated SAT is logged off.

Command: reset system “qualifier”

Qualifier: Reset levels are as specified below:

Qualifier	Reset or Reboot Process
1.	System Warm Start
2	System Cold Start without Translations
3	System Cold Start with Translations data loading from tape
4	System Reboot
5	A reset 5 is the same as a reset 4, plus all 24-hour tests are run immediately

The reset system 1 command may disrupt in-progress calls. The reset system 2, 3, 4, or 5 commands disrupt all calls in the system. Refer to the System Reset and Reboot Indications sections in Chapter 3 for details on each reset system command.

Board (V2 and V3)

This command is used to reset port circuit packs. All ports on the circuit pack must be busied out before entering the command.

Test results for a Test No. 53 are displayed as defined in Chapter 6. If the reset circuit pack is a DS1 Tie Trunk, test results for a Test No. 160 are also returned. The Maintenance Object Test/Repair Procedures section in Chapter 6 provides descriptions for all tests.

Command: reset board “qualifier”

Qualifier: Circuit pack location (b01, for example).

The error codes that may result from issuing the reset board command are provided in Table 4-B.

Table 4-B. Reset Command Error Codes

Error Code	Command Result	Description/Recommendation
	ABORT	System resources are unavailable. 1) Retry the command at 1 minute intervals a maximum of 5 times.
1005	ABORT	Applies only to DS1 circuit packs. The DS1 circuit pack to be reset is currently supplying the on-line synchronization reference. 1) To reset this circuit pack, use the set sync command to designate a new DS1 circuit pack as the on-line reference.
1015	ABORT	System resources are unavailable. All objects on the circuit pack are not in the out-of-service state. 1) Use the busyout board command to place all objects on the circuit pack in the out-of-service state. 2) Repeat the busyout board command.
1	FAIL	Circuit pack was not successfully halted. Replace the circuit pack.
2	FAIL	Circuit pack was not successfully restarted after being halted. Replace the circuit pack.
	PASS	Circuit pack was successfully reset and is running. 1) The test board CSS command should be run to verify that the circuit pack is functioning properly.

Reset Interface Command

This command resets the Interface 2 circuit pack. When the Applications Processor (AP), Distributed Communications System (DCS), Audio Information Exchange (AUDIX), or Call Management System (CMS) is first administered or the Interface 2 circuit pack is replaced, the command must be entered. Test results for Test No. 117 (VI) or Test No. 176 (V2 and V3) are displayed as defined in Chapter 6.

Warning: This command interrupts operation of the AP, DCS, AUDIX, or CMS.

Command: reset interface

When this command is entered on a system that contains a TN765 Processor Interface (Pi) circuit pack, the PI firmware on the tape will be read and downloaded into the PI. This activity may take up to 20 minutes if the firmware on tape has an incorrect checksum. Access to the tape will be blocked at this time. To shorten this waiting period, after waiting 5 minutes, disable all enabled links by using the change communication command. Remember to re-enable the links once a tape with good firmware is available.

Set/Enable/Disable Synchronization Commands (V2 and V3)

These commands are used to monitor and manipulate the synchronization subsystem in V2 or V3 systems. The enable and disable commands are used to enable and disable the automatic clock switching capability of the SPE and the Tone/Clock circuit pack. "SUCCESS" or "FAILURE" is displayed on the SAT at the completion of the command. The set command specifies which DS1 circuit pack is to provide the on-line reference. The set command will work only if synchronization has been disabled.

Command: enable synchronization

Command: disable synchronization

Command: set synchronization "qualifier"

Qualifier: Carrier and slot location of DS1 circuit pack that is to supply on-line reference.

Set/Display Options

This special command enables the technician (that is, remote user with INADS permission) to select which type of maintenance categories will report alarms automatically and which types will require the customer to call in. Judicious use of this command can reduce the number of ineffective alarms to the Customer Service Support Operations (CSSO). For the set/display options command to be effective, the default settings specified in this section should always be used. These settings are not intended to be changed on a per-system basis. Special circumstances (for example, special studies) may require temporary changes under the guidance of Tiers 3 and 4. The screen generated by the set options command looks as follows:

set options

ALARM REPORTING OPTIONS

	Major	Minor
On-board Station Alarms	y/n/w/lr	y/l/n/w/lr
Off-board Station Alarms	y/n/w/lr	y/l/n/lw/lr
On-board Trunk Alarms	y/n/w/r	y/n/w/lr
Off-board Trunk Alarms	y/n/w/lr	y/n/w/r

The current options are displayed on the form. The desired level of alarm reporting in each category can be selected or the “HELP” key can be pressed. The following is then displayed:

warning yes no report

The levels of filtering are as follows:

- **Warning(w)**

Alarms are raised as maintenance testing discovers them, but the severity of the alarm is downgraded to a warning. The advantage to the technician here is that the Alarm Log can still be used to pinpoint trunk or station problems reported by the customer. Alarmed resources that would normally have been taken out-of-service are still taken out-of-service. Alarm LEDs light on the port circuit pack and Maintenance circuit pack as before, but no attendant LEDs or stations reporting alarms are affected. There is no call to INADS.

- **Report (r)**

This option treats the alarms in the same manner as the warning category with one exception: alarms are reported to INADS using a special WARNING category. When an alarm of this type is received, INADS logs the occurrence and either creates a trouble ticket and closes it immediately or just throws it away. The retry strategy for a call of this type is similar to normal major or minor alarm reports. However, the acknowledgement LED on the attendant console or alarm reporting station does not reflect the status of the call.

- **Yes (y)**

Alarms are raised in the normal manner. There is no filtering of alarm data.

- **No (n)**

Alarms raised on a trunk or station in this category are dropped. Error information is provided as before, but there is no trace of an alarm. There is no LED activity of any kind and no call to INADS. Because resources are taken out-of-service without any record, this option is recommended only when other options do not provide the desired result.

In addition to the set options command, the display options command allows the technician to view current settings, but not to modify them. Information on this form is considered translation data and, thus, is preserved through all levels of restart.

This feature will affect the alarming of the maintenance objects (MOS) listed below. Neither the trunk nor the station category applies to alarms raised on the common portion of the circuit pack.

In all cases, if the option associated with the alarm type is set to “n”, the alarm report is dropped. All error information about the alarm is intact, but there is no record of an alarm and no LEDs light on the port circuit pack, the Maintenance circuit pack, the attendant console, or alarm reporting station to indicate a problem.

If the option is set to “warning” or “report”, port circuit pack LEDs and LEDs on the Maintenance circuit pack are affected in the same way as normal warning alarms.

The default parameters are as follows:

- Downgrade all station and trunk alarms (except on-board trunk alarms) to warning alarms.
- On-board major and minor trunk alarms should continue to raise alarms and report to INADS.

Station MOS Affected By This Command

Note: Although alarms on these MOS may appear as warnings, the alarms should be investigated in conjunction with user-reported problems.

- Analog Stations (AN L-LINE, AN L-NE-L, AN L-1 6-L)
- Digital Stations (DIG-LINE)
- MFAT Stations (HYB-LINE)
- MET Stations (MET-LINE)

Trunk maintenance is characterized by an escalation of a minor alarm to a major alarm if more than 75 percent of the members of the trunk group are alarmed. If the option for the trunk category is set to “w”, “r”, or “n”, this will no longer happen. Maintenance will remove an individual trunk member out-of-service according to the normal criteria used for major and minor alarms.

Trunk MOS Affected By This Command:

Note: Although alarms on these MOS may appear as warnings, the alarms should be investigated in conjunction with user-reported problems.

- Auxiliary Trunks (AUX-TRK)

- Central Office Trunks (CO-TRK)
- Direct Inward Dialing Trunks (DID-TRK)
- DS1 Tie Trunks (TIE-DS1)
- Tie Trunks (TIE-TRK)

Status Commands (V2 and V3)

The status commands are used to check the operational status of the following:

- Attendant (V2 and V3)
- Data-Modules (V2 and V3)
- Interface (V3)
- Journal-Link (V3)
- Link (V3)
- PMS Link (V3)
- Processor-Channel (V2 and V3)
- Stations (V2 and V3)
- Synchronization (V2 and V3)
- Trunk (V2 and V3)

The status commands provide internal software state information for diagnosis. Also, if the specified maintenance object (facility) is busy, the commands can help locate other facilities to which the facility is communicating. Thus, the time spent performing maintenance will be reduced.

Figure 4-13 (V2) or Figure 4-14 (V3) is an example of a typical status command result for stations.


```

status station 4106

                                STATION STATUS

      Extension: 4106           Service State: in service
      Port: E1904              Usage State: on-hook
                                Maintenance Busy? no

      Other Ports On the Active Call
  
```

Figure 4-15. Typical Status Command Results (V2)

```

status station 4106

                                STATION STATUS

      Extension: 4106           Service State: in service
      Port: E1904              Maintenance Busy? no
      Call Parked? no          SAC Activated? no
      Ring Cut Off Act? no      Control Rest: none
      CF Destination Ext:       Message Waiting: AUDIX
      Connected Ports: B1603

      ACD Status                Hotel/Motel Status
      Agent Logged In           AWU Call At:
      Work Mode                  DND :
                                Room Status:

      On ACD Call?
  
```

Figure 4-16. Typical Status Command Results

Attendant (V2 and V3)

Command: status attendant "qualifier"

Qualifier: The attendant console number (1, 2,3,4,5, 6, or 7).

The meaning of the information on the attendant form for V2 systems is as follows:

- **Console number:** The attendant console number (1, 2, 3, 4, 5, 6, or 7).
- **Port:** The attendant console's port location.
- **Service State:** "in-service", "out-of-service", or "interrupted."
- **Usage State:** "idle" or "active."
- **Maintenance Busy?** "Yes" or "No."
- **Other Ports on the Active Call:** The port locations of the facilities to which the attendant console is communicating.

The meaning of the information on the attendant form for V3 systems is as follows:

- **Console number:** The attendant console number (1, 2, 3, 4, 5, 6, or 7).
- **Port:** The attendant console's port location.
- **Service State:** "in-service/idle," "in-service active," "out-of-service," or "disconnected."
- **Maintenance Busy?** "Yes" or "No."
- **Connected Ports:** The port locations of the facilities to which the attendant console is connected.

Data-Module (V2 and V3)

Command: status data-module "qualifier"

Qualifier: Data module extension number (for example, 3277).

The meaning of the information on the data-modules form for V2 systems is as follows:

- **Port:** The data module's port location.
- **Service State:** "in-service", "out-of-service", or "interrupted."
- **Usage State:** "idle" or "active."
- **Maintenance Busy?** "Yes" or "No."
- **Other Ports on the Active Call:** The port locations of the facilities to which the data module is communicating.

The meaning of the information on the data-modules form for V3 systems is as follows:

- **Data Ext/Sta. Ext for DTDM:** The data module extension number. The DTDM is an exception, the connected station extension will be shown instead.

- **Port/Channel Number:** The module's port location. If the data module specified is a data channel, the channel number will be shown instead of the port location.
- **Service State:** "in-service/idle", "in-service/active", "out-of-service", or "disconnected."
- **Maintenance Busy?** "Yes" or "No."
- **Connected Ports:** The port locations of the facilities to which the data module is connected.

Interface (V3)

Command: status interface

The meaning of the information on the interface form is as follows:

If any of the following fields contain a count other than 0, it could mean problems with the S-Bus (for example, backplane wiring or connections).

- S-Bus Timeout
- S-Bus Parity Error
- SCP Sanity Timeout
- SCP Bus Timeout
- SCP Bus Error
- SCP Bus Parity Error

Journal-Link (V3)

Command: status journal-link "qualifier"

Qualifier: The qualifier is either wakeup-log or pros-log.

The meaning of the information on the journal-link form is as follows:

- **Link State:** "Up," "Down," or "Extension Not Administered." A wakeup-log or a pros-log link is considered administered only if an extension is given in the System Parameters Hospitality form.
- **Number of Retries:** Number of times the switch has tried to set up the link.

Link (V3)

Command: status link “qualifier”

Qualifier: The SCI link number (1, 2, 3, or 4).

The meaning of the information on the links form is as follows:

- **Link Number:** The SCI link number (1, 2, 3, or 4).
- **Destination:** Destination port (that is, Digital Line port or DS1 port to which the link is connected).
- **Link Status:** “in-service,” “maintenance busy,” or “disconnected.”
- **SAI Port Addr:** SAI port address to which the link is associated.
- **Error Count:** Error Counts for the following:
 - HDLC Device Check (receive and transmit)
 - Level 2 I-frames Retransmitted
 - Level 2 Reset (SABM)
- **LOCAL/REMOTE PROCESSOR CHANNELS:** Local/remote processor channel pairs. Each pair consists of a Processor Channel on the local machine and a Processor Channel on the remote machine that are connected in the communication session.

Note: The status link command does not always list the local and/or remote Processor Channels. If the application process using a particular Processor Channel has not initiated a startup session or if the gip command has not received the message for a startup session, the status command will not output a local Processor Channel. If a startup session has been initiated and the gip is informed, then the status command will output both local and remote Processor Channels. Therefore, the status link command will only display dynamic information about a link and Processor Channels. To display static information about Processor Channels and Link assignments, use disp communications processor command.

PMS-Link (V3)

Command: status pros-link

The meaning of the information on the pros-link form is as follows:

- **Link State:** “Up,” “Down,” or “Extension Not Administered.” The PMS link is considered to be administered only if an extension is given in the System Parameters Hospitality form.

- (Data Base Swapping?) “Yes” or “No.”
- (Number of Retries:) Number of times the switch has tried to set up the link.
- Maintenance Busy: “Yes” or “No.”

Processor-Channel (V2 and V3)

Command: status processor-channel “qualifier”

Qualifier: The processor channel number (1 through 64).

The meaning of the information on the processor-channel form is as follows:

- Channel Number: Processor channel number 1 through 64.
- Channel Status: State the channel is in: 1 through 8.
 - Status=1—Channel is not administered.
 - Status=2—Channel is administered but not used.
 - Status=3—Channel is in a state of entering waiting session accept (WSA).
 - Status=4—Channel is in a state of waiting for session accept (WSA) from the far end.
 - Status=5—Channel is waiting for action.
 - Status=6—Channel is in the data transfer state (channel is up and running).
 - Status=7—Channel is in a resynchronization state.
 - Status=8—Channel is waiting for acknowledge of disconnect message.
- Reset Count Number of times that reset has been issued for this channel.
- # of Message Buffer Allocated: Number of message buffers that are currently used for the communications on this channel. Light traffic=1-10, normal traffic=10-40, above 40= SC-Link alarm.
- SCI Link Number: Physical SCI link that the channel is associated with.
- Retransmission Count: Number of times that message retransmission has occurred.

Station (V2 and V3)

Command: status station “qualifier”

Qualifier: The station extension number (for example, 3277).

The meaning of the information on the station form for V2 systems is as follows:

- **Extension:** The station extension number.
- **Port:** The station's port location.
- **Service State:** "in service," "out of service," or "interrupted."
- **Usage State:** "on-hook" or "off-hook."
- **Maintenance Busy?** "Yes" or "No."
- **Other Ports on the Active Call:** The port locations of the facilities to which the station is communicating.

The meaning of the information on the station form for V3 systems is as follows:

- **Extension:** The station extension number.
- **Port:** The station's port location.
- **Service State:** "in-service/on-hook," "in-service/off-hook," "out-of-service," or "disconnected."
- **Maintenance Busy?** "Yes" or "No."
- **Call Park?** "Yes" or "No."
- **SAC Activated?** "Yes" or "No."
- **Ring Cut Off Act?** "Yes" or "No."
- **Control Rest:** One or two of the following: "none," "total," "stat-stat," "outward," or "terminate."
- **CF Destination Ex:** The call forwarding destination's extension number.
- **Message Waiting:** Any combination of the following: "AP-SPE," "AUDIX," or "PMS." If no messages are waiting, the field is blank.
- **Connected Ports:** The port locations of the facilities to which the station is connected.
- **Agent Logged in:** Displays (underneath it) the hunt groups (up to three) that the agent is logged into.
- **Work Mode:** Displays (underneath) the corresponding work mode of each split (hunt group) that an agent is logged into. For each split, one of the following work modes is displayed: "aux work," "after call," "manual in," or "auto in."
- **On ACD Call?** "Yes" or "No."

- **AWU Call At:** Time an automatic wakeup call is scheduled.
- **DND:** “not activated,” “button activated,” or “deactivation at xx:xx am/pm” (xx:xx am/pm is the time that Do Not Disturb will be deactivated).
- **Room Status:** “non-guest room,” “vacant,” or “occupied.”

Synchronization (V2 and V3)

Command: status synchronization

The meaning of the information on the synchronization form is as follows:

- **Maintenance Name:** Either the DS1 Qr Tone/Clock circuit pack.
- **Physical Location:** The DS1 or Tone/Clock circuit pack’s location.

Trunks (V2 and V3)

Command: status trunk “qualifier”

Qualifier: The trunk group ID number that this trunk belongs to and the trunk group member number (for example 40/3).

The meaning of the information on the trunks form for V2 systems is as follows:

- **Trunk Group/member:** The trunk group ID number that this trunk belongs to and the trunk group member number (for example 40/3).
- **Port:** The trunk’s port location.
- **Service State:** “in-service,” “out-of-service,” or “interrupted.”
- **Usage State:** “idle” or “active.”
- **Maintenance Busy?** “Yes” or “No.”
- **Other Ports on the Active call:** The port locations of the facilities that the trunk is communicating with.

The meaning of the information on the trunks form for V3 systems is as follows:

- **Trunk Group/member:** The trunk group ID number that this trunk belongs to and the trunk group member number (for example, 40/3).
- **Port:** The trunk’s port location.
- **Service State:** “in-service/idle,” “in-service/active,” “out-of -service,” or “disconnected.”

- Maintenance Busy? “Yes” or “No.”
- Connected Ports: The port locations of the facilities to which the trunk is connected.

System Features

The following features may be used to troubleshoot certain system resources using either an attendant console or a voice terminal.

- Automatic Circuit Assurance (ACA)
- Busy Verification of Terminals and Trunks
- Trunk Group Busy/Warning Indicators to Attendant
- Trunk Identification by Attendant
- Facility Test Calls

Complete descriptions of each feature is provided in the *DEF/N/TY™ Communications System Generic 1 and System 75—Feature Description, 555-200-201*. Refer to the *DEF/N/TY Communications System Generic 1 and System 75—Console Operation, 555-200-700*, and the *DEFINITY Communications System Generic 1 and System 75—Voice Terminal Operation, 555-200-701*, as required for detailed operating procedures (does not include Facility Test Calls which are described in this section).

Automatic Circuit Assurance (ACA)

Requires the use of a display-equipped voice terminal (may be nondisplay type if the Voice Message Retrieval feature is provided) or an attendant console. An “ACA activate/deactivate” button (one per system) is required on the voice terminal or attendant console.

Automatic Circuit Assurance assists users in identifying possible trunk malfunctions. The system maintains a performance record of individual trunks relative to short and long holding time calls. The system automatically initiates a referral call to an attendant console or display-equipped voice terminal when a possible failure is detected.

Holding time is the elapsed time from when a trunk is accessed to the time a trunk is released. When ACA is enabled via administration, the system measures the holding time of each call.

A short holding time limit and a long holding time limit is preset by the System Manager for each trunk group. The short holding time limit can be from 0 to 160 seconds. The long holding time limit can be from 0 to 10 hours. The measured holding time for each call is compared to the preset limits for the trunk group being used.

Measurements are not made on personal central office lines, out-of-service trunks, or trunks undergoing maintenance testing.

Busy Verification of Terminals and Trunks

Requires the use of a multi-appearance voice terminal or attendant console equipped with a “verify” button.

Busy Verification of Terminals and Trunks allows a user at a voice terminal or attendant console to make test calls to trunks, voice terminals, and hunt groups (DDC/UCD). These test calls check the status of an apparently busy resource. This provides an easy method to distinguish between a voice terminal or resource that is truly busy and one that only appears busy because of a trouble condition.

Trunk Group Busy/Warning Indicators to Attendant

Requires the use of an attendant console.

Trunk Group Busy/Warning Indicators to Attendant provides the console user with a visual indication of the trunk group status for each trunk group associated with the 12 Trunk Group Select buttons located on the console. Trunk groups with busy indications during nonbusy periods should be checked to ensure that the trunks are busy and not out-of-service. Use the Busy Verification of Terminals and Trunks feature to test the suspected faulty trunks.

Trunk Identification by Attendant

Requires the use of a display-equipped voice terminal or an attendant console equipped with a “trunk id” button.

Trunk Identification by Attendant allows a voice terminal or attendant console user to identify a specific trunk being used on a call. This is useful when a user experiences noise or poor transmission on a trunk call. The trunk identification (access code and group number) is displayed when the “trunk id” button is pressed while on a trunk call. Use of this feature is denied if there are more than two trunks on a call. If the call is trunk-to-trunk, the identification displayed is of the last trunk added to the call.

Facility Test Calls

The Facility Test Calls feature provides a voice terminal user the capability of making test calls to access specific trunks, touch-tone receivers, time slots, and system tones. The test call can be made by a local voice terminal user by dialing an access code (197 is the initial default value) or by an INADS terminal user over a trunk. The current access code can be obtained by displaying the Features Access Code form.

The following call descriptions are for local calls. If the calls are made from INADS, the access code must be preceded by the remote access telephone access number.

Trunk Test Call

The trunk test call accesses specific Tie or CO trunks. DID trunks cannot be accessed.

To place the call:

1. Dial the facilities access test code and listen for dial tone.
2. Dial the 5-digit port number "CSSpp"

C = Carrier number (A=1, B=2, C=3, D=4, E=5)

SS = Slot number (01 through 20)

pp = Port number (01 through 08)

3. Listen for one of the following tones:
 - Dial Tone—trunk is connected. Go to Step 4.
 - Reorder Tone—trunk is busy or maintenance busy.
 - Intercept Tone—this is not a trunk or touch-tone receiver.
4. Place a call.

Touch-Tone Receiver Test Call

The touch-tone receiver call accesses and tests the four touch-tone receivers located on the Tone Detector circuit pack. The INADS voice terminal must be a touch-tone model.

To place the call:

1. Dial the facilities access test code and listen for dial tone.
2. Dial the 5-digit port number "CSSPP":

C = Carrier number (A=1, B=2, C=3, D=4, E=5)

SS = Slot number (01 through 20)

pp = Touch-Tone Receiver Port number (01, 02, 05, or 06)

3. Listen for one of the following tones:
 - Dial Tone—touch-tone receiver is connected. Go to Step 4.
 - Reorder Tone—touch-tone receiver is busy or maintenance busy.
 - Intercept Tone—this is not touch-tone receiver or trunk.

4. Dial 1234567890*# and listen for dial tone (test passed) or intercept tone (test failed).

Note: The test fails if the touch-tone receiver cannot recognize all of the touch-tone signals.

Time Slot Test Call

The time slot test call connects the voice terminal user to a specific time slot located on the TDM Buses (A or B) or out-of-service time slots.

Specific Time Slots

To place the call:

1. Dial the facilities access test code and listen for dial tone.
2. Dial # and the 3-digit time slot number “xxx” (see below).

xxx = Time slot number (000 through 255 on Bus A and 256 through 511 on Bus B)

3. Listen for one of the following tones:
 - Confirmation Tone—time slot is idle or maintenance busy.
 - Reorder Tone—time slot is busy.
 - Dedicated Tone—tone on time” slot (see Table 4-C).

Out-of-Service Time Slots

To place the call:

1. Dial the facilities access test code and listen for dial tone.
2. Dial * * and listen for the following tones:
 - Confirmation Tone—connection is made. Go to Step 3.
 - Reorder Tone—no time slots’ are out-of-service.
3. Repeat from Step 1 to alternate between out-of-service time slots on TDM Bus A and B.

Table 4-C. Dedicated Time Slots for Tones

TDM-B Slot No.	Tone
261	697 HZ
262	770 Hz*
263	852 Hz*
264	941 Hz*
265	1209 Hz*
266	1336 Hz*
267	1447 Hz*
268	1637 Hz**
269	Dial Tone
270	Re-order Tone
271	Intercept Tone
272	Busy Tone
273	Ringing Tone
274	Call Waiting Ringback Tone
275	2025 Hz
276	2225 Hz
277	Music

* These tones are used to generate touch-tone signals.

System Tone Test Call

The system tone test call connects the voice terminal user to a specific system tone.

To place the call:

1. Dial the facilities access test code and listen for dial tone.
2. Dial * followed by the two-digit tone identification number (Table 4-D).
3. Listen for tone as listed in Table 4-D.

Table 4-D. System Access Tones—Facility Test Calls

Two Digit Code	
00	Null Tone
01	Dial Tone
02	Reorder Tone
03	Intercept Tone
04	Busy Tone
05	Recall Dial Tone
06	Confirmation Tone
07	Calls Waiting Tone
08	Ringing Tone
09	Call Waiting Ringback Tone
11	Dedicated Special Ringback Tone
12	697 Hz*
13	770 Hz*
14	852 HZ*
15	941 Hz*
16	1209 Hz*
17	1336 Hz*
18	1447 Hz*
19	1637 Hz*
20	Chime
21	350 Hz
22	440 Hz
23	480 Hz
24	620 Hz
25	2025 Hz
26	2225 Hz
27	Counter

* These tones are used to generate touch-tone signals.

Table 4-D. System Access Tones—Facility Test Calls (Contd)

Two-Digit Code	Tone
28	Calls Waiting 2
29	Calls Waiting 3
30	Busy Verification
31	Executive Override
32	Incoming Call Identification
33	Dial Zero
34	Attendant Transfer
35	Test Calls
36	Recall on Don't Answer
37	Ringing
38	Camp-On Recall ,
39	Camp-On Confirmation
40	Hold Recall
41	Hold Confirmation
42	Zip Tone
43	2804 Hz
44	1004 Hz (-16 db)
45	1004 Hz (0 db)
46	404 Hz
47	105-Type Test Line, Default Sequence
48	Redirect Tone
49	Voice Signaling Tone
50	Digital Milliwatt
51	440 Hz + 480 Hz (Ringback)
52	Music
53	100-Type Test Line
54	102-Type Test Line
55	Laboratory Test Tone 1
56	Laboratory Test Tone 2
57	Disable Echo Supervision Dial Tone
58	3 Seconds of Answer Tone
59	4 Seconds of Answer Tone
60	Restore Music or Silences
61	Service-Observing Warning

Analog Tie Trunk Back-to-Back Testing

The TN760B circuit pack can be configured for back-to-back testing by making translation and cross-connect changes. This testing configuration allows for the connection of Tie Trunks back-to-back in the same switch to verify the operation of Tie Trunk ports. The tests can be performed in either the E&M or simplex modes.

E&M Mode Test Procedure

The procedures to perform the Analog Tie Trunk port test in the E&M mode are as follows:

1. At the SAT, enter list configuration trunks command to determine what ports are assigned on the Tie Trunk circuit pack.
2. Enter display dialplan command to determine the Trunk Access Code (TAC) format.
3. Enter display port xx command for all ports defined in Step 1. This displays the trunk groups that the ports are members of.

Note: See the Handling Port Circuit Packs section in Chapter 3 for details of how to remove and replace port circuit packs.

4. Remove the Tie Trunk circuit pack from the carrier slot.
5. Set the dip (option) switches for each of the two ports to be tested on the Tie Trunk circuit pack to E&M mode and unprotected.
6. Insert the circuit pack back into the slot.
7. Enter display trunk xx p command for each trunk group identified in Step 3. This command displays the specified trunk group on the SAT screen and prints a hard copy on the printer. Save this data for later use.
8. Remove all members defined by these ports from the trunk group(s) using the ch trunk xx command.
9. Enter add trunk n command to add a new (test) trunk group; then enter the following information:
 - Group Type — tie
 - TAC — (use trunk access code obtained from dial plan)
 - Trunk Type (in/out) — wink/wink
 - Port — assign two of the ports from the tie trunk
 - Mode — E&M
 - Type — specify one port as t1 standard and other port as t1 compatible.

Examples of the Trunk Group forms are shown in Figures 4-15 and 4-16.

display trunk-group 10		Page 1 of 5
TRUNK GROUP		
Group Number: 10	Group Type: tie	SMDR Reports? y
Group Name: tr 10	COR: 1	TAC: 110
Direction: two-way	Outgoing Display? n	Data Restriction? n
MIS Measured? n	Busy Threshold: 60	Night Service:
Dial Access? y	Internal Alert? n	Incoming Destination:
Queue Length: 0	Auth Code? n	
Comm Type: voice		
TRUNK PARAMETERS		
Trunk Type (in/out): wink/wink	Incoming Rotary Timeout(sec): 5	
Outgoing Dial Type: tone	Incoming Dial Type: tone	
Digit Treatment:	Disconnect Timing(msec): 500	
Used for DCS? n	Digits:	
ACA Assignment? n		
Baud Rate: 1200	Synchronization: async	Duplex: full
Incoming Dial Tone? y	Maintenance Tests? y	
Answer Supervision Timeout:	Suppress # Outpulsing? n	

Figure 4-17. Trunk Group Form

Page 2 of 5					
TRUNK GROUP					
GROUP MEMBER ASSIGNMENTS					
	Port	Name	Mode	Type	Answer Delay
1:	B1901		E & M	t1 stan	
2:	B1902		E & M	t1 comp	
3:					
4:					
5:					
6:					
7:					
8:					
9:					
10:					
11:					
12:					
13:					
14:					
15:					

Figure 4-18. Trunk Group Form (E&M Mode)

10. Locate the tie trunk port terminal connections at the cross-connect field. For systems equipped with 110-type hardware, see Table 4-E; for systems equipped with 66-type hardware, see Table 4-F.

Table 4-E. Carrier Lead Appearances at 110 Cross-Connect Field

110 Connecting Block Terminals	CO Trunk TN747 or TN747B	Tie Trunk TN760 or TN760B
1	T1	T1
2	R1	R1
3		T11
4		R11
5		E1
6		M1
7	T2	T2
8	R2	R2
9		T12
10		R12
11		E2
12		M2
13	T3	T3
14	R3	R3
15		T13
16		R13
17		E3
18		M3
19	T4	T4
20	R4	R4
21		T14
22		R14
23		E4
24		M4
25	T5	
26	R5	
27		
28		
29		
30		
31	T6	
32	R6	
32		
33		
34		
36		
37	T7	
38	R7	
39		
40		
41		
42		

Table 4-E. Carrier Lead Appearances at 110 Cross-Connect Field (Contd)

110 Connecting Block Terminals	CO Trunk TN747 or TN747B	Tie Trunk TN760 or TN760B
43	T8	
44	R8	
45		
46		
47		
48		
49		
50		

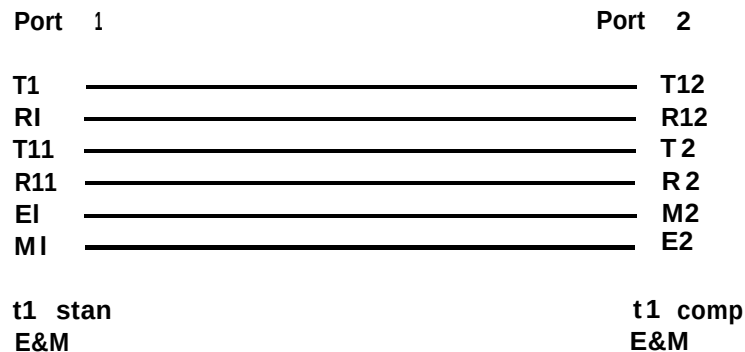
Table 4-F. Carrier Lead Appearances at 66-Type Cross-Connect Field

66 Connecting Block Terminals	CO Trunk TN747 or TN747B	Tie Trunk TN760 or TN760B
1	T1	T1
2	R1	R1
3		T11
4		R11
5		E1
6		M1
7	T2	T2
8	R2	R2
9		T12
10		R12
11		E2
12		M2
13	T3	T3
14	R3	R3
15		T13
16		R13
17		E3
18		M3
19	T4	T4
20	R4	R4
21		T14
22		R14
23		E4
24		M4
25	T5	
26	R5	
27		
28		
29		
30		
31	T6	
32	R6	
32		
33		
34		
36		
37	T7	
38	R7	
39		
40		
41		
42		

Table 4-F. Carrier Lead Appearances at 66-Type Cross-Connect Field (Contd)

66 Connecting Block Terminals	CO Trunk TN747 or TN747B	Tie Trunk TN760 or TN760B
43	T8	
44	R8	
45		
46		
47		
48		
49		
50		

11. At the cross-connect field, disconnect outside trunk facilities from the Tie Trunk ports and mark the disconnected wires for later reconnecting the Tie Trunk ports back to normal operation. The D Impact Tool (AT-8762) is required to perform this step.
12. Use jumper wires (DT 24 M-Y/BL/R/G and DT 24 P-W/BRN) and the D Impact Tool to connect wiring between the two ports assigned in Step 9 at the cross-connect field, for example, if the two ports on the Analog Tie Trunk circuit pack are port 1 and 2, connect the wirings as shown below:



13. Check all wirings to verify good connections between the two test ports.
14. Place a call from one voice terminal to another voice terminal using the tie trunk ports assigned. Dial TAC and extension, for example, if TAC of tie trunk group is 110 and station number is 5012, then dial 1105012. If the call cannot be made, either one of these ports may be bad. There are 4 ports on TN760B (port 1, 2, 3, and 4), try different combinations to determine bad ports.
15. if there is a bad port on the circuit pack, try to switch to an unused port; but, if all ports are normally used, then replace the circuit pack.
16. Disconnect the jumpers between two ports; then use SAT and trunk printouts to restore all trunk group changes to normal values.

Simplex Mode Test Procedure

The procedure to perform the Analog Tie Trunk Port test in the simplex mode is as follows:

1. Repeat Steps 1 through 4 of the E&M Mode Test Procedure.
2. Set the dip (option) switches for each of the two ports to be tested on the Tie Trunk circuit pack to simplex mode.
3. Repeat Steps 6 through 8 of the E&M Mode Test Procedure.
4. Enter add trunk n command to add a new (test) trunk group, then enter the following information:
 - Group Type — tie
 - TAC— (use trunk access code obtained from dial plan)
 - Trunk Type (in/out) — wink/wink
 - Port— assign two of the ports from the tie trunk
 - Mode— simplex
 - Type— type 5

An example of the Trunk Group Form Sheet 2 is shown in Figure 4-17.

Page 2 of 5

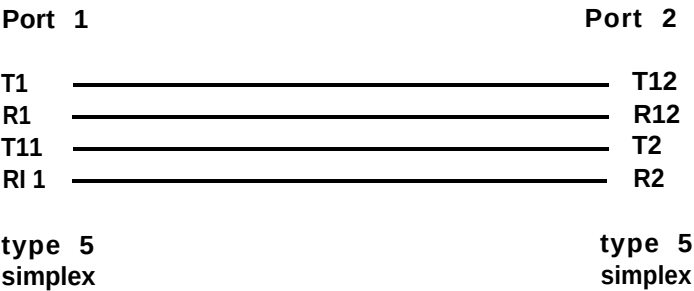
TRUNK GROUP

GROUP MEMBER ASSIGNMENTS

Port	Name	Mode	Type	Answer Delay
1: B1901		simplex	type 5	
2: B1902		simplex	type 5	
3:				
4:				
5:				
6:				
7:				
8:				
9:				
10:				
11:				
12:				
13:				
14:				
15:				

Figure 4-19. Trunk Group Form (Simplex Mode)

- 5. Locate the tie trunk port terminal connections at the cross-connect field. For systems equipped with 11 O-type hardware, see Table 4-E. For systems equipped with 66-type hardware, see Table 4-F.
- 6. At the cross-connect field, disconnect outside trunk facilities from the Analog Tie Trunk ports and mark the disconnected wires for later reconnecting the Tie Trunk ports back to normal operation. The D Impact Tool (AT-8762) is required to perform this step.
- 7. Use jumper wires (DT 24 M-Y/BL/R/G) and the D Impact Tool to connect wiring between the two ports assigned in step 4 at the cross-connect field, for example, if the two ports on the Analog Tie Trunk circuit pack are port 1 and 2, connect the wirings as shown below:



- 8. Repeat steps 13 through 16 of the E&M Mode Test Procedure.

CHAPTER 5. ACCESSING ERRORS AND ALARMS

General

The maintenance subsystem is that part of the software that is responsible for initializing and maintaining the system. Through Error and Alarm Logs the maintenance subsystem maintains an error history of problems discovered in the system and also provides a user interface for on-demand testing.

The system is divided into separate entities called maintenance objects (MOs). Each MO is treated independently and is identified by what type of object it is (maintenance name) and where it is located in the system (physical name). Some examples of maintenance objects are:

Maintenance Name	Physical Name
CO-TRK	EI 903
TAPE	0

Error Generation/Tracking

All types of errors logged against an MO are kept in a maintenance record for that MO. This record is created when the first error is reported and remains active until maintenance determines that the problem no longer exists. A counter is kept for each type of error, and each time the error reoccurs, the associated counter is increased.

Maintenance monitors the status of the MO as long as a counter is active. To prevent the record from being active forever, a “leaky bucket” mechanism operates on each in-line error counter to slowly reduce the counter value over time. Periodically (usually 15 minutes), these counter amounts are reduced. If the error is still being reported, the “leaky bucket” won’t have much effect. However, if the problem is transient and errors are no longer being reported, the “leaky bucket” method provides a mechanism for the counters to be reduced and the maintenance record to be retired.

Once a maintenance record becomes active, testing is scheduled to run more frequently to monitor the behavior of the MO. The results of these tests are recorded in the maintenance record. Each test has a counter associated with it: the counter is incremented when the test fails and is decremented when the test passes. If the tests abort because the object to be tested is in use, the counters are not incremented or decremented. The “leaky bucket” method is not used for counters associated with tests.

Alarm Generation Thresholds

Each error and test counter is assigned a threshold value. If any counter should reach its threshold value, accelerated testing will begin and, in some cases, an alarm will be raised. In general, alarms are raised only by test failures; in-line errors, in most cases, do not raise alarms. An alarm will not be resolved until all tests have passed and all alarming counters go to zero. Also, the maintenance record will be active until all counters are reduced to zero.

Alarm Log

The system produces a software record of every alarm detected in the system. This record, the Alarm Log, can be displayed on the SAT or remotely displayed by INADS.

An entry in the Alarm Log is generated as a result of errors detected on a System 75 maintenance object by automatic system tests, demand tests, and in-line error detection. The high-level software determines if the errors are serious enough, or if enough errors have occurred, to warrant alarm status.

Alarms are retired if the problem is resolved and further maintenance tests indicate that the problem no longer exists. Alarms are also retired if the errors causing the alarm have not been reported for a predetermined time interval.

The Alarm Log is restricted in size. If the log is full, a new entry overwrites the oldest resolved alarm. If there are no resolved alarms, the oldest error (which is not alarmed) is overwritten. If the log consists of only active alarms, the new alarm will be dropped. The Alarm Log is saved on tape.

Hardware Alarm Reports

When the display alarms command is entered, the Hardware Alarm Reports form (see Figure 5-1) is displayed;

display alarms
Page 1 of 1

HARDWARE ALARM REPORTS

The following options control which alarms will be displayed.

ALARM TYPES

Active? y	Resolved? n	
Major? y	Minor? y	Warning? y

REPORT PERIOD

Interval: a From: / / : To: / / :

EQUIPMENT TYPE (Choose only one, if any, of the following)

Board Number:
 Port:
 Category:
 Extension:
 Trunk (group/member): /

Figure 5-1. Hardware Alarm Reports Form

The following three options are available from this form:

1. Specifies type of alarms to be displayed by entering "y" (yes) in the blank following the alarm type. Entering "n" (no) omits an alarm type. Multiple selections are permitted. If no entry is made, all active major, minor, and warning alarms are displayed.
2. Specifies the desired period of time during which the alarms were active.
 - Interval: Display alarm records for the last hour, last day, last week, or all. The default is "all".
 - From: Display alarm records from the time specified as the beginning of the period. If no beginning date is entered, the display shows the alarms active since a month prior to the current time.
 - To: Display alarm records to the time specified as the end of the period. If no end date is entered, any alarm that is active after the beginning date and up to the current time will be displayed.
3. Specifies alarms to be displayed for one of the following five equipment types:
 - Board Number: Alarms for a particular circuit pack by location (BO1, for example)

- **Pork Alarms** for a particular port circuit (60101, for example)
- **Category:** Alarms for a particular equipment category
- **Extension:** Alarms associated with a particular extension number
- **Trunk (group/member):** Alarms associated with a particular trunk group and member number as identified in translations. If no member number is specified, all errors for the trunk group are displayed.

If no options are selected (and the ENTER key is pressed), the entire Alarm Log is displayed.

Errors/Alarms Categories Lists

The Hardware Alarm Reports form and the Hardware Error Reports form both contain a Category field that shows the alarms (or errors) for a particular equipment category. The following pages contain comprehensive lists of Errors/Alarms Categories. The first list is arranged alphabetically by category and the second alphabetically by MO name.

Errors/Alarms Categories List A (arranged alphabetically by category)

CATEGORY	MO NAME
data-mod	PDMODULE, TDMODULE
detector	DETR-BD, DTMR-PT, GPTD-PT, TONE-BD
environ	AC-POWER, CABINET, CARR-POW, DC-POWER EMG-XFER, EXT-DEV, POWER, AUX-CAB
ext-dev	EXT-ALRT, EXT-DEV
generatr	TDM-CLK, TONE-BD, TONE-PT
inads-link	INADS
infc	INFC1 , INFC2, INFC3-BD, INT-PT, SC-INTF, SC-LINK, P-INT-BD
maint	MAINT
rebus	DATA-BD, MEM-BD, INFC1 , MAINT, PROCR SW-CTL, TAPE
memory	MEM-BD
mist	TIME-DAY, TAPE
modem	MODEM-BD, MODEM-PT
netcon	DATA-BD, DATA-CHL, SW-CTL

pms/jrnl	PMS-LINK, JRNL-LNK
procr	PROCR
s-syn	S-SYN-BD, S-SYN-PT
stabd	ANL-BD, ANL-16-L, ANL-LINE, ANL-NE-L, DIG-BD, DIG-LINE, HYB-BD, HYB-LINE, MET-BD, MET-LINE
stacr	ANL-16-L, ANL-LINE, ANL-NE-L, DIG-LINE, HYB-LINE, MET-LINE
stations	ANL-16-L, ANL-LINE, ANL-NE-L, DIG-LINE, HYB-LINE, MET-LINE
tape	TAPE
tdm	TDM-BUS, SW-CTL
tone	DETR-BD, DTMR-PT, GPTD-PT, TONE-BD
trkbd	AUX-BD, AUX-TRK, CO-BD, CO-TRK, DID-BD, DID-TRK, DS1-BD, TIE-BD, TIE-DS1, TIE-TRK
trckrk	AUX-TRK, CO-TRK, DID-TRK, TIE-DS1, TIE-TRK
trunks	AUX-TRK, CO-TRK, DID-TRK, TIE-DS1, TIE-TRK

Errors/Alarms Categories List B (arranged alphabetically by MO name)

MO NAME	CATEGORY
AC-POWER	environ
ANL-BD	stabd
ANL-LINE	stabd, stacrk, stations
ANL-NE-L	stabd, stacrk, stations
ANL-16-L	stabd, stacrk, stations
AUX-BD	trkbd
AUX-CAB	environ
AUX-TRK	trkbd, trkcrk, trunks
BCMS-LNK	bcms
CABINET	environ
CARR-POW	dup-spe, environ
CO-DS1	trkbd, trkcrk, trunks
CO-TRK	trkbd, trkcrk, trunks
DATA-BD	rebus, netcon
DATA-CHL	netcon
DATA-CON	netcon
DT-LN-BD	data-mod
DAT-LINE	data-mod
DC-POWER	environ
DETR-BD	detector, tone
DID-TRK	trkbd, trkcrk, trunks
DIG-BD	stabd
DIG-LINE	stabd, stacrk, stations
DS1-BD	trkbd

DTMR-PT	detector, tone
EMG-XFER	environ
EXT-DEV	ext-dev
GPTD-PT	detector, tone
HYB-BD	stabd
HYB-LINE	stabd, stacrck, stations
INADS	inads-link
JRNL-LNK	pms/jrnl
MAINT	maint
MEM-BD	rebus, memory
MET-BD	stabd
MET-LINE	stabd, stacrck, stations
MODEM-BD	modem
MODEM-PT	modem
PDMODULE	data-mod
PMS-LINK	pms/jrnl
POWER	environ
PROCR	rebus, procr
S-SYN-BD	s-syn
S-SYN-PT	S-syn
SW-CTL	rebus, netcon, tdm .
TAPE	rebus, mist, tape
TDM-BUS	tdm
TDM-CLK	generatr
TDMODULE	data-mod
TIE-DS1	trkbd, trkcrk, trunks

TIE-TRK	trkbd, trkcrk, trunks
TIME-DAY	mist
TONE-BD	detector, generatr, tone
TONE-PT	generatr

Typical Alarm Log

Figure 5-2 is a typical Alarm Log display.

display alarms

Page 1

ALARM REPORT

Port	Maintenance Name	On Board?	Alt Name	Alarm Type	Svc State	Ack?	Date Alarmed	Date Resolved
TAPE	TAPE	n		MAJOR	Out	Y	12/22/09:05	00/00/00:00
A	SW-CTL	Y		MINOR	In	n	12/22/09:15	00/00/00:00
A	SW-CTL	Y		MINOR	In	n	12/22/09:20	00/00/00:00
A	SW-CTL	Y		MINOR	In	n	12/22/09:25	00/00/00:00
A	SW-CTL	Y		MINOR	In	n	12/22/09:28	00/00/00:00
A10	DS1-BD	Y		MINOR	In	n	12/22/09:30	00/00/00:00
B03	DS1-BD	Y		MINOR	In	n	12/22/09:30	00/00/00:00
B0501	HYB-LINE	n	409	WARNING	In	n	12/22/09:40	00/00/00:00
B0501	HYB-LINE	n	409	WARNING	In	n	12/22/09:40	00/00/00:00
B0502	HYB-LINE	n	410	WARNING	In	n	12/22/09:41	00/00/00:00
B0502	HYB-LINE	n	410	WARNING	In	n	12/22/09:42	00/00/00:00
B1206	DIG-LINE	n	403	WARNING	In	n	12/22/10:31	00/00/00:00
B1207	DIG-LINE	n	404	WARNING	In	n	12/22/10:31	00/00/00:00
B1208	DIG-LINE	n	405	WARNING	In	n	12/22/10:31	00/00/00:00

press CANCEL to quit -- press NEXT PAGE to continue

Figure 5-2. Typical Alarm Log Display Output

Information contained on the display is listed under columns as follows:

- **Port:** Physical location of the maintenance object.
- **Maintenance Name:** Abbreviated identifying name of the maintenance object.
- **On Board?:** A “y” (yes) means that the fault detected is on the associated circuit pack. An “n” (no) means that the fault has not been localized to a circuit pack. On-board alarms will cause the red LED on the circuit pack to light, whereas off-board alarms will not.

- **Alt Name:** Extension number for terminals or trunk group number for trunk groups. .
- **Alarm Type:** "MAJOR," "MINOR," or "WARNING".
- **Svc State:** "In," "Out," "Rdy". An "In" indicates that a maintenance object (MO) is currently in use. An "Out" indicates that an MO is currently not operational. An "Rdy" indicates that an MO (for example, a trunk) has been busied out by craft at the near end. Therefore, while no outgoing calls are permitted, a trunk may still try to service incoming calls.
- **Ack?:** A "y" (yes) or "n" (no) indicates whether or not INADS has acknowledged the alarm.
- **Date Alarmed:** Month, Day, hour, and minute that the alarm was raised.
- **Date Resolved:** Month, Day, hour, and minute that the alarm was resolved. 00/00/00:00 is displayed for active alarms.

If a number of alarms are active, the log can be used with the List of Alarms in Table 5-A to determine which alarms should be cleared first. The list presents all the alarms that can occur in System 75 in their descending order of urgency. Alarms should always be cleared in this order.

Table 5-A. System 75 List of Alarms

Maintenance Name	Alarm Level	On / Off Board*	Circuit Pack (Board) Name
POWER	Major	off	
PROC	Major	On	Processor
MEMORY	Major	On	Memory
MEM1-BD	Major	On	Memory 2
MEM2-BD	Major	On	Memory 3
TONE-PT	Major	On	Tone/Clock
TDM-CLK	Major	On	Tone/Clock
TDM-CLK	Major	off	Tone/Clock
TAPE	Major	off	
SW-CTL	Major	On	Network Control
INADS	Major	off	
DTMR-PT	Major	On	Tone Detector
GPTD-PT	Major	On	Tone Detector
AUX-CAB	Major	off	
SC-INTF	Major	On	Interface 1, 2, or 3
SC-INTF	Major	off	
SC-LINK	Major	On	Interface 1, 2, or 3
SC-LINK	Major	off	
INFC1	Major	On	Interface 1
INFC2	Major	On	Interface 2
INFC2	Major	off	
INFC3-BD	Major	On	Interface 3
S-SYN-PT	Major	On	Speech Synthesizer
CABINET	Major	On	
CARR-POW	Major	On	
EMG-XFER	Major	off	
TAPE	Minor	On	Tape Control
TAPE	Minor	off	Tape Recorder
TAPE	Minor	off	Tape Cartridge
MAINT	Minor	On	Maintenance
MAINT	Minor	off	Maintenance
TDM-BUS	Minor	On	
SW-CTL	Minor	On	Network Control
CABINET	Minor	On	
POWER	Minor	off	
ITR-LEV	Minor	On	Tone Detector
DTMR-PT	Minor	On	Tone Detector

Table 5-A. System 75 List of Alarms (Contd)

Maintenance Name	Alarm Level	On / Off Board*	Circuit Pack (Board) Name
GPTD-PT	Minor	On	Tone Detector
TONE-PT	Minor	On	Tone/Clock
TDM-CLK	Minor	off	
DATA-CHL	Minor	On	Network Control
DATA-CON	Minor	On	Network Control
TONE-BD	Minor	On	Tone/Clock
ANN-BD*	Minor	On	Announcement CP
ANL-BD*	Minor	On	Analog Line
DIG-BD*	Minor	On	Digital Line
HYB-BD	Minor	On	Hybrid Line
DT-LN-BD*	Minor	On	Data Line
AUX-BD*	Minor	On	Auxiliary Trunk
TIE-BD*	Minor	On	Tie Trunk
DS1-BD*	Minor	On	DS1 Tie Trunk
DS1-BD*	Minor	off	DS1 Tie Trunk
DID-BD*	Minor	On	DID Trunk
MODEM-BD	Minor	On	Pooled Modem
S-SYN-BD*	Minor	On	Speech Synthesizer
INFC3-BD	Minor	On	Interface 3
DATA-BD	Minor	On	Network Control
MET-BD*	Minor	On	MET Line
CO-BD*	Minor	On	CO Trunk
CO-TRK**	Minor	On	CO Trunk
CO-TRK**	Minor	off	
DID-TRK**	Minor	On	DID Trunk
DID-TRK**	Minor	off	
AUX-TRK**	Minor	On	Auxiliary Trunk
TI E-TRK**	Minor	On	Tie Trunk
TI E-TRK**	Minor	off	
TIE-DS1 .*	Minor	On	DS1/DMI Tie Trunk
S-SYN-PT	Minor	On	Speech Synthesizer
ANL-LINE**	Minor	On	Analog Line
ANL-16-U*	Minor	On	Analog Line (TN746
ANL-NE-L**	Minor	On	Analog Line (TN769/TN746)
DIG-LINE**	Minor	On	Digital Line
HYB-LINE	Minor	On	Hybrid Line
HYB-LINE	Minor	off	

Table 5-A. System 75 List of Alarms (Contd)

Maintenance Name	Alarm Level	On/ Off Board*	Circuit Pack (Board) Name
MET-LINE**	Minor	On	MET Line
MET-LINE**	Minor	off	
DAT-LINE	Minor	On	
MODEM-PT	Minor	On	Pooled Modem
PDMODULE	Minor	On	Digital Line
TDMODULE	Minor	On	Digital Line
ANN-PT	Minor	On	Announcement CP
JRNL-LNK	Minor	off	
PMS-LNK	Minor	off	
EMG-XFER	Warning	off	
ANL-LINE	Warning	off	
ANL-1 6-L	Warning	off	
ANL-NE-L	Warning	off	
DIG-LINE	Warning	off	
HYB-LINE	Warning	On	
HYB-LINE	Warning	off	
MET-LINE	Warning	off	
PDMODULE	Warning	off	
TDMODULE	Warning	off	
AUX-TRK	Warning	On	
TI E-TRK	Warning	off	
DID-TRK	Warning	off	
DS1-BD	Warning	off	
TIE-DS1	Warning	off	
TAPE	Warning	off	
TDM-BUS	Warning	On	
JRNL-LNK	Warning	off	
PMS-LNK	Warning	off	

• On Board means that the fault detected is on the associated circuit pack.

Off Board means that the fault has not been localized to a circuit pack.

• * Alarms on this MO may appear as warning.

Use display options command to determine current valid settings.

For System 75 XE, use the List of Alarms in Table 5-B to determine which alarms should be cleared first. The list presents all the alarms that can occur in System 75 XE in their descending order of urgency. Alarms should always be cleared in this order.

Table 5-B. System 75 XE List of Alarms

Maintenance Name	Alarm Level	On/ Off Board*	Circuit Pack (Board) Name
DC-POWER	Major	off	
PROC	Major	On	Processor
MEMORY	Major	On	Memory
TONE-PT	Major	On	Tone/Clock
TDM-CLK	Major	On	Tone/Clock
TDM-CLK	Major	off	Tone/Clock
TAPE	Major	off	
SW-CTL	Major	On	Network Control
INADS	Major	off	
DTMR-PT	Major	On	Tone Detector
GPTD-PT	Major	On	Tone Detector
EXT-DEV	Major	off	Customer Device
SC-INTF	Major	off	
SC-LINK	Major	off	
P-INT-PT	Major	On	Processor Interface
P-INT-PT	Major	off	Processor Interface
S-SYN-PT	Major	On	Speech Synthesizer
EMG-XFER	Major	On	
MAINT	Minor	On	Processor
MAINT	Minor	off	Processor
TDM-BUS	Minor	On	
SW-CTL	Minor	On	Network Control
TDM-CLK	Minor	off	
EXT-DEV	Minor	off	Customer Device
ITR-LEV	Minor	On	Tone Detector
DTMR-PT	Minor	On	Tone Detector
GPTD-PT	Minor	On	Tone Detector
TAPE	Minor	On	Tape Drive
TAPE	Minor	off	
TONE-PT	Minor	On	Tone/Clock

Table 5-B. System 75 XE List of Alarms (Contd)

Maintenance Name	Alarm Level	On / Off Board*	Circuit Pack (Board) Name
DATA-CHL	Minor	On	Network Control
TONE-BD	Minor	On	Tone/Clock
DETR-BD	Minor	On	Tone Detector
ANN-BD*	Minor	On	Announcement
ANL-BD*	Minor	On	Analog Line
DIG-BD*	Minor	On	Digital Line
HYB-BD	Minor	On	Hybrid Line
CO-BD*	Minor	On	CO Trunk
DATA-BD	Minor	On	Network Control
DT-LN-BD*	Minor	On	Data Line
AUX-BD*	Minor	On	Auxiliary Trunk
TI E-BD*	Minor	On	Tie Trunk
DID-BD*	Minor	On	DID Trunk
DS1-BD*	Minor	On	DS1 Tie Trunk
DS1-BD*	Minor	off	DS1 Tie Trunk
MODEM-BD	Minor	On	Pooled Modem
S-SYN-BD*	Minor	On	Speech Synthesizer
P-INT-BD	Minor	On	Processor Interface
MET-BD*	Minor	On	MET Line
CO-TRK**	Minor	On	CO Trunk
CO-TRK**	Minor	off	
DID-TRK**	Minor	On	DID Trunk
DID-TRK**	Minor	off	
ANN-PT	Minor	On	Announcement CP
S-SYN-PT	Minor	On	Speech Synthesizer
AUX:TRK**	Minor	On	Auxiliary Trunk
TI E-TRK**	Minor	On	Tie Trunk
TI E-TRK**	Minor	off	
TIE-DS1 .*	Minor	On	DS1/DMI Tie Trunk
ANL-LINE**	Minor	On	Analog Line
AN L-16-LINE**	Minor	On	Analog Line (TN746
ANL-NE-LINE**	Minor	On	Analog Line (TN769/TN746)
DIG-LINE**	Minor	On	Digital Line

Table 5-B. System 75 XE List of Alarms (Contd)

Maintenance Name	Alarm Level	On / Off Board*	Circuit Pack (Board) Name
HYB-LINE	Minor	On	Hybrid Line
HYB-LINE	Minor	off	
MET-LINE**	Minor	On	MET Line
MET-LINE**	Minor	off	
DAT-LINE	Minor	On	Data Line
MODEM-PT	Minor	On	Pooled Modem
PDMODULE	Minor	On	Digital Line
TDMODULE	Minor	On	Digital Line
JRNL-LNK	Minor	off	
PMS-LNK	Minor	off	
EMG-XFER	Warning	off	
ANL-LINE	Warning	off	
DIG-LINE	Warning	off	
HYB-LINE	Warning	off	
MET-LINE	Warning	off	
AUX-TRK	Warning	off	
TI E-TRK	Warning	off	
DID-TRK	Warning	off	
DS1-BD	Warning	off	
TIE-DS1	Warning	off	
TAPE	Warning	off	
TDM-CLK	Warning	off	
TDM-BUS	Warning	off	
PDMODULE	Warning	off	
TDMODULE	Warning	off	
ANN-PORT	Warning	off	
JRNL-LNK	Warning	off	
PMS-LNK	Warning	off	

- ON BOARD means that the fault detected is on the associated circuit pack.
- OFF BOARD means that the fault has not been localized to a circuit pack.

- * Alarms on this MO may appear as warning.
- Use display options command to determine current valid settings.

Note: Items marked Tone/Clock can be either a TN741 Tone/Clock or TN756 Tone Detector/Generator circuit pack.

Items marked Tone Detector can be either a TN748B Tone Detector or TN756 Tone Detector/Generator circuit pack.

Error Log

A record of errors detected during automatic system tests, demand tests, and in-line error detection *is* maintained in the Error Log. The Error Log, like the Alarm Log, is restricted in size. A new entry overwrites the oldest unalarmed entry. The overwritten entry must be at least 6 minutes old. If no such entry is found, the error is not entered. The Error Log can be displayed on the on-site SAT or remotely by INADS. The Error Log is saved on tape.

For each logical/physical name pair, there can only be six errors logged. Errors associated with the resolved alarms for that logical/physical name pair are the first to get replaced. After that the old ones are replaced.

The Error Log can be displayed on the on-site SAT or remotely by INADS. The Error Log is saved on tape via the save translations command or by issuing the reset system 3 command (see the System Reset and Reboot Indications in Chapter 3).

Hardware Error Report

When the display errors command is entered, the Hardware Error Reports form (see Figure 5-3) is displayed.

display errors
Page 1 of 1

ERROR REPORTS

The following options control what errors will be displayed.

ERROR TYPES

Error Type: Active Alarms Only? y

REPORT PERIOD

Interval: d From: / / : To: / / :

EQUIPMENT TYPE (Choose only one, if any, of the following)

Board Number:

Port:

Category:

Extension:

Trunk (group/member): /

Figure 5-3. Hardware Error Reports Form

Options are available as follows. If no options are selected, the entire Error Log is displayed.

- Specifies all Error Log entries for a particular error code entry.
 - Error Type: Specifies the type of errors associated with an object. This field is defaulted to all the errors.
 - Active Alarms Only?: The user may select error entries based on active alarms by entering “y” (yes) which is the default. Entering “n” (no) will display the entire Error Log, or at least all applicable errors based on other selection criteria.
- Specifies the desired period of time during which the alarms were active.
 - Interval: Display only error records for the last hour, last day, last week, or all. The default is the last day.
 - From: Display error records from the time specified as the beginning of the period. If no beginning date is entered, the display shows the error records active since a month prior to the current time.
 - To: Display error records to the time specified as the end of the period. If no end data is entered, the display ends at the current time. If the “to” time is specified as a time greater than the current time, the errors displayed are errors in the past because the times on the Error Log are circular.
- Specifies errors to be displayed for one of the following five equipment types:
 - Board Number: Errors for a particular circuit pack by location (BO1, for example)
 - Port Errors for a particular port circuit (BO1 01, for example)
 - Category: Errors for a particular equipment category—same as for Alarm Log Display
 - Extension: Errors associated with a particular terminal extension number
 - Trunk (group/member): Errors associated with a particular trunk group and member number as identified in translations. If no member number is specified, all errors for the trunk group are displayed.

Error Log Display

Figure 5-4 is a typical Error Log display.

display errors											Page 1
HARDWARE ERROR REPORT											
Port	Mtce Name	Alt Name	Err Type	Aux Data	First Occur	Last Occur	Err Cnt	Err Rate	Rt/ Hr	Alarm Status	Act?
B1906	DIG-LINE	2864	513	0	12/27/18:43	12/28/09:52	87	5	3	a	y
B1906	DIG-LINE	2864	1025	40965	12/27/18:43	12/28/09:52	87	5	3	a	y
B1906	DIG-LINE	2864	1793		12/27/18:44	12/27/23:54	12	2	0	a	y
B1905	DIG-LINE	2860	1793		12/27/18:44	12/27/23:54	1	0	0	n	n
B1901	DIG-LINE	2849	1793		12/27/18:44	12/27/23:54	1	0	0	n	n
C0908	HYB-LINE	2923	1025		12/28/01:52	12/28/01:52	1	0	0	n	n
B1607	DIG-LINE	2945	1793		12/28/02:06	12/28/02:06	1	0	0	n	n
B1701	DIG-LINE	2846	1793		12/28/02:10	12/28/01:10	1	0	0	n	n
B1202	DIG-LINE	2828	1793		12/28/01:21	12/28/02:21	1	0	0	n	n
C2008	ANL-LINE	2850	0	0	12/28/08:52	12/28/08:52	1	0	1	r	n
C2005	ANL-LINE	2943	0	0	12/28/08:52	12/28/08:52	1	0	1	r	n
C2003	ANL-LINE	2932	0	0	12/28/08:52	12/28/08:52	1	0	1	r	n
C2001	ANL-LINE	2820	0	0	12/28/08:52	12/28/08:52	1	0	1	r	n
C2004	ANL-LINE	2957	0	0	12/28/08:52	12/28/08:52	1	0	1	r	n

Figure 5-4. Typical Error Log Display Output

Information contained on the display is listed under columns as follows:

- **Port:** Physical location of the maintenance object.
- **Mtce Name:** The abbreviated identifying name of the maintenance object.
- **Alt Name:** Extension number for terminals or trunk group number for trunk groups.
- **Err Type:** Numerical error code that identifies the type of problem.
- **Aux Data:** Additional numerical information (auxiliary data) concerning the error type. Only the most recent auxiliary data related to the error type is displayed. A detailed listing of auxiliary data numbers by error code is included for many maintenance objects in "Chapter 6. Errors and Alarms: Repair Procedures."
- **First Occur:** Month, day, hour, and minute that this error type was reported.
- **Last Occur:** Month, day, hour, and minute of the most recent occurrence of this error type.

Note: If the system is unable to retrieve the time of day when this error type last occurred, "01:43" is displayed.

- **Err Cnt:** A count of the number of times that this error type has occurred.

Err Rate: Average hourly rate at which the errors have occurred from the first occurrence to the present.

- **Rt/Hr:** Approximation of the rate at which this error occurred in the last hour.

Alarm Status: Status of this maintenance object in the Error and Alarm Logs ("n" for not alarmed, "a" for active alarm, and "r" for resolved alarm).

Act?: A flag indicating whether or not the maintenance object is still under active consideration by the maintenance software "y" (yes) or "n" (no).

Note: If there are any SYSTEM errors in the Hardware Error Log, enter the display `initcauses` command to obtain additional information. It is possible that some information was not logged in the Error Log. By displaying the `initcauses`, this information can be seen and used to analyze system errors more closely.

CHAPTER 6. ERRORS AND ALARMS: REPAIR PROCEDURES

General

Trouble-clearing is based on the type of indication received, system-alarmed troubles or user-reported troubles. When viewing the Alarm Log, all major alarms are displayed first, minor alarms are displayed second, and warning alarms are displayed last. Each level of alarm is displayed by importance of functional area. When two or more alarms of the same level are displayed, the functional area that is the most critical to switch operation is displayed first. This alarmed entry should be resolved first because it may be affecting the rest of the alarmed entries.

Sometimes system-alarmed and user-reported troubles will exist at the same time. The alarmed troubles should always be cleared first, if possible. This will often clear the user-reported faults without additional maintenance.

Port Troubles

Failures in trunk and station circuit packs (CPS) in the port carriers and in the port slots of the control carrier(s) are the easiest to repair. Failures are usually independent and can be cleared by replacing the circuit pack with the red alarm light-emitting diode (LED) or on-board alarm in the Error Log. It is desirable to wait, if possible, until the amber (busy) LED is dark before removing the pack. However, during moderate to heavy system activity, at least one station or trunk is usually busy.

There is an alternative to replacing a port circuit pack that has only one (or few) failed port(s). The voice terminal or trunk assigned to the failed port can be moved to a good port on the same or another port pack. If this is done, the wiring must also be changed at the cross-connect field (see *AT&T System 75 Wiring, 555-200-111*, for cross-connect field wiring information). This method should only be done to temporarily improve the system until a new circuit pack is obtained.

This is an administrative rather than a maintenance procedure and should be done by the System Manager. The new port must be compatible with the trunk or voice terminal. System records should be updated to identify the defective port so that it will not be used again. Packs with more than two or three bad ports should always be replaced.

Common Control Troubles

The circuit packs in the common control area of the control carrier A are more difficult to repair. The system must be powered down before any of these packs are replaced. After the circuit pack suspected of being defective has been replaced, the system is powered up (rebooted). The alarm data is written to tape.

Another factor increasing the difficulty of trouble-clearing in the common control area is the high degree of interaction among the circuit packs. Multiple alarms and off-board alarms are more likely to occur in common control troubles than in port troubles. Use of the Alarm Log and the List of Alarms is often necessary when clearing problems.

For more detailed information on repairing Common Control circuit packs, refer to the XXX-BD maintenance documentation later in this chapter.

Voice Terminal and Trunk Troubles

If the system isolates a fault to a voice terminal or if a user complaint indicates a voice terminal problem, the trouble must be isolated to the voice terminal itself or to the wiring between the cabinet and the voice terminal. Tests for checking wiring and voice terminal performance can be generated at the System Access Terminal (SAT) and at designated voice terminals.

Warning: A visual inspection of voice terminal wiring, particularly the mounting cord, is always advisable in cases of voice terminal trouble reports. A dead voice terminal can be the result of a loose mounting cord. Voice terminal trouble can also occur when wiring is crushed or severed by furniture or traffic.

Trunk problems, reported by alarms or by users, can be evaluated through tests from voice terminals or the SAT. If trunk troubles appear to be outside the System 75, the responsible common carrier should be asked to make the repairs.

If any Major trunk alarms are found, it may be because more than 75 percent of the trunks are alarmed in that group. Check all the trunks in that group and follow outlined procedure.

Error Generation/Tracking

Errors are generated by periodic maintenance tests run on a Maintenance Object (MO) or by using the MO (for example, placing a phone call or saving translations). These errors are reported to the maintenance subsystem and logged in the Error Log which then causes initial testing to begin on the MO.

All types of errors logged against an MO are kept in a maintenance record for that MO. This record is created when the first error is reported and remains active until maintenance determines that the problem no longer exists. A counter is kept for each type of error, and each time the error reoccurs, the associated counter is increased.

Each error and test counter is assigned a threshold value. If any counter should reach its threshold value, accelerated testing will begin and, in some cases, an alarm will be raised. In general, alarms are raised only by test failures; in-line errors, in most cases, do not raise alarms. An alarm will not be resolved until **all** tests have passed and all alarming counters go to zero. Also, the maintenance record will be active until all counters are reduced to zero.

Error/Alarm Resolution

The same tests that run automatically are also available to the technician and the results of these craft-demanded tests will affect the error counters in the same way. Thus, if an alarm is raised by a transient problem that is no longer active, the process of resolving the alarm can be speeded up by running the appropriate tests the correct number of times.

The test command provides a way to run specific tests on a particular MO. Normally, the test command plus the maintenance name, location of the object, and the type test (short or long) will execute the tests necessary to clear the alarm.

A typical command line entry to test the Maintenance circuit pack (which is identified as MAINT in the Error and Alarm Logs) is as follows:

```
test maint s r 3
```

This tells the maintenance software to test the MAINT MO by invoking the short sequence of tests and to repeat the test three times.

Test Commands

The test commands (except the test led command) cause tests to be run on the System 75 MOs. The short tests are those that the maintenance software automatically runs each hour and are not service-affecting. The long tests are basically those tests that the maintenance software automatically runs once every 24 hours and are more destructive than the short tests. When a long test is specified, the short tests are run also. The tests can be repeated as required by inserting r at the end of the command line and entering the number (No.) of times that the test is to be run. Some of the tests can be disabled by administering forms on the SAT. The command line entries required to execute the various test commands are provided in the following "Maintenance Object Test/Repair Procedures" section.

All test results are displayed at the SAT or at the Initialization and Administration System (INADS) center. Figure 6-1 is an example of the test results for a port circuit.

test port 2B1905 long				
TEST RESULTS				
Port	Maintenance Name	Test No.	Result	Error Code
291905	DIG-LINE	9	PASS	
2B1905	DIG-LINE	11	PASS	
2B1905	DIG-LINE	13	PASS	
291905	DIG-LINE	16	PAS S	
2B1905	DIG-LINE	17	PASS	

Figure 6-1. Typical Demand Test Results

The following information is contained in the test results:

- **Port:** Maintenance object's physical location—port network number (1 for PPN or 2 for EPN), carrier, slot number, port number. If the port network number is not entered in the command, then the system assumes a 1 for the PPN.

Note: This information does not apply to fixed-position circuit packs.

• **Maintenance Name:** Maintenance object's logical name.

- **Test No.:** A system-identifying number for the individual tests. Descriptions of the tests according to "Test No." are provided for each MO.
- **Result:** The results of the individual test—"PASS," "FAIL," or "ABORT".

Note: All tests for a port on an intelligent port circuit pack abort if that port is busy.

- **Error Code:** A system-generated number that tells why the individual test failed or aborted. A detailed list of the codes according to "Test No." is provided for each MO.

Maintenance Object Test/Repair Procedures

The rest of this chapter contains information required for accurate interpretation of the Alarm Log have, efficient maintenance testing, and speedy repair of alarmed MOs. The following details are provided for each MO:

- alarm level(s)
- hardware error(s) associated with the MO
- the associated test that caused the error(s)
- test sequences
- appropriate command line entry
- test description(s)
- error code description(s)
- recommended maintenance procedures.

For your convenience, the MOs have been arranged alphabetically by their Alarm Log names.

Note: Some test commands may trigger test sequences for more than one Maintenance Object.

AC-POWER (AC Power)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
AC-POWER	MAJOR	test environment	AC Power

The AC Power maintenance object represents the AC power provided to the switch from a wall outlet. The AC power comes from the wall outlet, through the Power Distribution Unit (PDU), and is then distributed to the various Carrier Port Power Supply. The Battery Charger monitors AC power via fuse F5. Figure 6-2 illustrates the relation of fuse F5 to the rest of the system (Figure 6-2 also shows other Environment maintenance related items that can be ignored for this section on AC Power). Figure 6-3 shows the position of the fuses on the PDU, and describes how to replace a fuse. When the switch loses power (for example, a power outage in the building), a major alarm is logged against AC Power, and the system goes on battery backup, which is known as Nominal Power Holdover (NPH). If power is restored before the NPH time expires, the alarm is resolved. The nominal power holdover provided in R1V3 is as follows:

- The battery will supply 10 seconds of power to the cabinet and then an additional 10 minutes of power to just the control carrier (carrier A).

CHAPTER 6. ERRORS AND ALARMS: REPAIR PROCEDURES

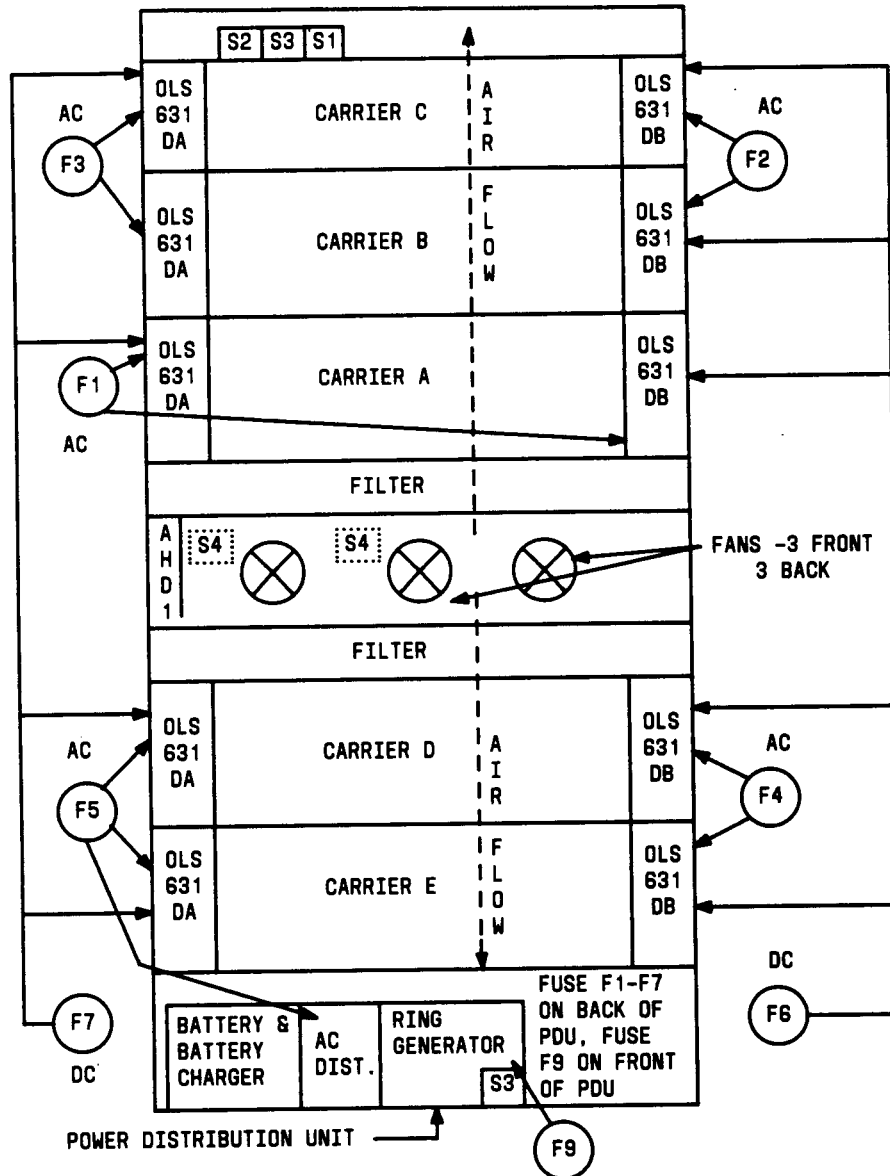
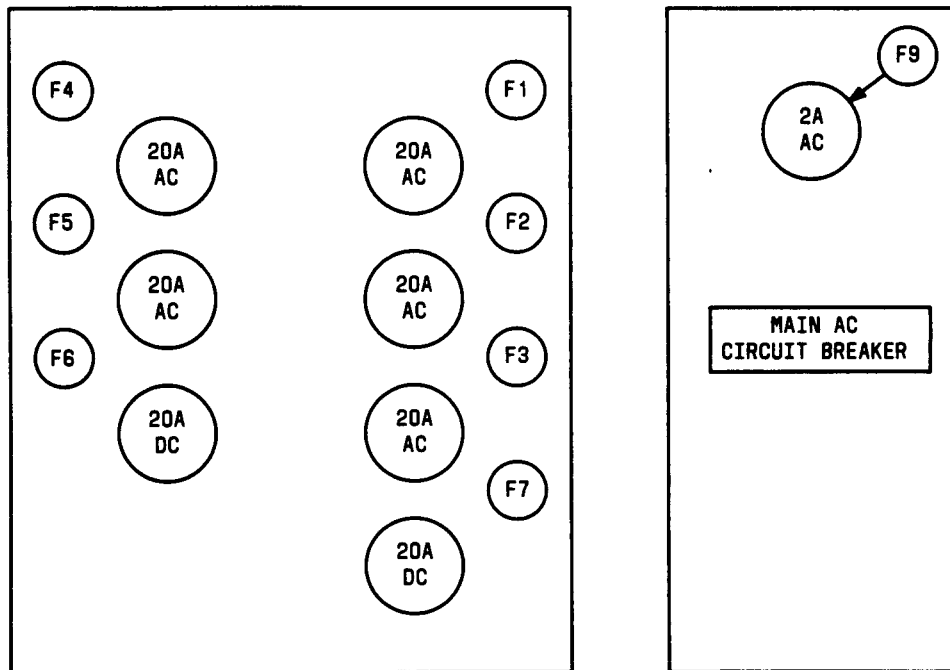


Figure 6-2. Medium Cabinet Environment Components (Sensors)



BACK OF PAOWER DISTRIBUTION UNIT

FRONT OF POWER DISTRIBUTION UNIT

FUSE F8 (5A AC) IS LOCATED ON THE BACK OF THE PDU ABOVE THE COVENIENCE OUTLET AND IS NOT SHOWN FOR CLARITY.

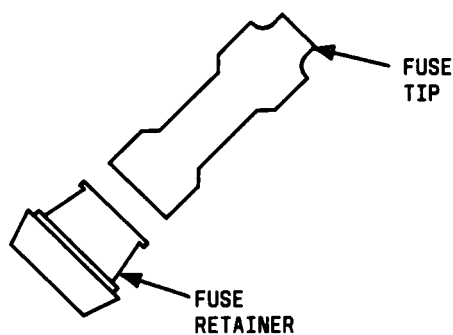


Figure 6-3. Medium Cabinet

FUSES F1-F7 ARE ILLUSTRATED AT THE LEFT. WHEN REPLACING ONE OF THESE FUSES CARE MUST BE TAKEN TO INSTALL THEM FUSE TIP FIRST. FUSES F8-F9 ARE SYMETRICAL AND CAN BE INSERTED EITHER WAY.

Figure 6-3. Medium cabin fuse location and replacement.

Hardware Error Log Entries and Test to Clear Values

AC Power (AC-POWER) Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test environment s
513	0 or 1l	AC Power Query (#5)	MAJOR	OFF	test environment s r 1

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery & Battery Charger Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery & Battery Charger Query Test (#5) (a)	x	x	ND
AC Power Query Test (#5)	x	x	ND
OLS Recycle Test (carrier E,D,A,B,C) (#126) (b)		x	ND
OLS Query Test (carrier E, D, A,B,C) (#127) (b)	x	x	ND
Emergency Transfer Query Test (#1 24) (c)	x	x	ND
Cabinet Sensors Query Test (#1 22) (d)	x	x	ND
Adjunct Processor Query Test (AP 1,2,3) (#1 20) (e)	x	x	ND

•D = Destructive
ND = Non-destructive

- (a) Refer to POWER (Battery & Battery Charger) maintenance documentation for a description of this test.
- (b) Refer to CARR-POW (Carrier Port Power Supply) maintenance documentation for a description of this test.
- (c) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a description of this test.
- (d) Refer to CABINET (Cabinet Sensors) maintenance documentation for a description of this test.
- (e) Refer to AUX-CAB (Adjunct Processor) maintenance documentation for a description of this test.

Power Query Test (#5)

This test queries the Maintenance circuit pack (TN731 or TN731B) for the status of AC power to the switch.

Test #5 Power Query Test		
Error Code	Test Result	Description / Recommendation
	ABORT	System resources required to run this test are not available or response to the test request was not received within the allowable time period or Internal System Error. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	The switch is currently without AC power. 1) Check for AC power at the wall outlet. a) If there is no AC power at the wall outlet, then the problem is not with the system itself. Power must be restored to the wall outlet. b) If there is AC power at the wall outlet, then there could be a problem with the Battery or Battery Chargers. Resolve all alarms logged against POWER (Battery & Battery Charger) and rerun the test. If the test still fails, the fuse F5 may have blown. Replace fuse F5 (see Figure 6-3), and rerun the test. If the test still fails, then MAINT (Maintenance Circuit Pack) may be incorrectly reporting the problem. Resolve all alarms against these MOs, and rerun the test. If the test still fails, then escalate the problem.
100	FAIL	The switch is currently without AC power, and AC Power maintenance is in the middle of timing the NPH interval. 1) Follow the repair steps outlined above for Error Code 1.
	PASS	The MAINT (Maintenance Circuit Pack) has reported that the switch has AC power. If there is no AC power at the wall outlet, then look for and resolve all alarms against the appropriate MO listed.

ANL-LINE (8-Port Analog Line), ANL-NE-L (8-Port Neon Analog Line), ANL-BD

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
ANL-LINE	MIN	test port CSSpp l	8-Port Analog Line Circuit Pack
ANL-LINE	WRN	test port CSSpp s	8-Port Analog Line Circuit Pack
ANL-NE-L	MIN	test port CSSpp l	8-Port Neon Analog Line Circuit Pack
ANL-NE-L	WRN	test port CSSpp s	8-Port Neon Analog Line Circuit Pack
ANL-BD	(b)		

(a) Where C is the carrier number (for example, A, B, C, D, or E); and SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to XXX-BD (Common Port Board) maintenance documentation.

8-Port Analog Line Circuit Pack Maintenance

The 8-Port TN742, TN769, and TN712 Analog Line circuit packs provide eight ports for single-line on-premises or off-premises analog endpoints such as analog voice terminals, queue warning level lamps, recorded announcements, dictation machines, PagePac* paging system equipment, external alerting devices, modems, facsimile machines, and AUDIX voiceports. The TN769 supports a neon message waiting lamp, but the TN742 and TN712 do not.

Test 48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing is disturbing the customer or the terminal equipment, it should be disabled using the Tests field of the station administration screen. However, on some releases of the software, this will disable Tests 6, 47, and 35 as well as Test 48. Test 47 may cause a false alarm when the port is connected to off-premises equipment, some non-voice terminal equipment, and some loop equipment. If this is the case, then the test should be disabled using the Tests field of the change station command.

No maintenance of the terminal connected to the Analog Line circuit pack is performed, except to determine whether or not the terminal is connected. Failures of the neon message waiting lamp power and the common ringing application circuitry are reported as part of the common circuit pack errors (see errors 1281 and 1793 in the XXX-BD maintenance documentation).

Hardware Error Log Entries and Test to Clear Values

ANL-LINE or ANL-NE-L Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test port CSSpp s
1(a)	40975 40977	none			
15(b)	Any	Port Audits and Updates Test (#36)			
18	0	busyout station <extension>	WRN	ON	release station <extension>
257(c)		Station Present Test (#48)	WRN	OFF	test port CSSpp s r 3
513		Battery Feed Test (#35)	MIN	ON	test port CSSpp s r 2
769(d)		Loop Around and Conference Test (#47)	MIN	ON	test port CSSpp 1 r 3
1025		NPE Crosstalk Test (#6)	MIN	ON	test port CSSpp l r 3
1281 (e)					
1793 (e)					

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) These are in-line errors and can only be resolved over time.

40975 indicates that the terminal equipment was on-hook when ring-trip was detected during ringing. This usually indicates a failure in the terminal equipment or the type of terminal has a low ringer impedance. Call the terminal equipment and verify that the terminal rings. If the terminal does not ring, then replace it; otherwise, run test PORT CSSpp and follow the procedure for Test #48.

40977 indicates that no terminal equipment was connected when ringing was attempted. Run test port CSSpp and follow the procedure for Test #48.

- (b) This is a software audit error that does not indicate any hardware malfunction. Run short test sequence and investigate any associated errors (if any).
- (c) Test 48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing is disturbing the customer or the terminal equipment, it should be disabled using the Test field of the station administration screen. However, on some releases of the software this will disable Tests 6, 47, and 35 as well as Test 48.

(d) Test 47 may cause a false alarm when the port is connected to off-premises equipment, some non-voice terminal equipment, and some loop equipment. If this causes a false alarm, then disable the test changing the Test field of change station command to "no". In V1 1.6, V2 1.5, V3 1.4, and in subsequent software issues Test 47 does not raise an alarm.

(e) See the XXX-BD (Common Port Board) maintenance section.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the Battery Feed Test, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Teat Sequence	Long Test Sequence	D/ND*
Battery Feed Test (#35)	x	x	ND
Station Present Test (#48)	x	x	ND
NPE Crosstalk Test (#6)		x	ND
Loop Around and Conference Test (#47)		x	ND
Station Status and Translation Audits and Updates Test (#36)		x	ND

•D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) if neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1005	ABORT	This indicates that the test is not applicable when the analog port is used with combined modem pool. This error can be ignored.
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.
1020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1) Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests, examining station wiring, examining the station, and ensuring that the terminal is correctly translated as off-premises or on-premises. Note: This test will always pass for TN712 Analog circuit packs prior to Vintage 14 and TN742 prior to Vintage 4.

Battery Feed Test (also called Port Diagnostic Test) (#35)

The battery feed chip provides power to the voice terminal equipment, signaling, rotary dial pulsing, transmission, and balance. This test checks the signaling and switchhook capabilities of the battery feed chip by terminating the port, applying battery, and trying to detect a current.

Test #35 Battery Feed Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1005	ABORT	This indicates that the test is not applicable when the analog port is used with combined modem pool. This error can be ignored.

Test #35 Battery Feed Test (Contd)		
Error Code	Test Result	Description / Recommendation
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The port's battery feed chip is unable to supply sufficient power to the terminal equipment. 1) Replace the circuit pack because this port is defective.
	PASS	The port's battery feed chip is able to provide power to the station equipment to detect on/off-hook. However, the battery feed chip may still be unable to provide power for touch-tones. If tones are heard when buttons are pressed, then the battery feed chip is functioning correctly; otherwise, replace the circuit pack because this port is defective. User-reported troubles on this port should be investigated using other port tests, examining station wiring, examining the station, and ensuring that the terminal is correctly translated as off-premises or on-premises. Note: This test will always pass for TN712 Analog circuit packs prior to Vintage 14 and TN742 prior to Vintage 6.

Station Status and Translation Audits and Updates Test (#36)

Test 36 updates the analog port's message lamp state (if it has one) and translations (such as station type, dial type, network connection) with information kept in the software. The software is updated with the switchhook state reported by the port processor. When the ringer is in the off state, this test also turns off the station's ringer to prevent constant ringing caused by defective hardware.

Test #36 Station Status and Translation Audits and Updates Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1006	ABORT	This port has been busied out by craft or taken out-of-service by the failure of the NPE Crosstalk Test. 1) Look in the Error Log for error type 18 (port busied out) for this port. If this error is present then release the port with the release station <extension> command and run the test again. 2) Look in the Error Log for error type 1025 (NPE Crosstalk Test failed) for this port. If this error is present, then investigate the errors associated with the NPE Crosstalk Test (#6) first. 3) If the test continues to abort, escalate the problem.
1005	ABORT	This indicates that the test is not applicable when the analog port is used with combined modem pool. This error can be ignored.

Test #36 Station Status and Translation and Updates Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	This does not indicate a hardware problem. The switchhook audit failed and the other updates were not performed because of this failure. This may occur when the audit is performed at the same time that the terminal equipment goes off-hook. Use status station to determine when the port is available for testing. 1) When the port becomes available for testing, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
5	FAIL	This does not indicate a hardware problem but may be an internal software error. The message waiting lamp update failed: The translation and ringer updates were not performed because of this failure.
7	FAIL	The translation update failed. The ringer update was not performed because of this failure. This does not indicate a hardware problem but may be an internal software error.
8	FAIL	This does not indicate a hardware problem but may be an internal software error. The ringer update failed. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	The software and the port processor have the same status. User-reported troubles on this port should be investigated using other port tests, examining station wiring, examining the station, and ensuring that the terminal is correctly translated as off-premises or on-premises. Note: This test will always pass for TN712 Analog circuit packs TN712 prior to Vintage 14 and TN742 prior to Vintage 6.

Loop Around and Conference Test (#47)

Each analog port consists of:

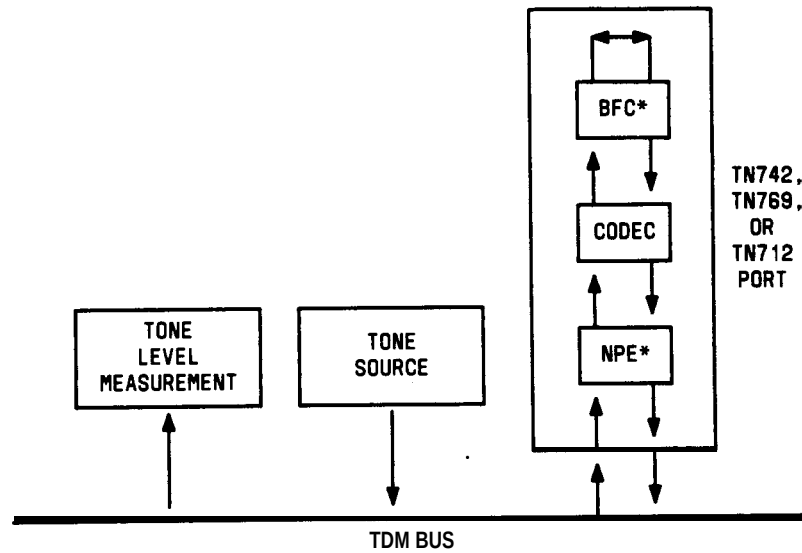
- A Network Processing Element (NPE) for port connectivity and gain, and conferencing functionality.
- A codec that converts the digital signals of the TDM Bus to analog signals.
- A battery feed chip that provides power to the voice terminal set for signaling, dial pulsing, transmission, and balance.

This test is designed to check the on-board transmission capabilities of the NPE, the codec, and the battery feed chip of the analog port. A tone detector and a tone generator talk and listen on the same pair of time slots that the analog port is listening and talking to. The analog port is then instructed to go into loop around mode (see Figure 6-4). The test passes if the signal measured by the tone detector is within acceptable limits.

The Conference Circuit Test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. As part of Test 47 the operation of the port conference circuits in the NPE for three and four parties is also tested. Noise is also tested. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a tone detector port. If the level of the tone is within a certain range the test passes.

The noise test is performed by filtering out the tone and then measuring inherent port noise.

Note: This loop around test is sensitive to the length of the loop, the equipment in the loop, or the equipment terminating the loop, such as off-premises stations. If this test is causing a false alarm, then disable the test by changing the Test field to “no” using the change station command for this station.



* BFC - BATTERY FEED AND HYBRID CHIP
NPE - NETWORK PROCESSING ELEMENT

Figure 6-4. Analog Loop Around and Conference Test

Test #47 Loop Around and Conference Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	ABORT	The port has been seized for a valid call during the conference or noise test. Use status station to determine when the port is available for testing. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #47 Loop Around and Conference Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003		The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1005	ABORT	This indicates that the test is not applicable when the analog port is used with combined modem pool. This error can be ignored.
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #47 Loop Around and Conference Test (Contd)		
Error Code	Test Result	Description / Recommendation
7	FAIL	The conference test or the noise test failed. This will cause noisy or unreliable connections, or other users calling this port may hear an echo. 1) Disconnect the terminal equipment from the circuit pack at the cross-connect and run the test again. 2) If it fails again, then replace the circuit pack and reconnect the terminal equipment. If, instead, the test passes the second time, then the test results were affected by the terminal equipment connected to the port; in this case, the following should be done if all other tests pass or abort and the station is operating properly: a. If the software is V1 1.6, V2 1.5, V3 1.4, or newer, ignore the results of this test. The software will ignore failures of Test #47 and will not alarm. b. If the software is earlier than V2 1.5 or V3 1.4, then the test should be disabled by changing the Test field to "no" after reconnecting the station (this will also disable Test #48). c. If the software is earlier than V1 1.6, and this port is generating false alarms (769 errors are logged), then upgrade the customer software to V1 1.6 so that the software will ignore the failure. If there are failures of other tests, then investigate those errors. User-reported troubles with this port should be investigated using other port tests, examining station wiring, examining the station, and ensuring that the station is correctly translated as off-premises or on-premises.
19(a)	FAIL	The reflective loop around with gain set to low and the 600 ohm balance failed. This will cause noisy or unreliable connections.
21(a)	FAIL	The reflective loop around with gain set to high and the RC balance failed. This will cause noisy or unreliable connections.
22(a)	FAIL	The non-reflective loop around test failed. Other users calling this port may hear an echo. See the procedure for Error Code 7 above.

See Note (a) on next page.

Test #47 Loop Around and Conference Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	The port is able to provide an analog transmission path to the station equipment. User-reported troubles on this port should be investigated using other port tests, examining station wiring, examining the station, and ensuring that the terminal is correctly translated as off-premises or on-premises. Note: This test will always pass for TN712 Analog circuit packs prior to Vintage 14 and TN742 prior to Vintage 6.

- (a) If the reflective Loop Around Test fails for all ports on a circuit pack, a -5V power problem is indicated. If -5V power has been lost, the Loop Around Test will fail on all Analog Port and Trunk circuit packs in that carrier. A red LED lit on TN736 or TN752 indicates a problem within the circuit pack. Replace the circuit pack. See CARR-POW (Carrier Port Power Supply) maintenance section for a description of the power supplies and replacement procedures.

Station Present Test (also called Ringing Application Test) (#48)

This test provides a burst of ringing current to the terminal equipment and detects that current flows. This test ascertains if terminal equipment is connected to the port.

Test 48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing is disturbing the customer or the terminal equipment, it should be disabled using the Test field of the station administration screen. However, on some releases of the software this will disable Tests 6, 35, 47, and 48.

Test #48 Station Present Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #48 Station Present Test (Contd)		
Error Code	Test Result	Description / Recommendation
1008	ABORT	Could not allocate a ringing circuit. Either all the ringing circuits are in use or the ringing generator is defective, or it is not wired correctly. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, run the test station <extension> command on other Analog (TN742, TN769, TN746, or TN712) circuit packs. If an ABORT 1008 occurs for Test 48 on other circuit packs as well, then the ringing generator may be defective or is not wired correctly. If it doesn't occur on other ports then that circuit pack is currently using all four ringing phases.
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The terminal equipment is not connected to the circuit pack or the ringing generator may have failed. Some terminal equipment such as modems may fail even when connected properly. 1) Check all of the wiring between the station equipment and the switch. Then run the test again. 2) If the test fails again, look for errors in the Error Log. If no errors are present, then disable the test using the change station <extension> command and entering "n" for the Test field. Note that in V2 1.5, V3 1.5, and in subsequent software releases this will also disable Tests 6, 47, and 35 on this port.

Test # 48 Station Present Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	The station is connected properly to the switch. This test may also pass if no terminal equipment is connected and the terminal is very far from the switch (that is, it is off-premises). User-reported troubles on this port should be investigated using other port tests, examining station wiring, examining the station, and ensuring that the terminal is correctly translated as off-premises or on-premises. Note: This test will always pass for TN712 Analog circuit packs prior to Vintage 14 and TN742 prior to Vintage 6.

ANL-16-L (16-Port Neon Analog Line Circuit Pack), ANL-BD

MO Name As H Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
ANL-1 6-L	MIN	test port CSSpp I	16-Port Neon Analog Line Circuit Pack
ANL-1 6-L	WRN	test port CSSpps	16-Port Neon Analog Line Circuit Pack
ANL-BD	(b)		

(a) Where C is the carrier number (for example, A, B, C, D, or E); and SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to the XXX-BD (Common Port Board) maintenance section.

The 16-port TN746 Analog Line circuit pack provides 16 ports for single-line, on-premises only analog voice terminals. The TN746 ports do not have lightning protection and thus cannot support off-premises stations.

Test 48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing is disturbing the customer or the terminal equipment, it should be disabled using the Test field of the change station screen. However, on some releases of the software, this will disable Tests 6, 7, 35, 48, and 161.

No maintenance of the terminal connected to the analog circuit pack is performed, except to determine if the terminal is connected. Failures of the neon message waiting lamp power and the common ringing application circuitry are reported as part of the common port circuit pack errors—see errors 1281 and 1793 in the XXX-BD (Common Port Board) maintenance section.

Hardware Error Log Entries and Test to Clear Values

16-Port Analog Line Circuit Pack (ANL-16-L) Error					Log Entries
Error Type	Aux Data	Associated Test	Alarm on/Off Level	Board	Test to Clear Value
0†	o	Any	Any	Any	test port CSSpp s
1(a)	40977	None			
15(b)	Any	Port Audits and Updates Test (#36)			
18	0	busyout station <extension>	WRN	ON	release station <extension>
257(c)	40973	None			
513(d)		Station Present Test (#48)	WRN	OFF	test port CSSpp s r 2
769		Battery Feed Test (#35)	MIN	ON	test port CSSpp s r 2
1025		Loop Around Test(#1 61)	MIN	ON	test port CSSpp s r 2
1281		Conference Test(#7)	MIN	ON	test port CSSpp s r 2
1537		NPE Crosstalk Test (#6)	MIN	ON	test port CSSpp s r 2

† This error indicates that an alarm has been raised against the MO without any errors being logged against it. This condition is caused by heavy loads on the switch, and is a transient condition. Run the short test sequence if any errors exist. Refer to the appropriate test description and follow recommended procedures. If no errors exist, due to the short test sequence, then run the long test sequence. If all tests pass, ignore the error.

Notes:

- (a) This is an in-line error and can only be resolved over time. This indicates that no terminal equipment was present when ringing was attempted. Run test port CSSpp and follow the procedure for the results of Test #48.
- (b) This is a software audit error that does not indicate any hardware malfunction. Run short test sequence and investigate any associated errors (if any).
- (c) This is an in-line error and can only be resolved over time. This error indicates that ringing voltage is absent. If only one Analog circuit pack (CP) in the system has this problem, then replace the circuit pack. If only Analog CPS on a particular carrier have this error, then the ringing generator may not be connected to this carrier. If Analog CPs on many carriers have this error, then the problem is probably with the ringing generator.
- (d) Test 48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing is disturbing the customer or the terminal equipment, it should be disabled using the Test field of the station administration screen. However, on some releases of the software, this will disable Tests 6, 7, 35, 48, and 161.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery Feed Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery Feed Test (#35) (also called Port Diagnostic Test)	x	x	ND
Station Present Test (#48) (also called Ringing Application Test)	x	x	ND
Loop Around Test (#1 61)		x	ND
Conference Test (#7)		x	ND
NPE Crosstalk Test (#6)		x	ND
Station Status and Translation Audits and Updates Test (#36)	x	x	ND

•D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test # 6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test [Contd)		
Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to the TDM-BUS maintenance section to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated by using other "port tests, examining station wiring, or examining the station.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The Conference Circuit Test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a tone detector port. If the level of the tone is within a certain range, the test passes.

Test # 7 Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #7 Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1018	ABORT	Test disabled via administration. This only applies to analog stations. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to “y”. Use the change station <extension> command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port did not conference the tones correctly. This will cause noisy and unreliable connections. 1) If the remaining ports are currently not in use (yellow LED is off), attempt to reset the circuit pack. Then repeat the test. 2) If the test fails again, replace circuit pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and examining station, trunk, or external wiring.

Battery Feed Test (also called Port Diagnostic Test) (#35)

The battery feed chip provides power to the voice terminal equipment, signaling, rotary dial pulsing, transmission, and balance. This test checks the signaling and switchhook capabilities of the battery feed chip by terminating the port, applying battery, and trying to detect a current.

Test #35 Battery Feed Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #35 Battery Feed Test (Contd)		
Error Code	Test Result	Description / Recommendation
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The port's battery feed chip is unable to supply sufficient power to the terminal equipment. Replace the circuit pack.
	PASS	The port's battery feed chip is able to provide power to the station equipment to detect on/off-hook, but may not be able to supply power for touch-tones. If touch-tones are inoperative on this station, then replace the circuit pack because this port is inoperative. User-reported troubles on this port should be investigated using other port tests, examining station wiring, or examining the station.

Station Status and Translation Updates and Audits Test (#36)

This test updates the analog port's message lamp state (if it has one) and translations (such as station type, dial type, network connection) with information kept in the software. The software is updated with the switchhook state reported by the port processor. When the ringer is in the off state, this test also turns off the station's ringer to prevent constant ringing caused by defective hardware.

Test #36 Station Status and Translation Updates and Audits Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1006	ABORT	This port has been busied out by craft or taken out-of-service by the failure of the NPE Crosstalk Test. 1) Look in the Error Log for error type 18 (port busied out) for this port. If this error is present then release the port with the release station <extension> command and run the test again. 2) Look in the Error Log for error type 1025 (NPE Crosstalk Test failed) for this port. If this error is present, then investigate the errors associated with the NPE Crosstalk Test (#6) first. 3) If the test continues to abort, escalate the problem.

Test #36 Station and Translation Updates and Audits Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	This does not indicate a hardware problem. The switchhook audit failed. The other updates were not performed because of this failure. This may occur when the audit is performed at the same time that the terminal equipment goes off-hook. Use status station to determine when the port is available for testing. 1) When the port becomes available for testing, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
5	FAIL	This does not indicate a hardware problem but may be an internal software error. The message waiting lamp update failed. The translation and ringer updates were not performed because of this failure.
7	FAIL	The translation update failed. This does not indicate a hardware problem but may be an internal software error. Update was not performed because of this failure.
8	FAIL	This does not indicate a hardware problem but may be an internal software error. The ringer update failed. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	The software and the port processor have the same status. User-reported troubles on this port should be investigated using other port tests, examining station wiring, or examining the station.

Station Present Test (also called Ringing Application Test) (#48)

This test provides a burst of ringing current to the terminal equipment and detects that current flows. This test ascertains if terminal equipment is connected to the port.

Test 48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing is disturbing the customer or the terminal equipment, it should be disabled using the Test field of the station administration screen. However, on some releases of the software this will disable Tests 6, 7, 35, 48, and 161.

Test # 48 Station Present Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test # 48 Station Present Test (Contd)		
Error Code	Test Result	Description / Recommendation
1008	ABORT	Could not allocate a ringing circuit. Either all the ringing circuits are in use or the ringing generator is defective, or it is not wired correctly. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, run the test station <extension> command on other Analog (TN742, TN769, TN746, or TN712) circuit packs. If an ABORT 1008 occurs for Test 48 on other circuit packs as well, then the ringing generator may be defective or is not wired correctly. If it does not occur on other ports, then all four ringing generators are in use.
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The terminal equipment is not connected to the circuit pack. Some terminal equipment such as modems may fail even when connected properly. 1) Check all of the wiring between the station equipment and the switch. Then run the test again. 2) If the test fails again, check for errors in the Error Log. If no errors are present, then disable the test using the change station <extension> command and entering "n" for the Test field. Note that in V2 1.5, V3 1.5, and in subsequent software releases this will also disable Tests 6, 7, 35, and 161 on this port.

Test #48 Station Present Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	The station is connected properly to the switch. This test may also pass if no terminal equipment is connected and the terminal is very far from the switch. User-reported troubles on this port should be investigated using other port tests, examining station wiring, or examining the station.

Loop Around Test (#161)

Each analog port consists of:

- a Network Processing Element (NPE) for port connectivity, gain, and conferencing functionality.
- a codec that converts the digital signals of the TDM Bus to analog signals.
- a battery feed chip that provides power to the voice terminal set for signaling, dial pulsing, transmission, and balance.

This test is designed to check the on-board transmission capabilities of the NPE, the codec, and the battery feed chip of the analog port. A tone detector and a tone generator talk and listen on the same pair of time slots that the analog port is listening and talking to. The analog port is then instructed to go into loop around mode (see Figure 6-5). The test passes if the signal measured by the tone detector is within acceptable limits.

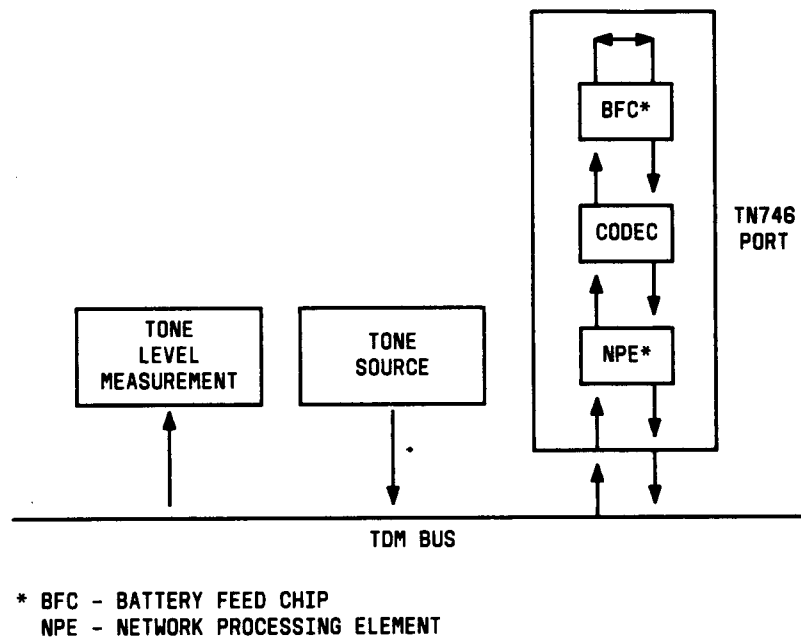


Figure 6-5. Analog Loop Around Test

Test #161 Loop Around Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.

Test #161 Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via administration. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station extension command.
2000	ABORT	Response to the test request was' not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The reflective Loop Around Test failed. This will cause noisy or unreliable connections or other users calling this port may hear an echo. Replace the circuit pack.
	PASS	The port is able to provide an analog transmission path to the station equipment. User-reported troubles on this port should be investigated using other port tests, examining station wiring, or examining the station.

ANN-BD (Announcement Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
ANN-BD	MINOR	test board CSS I	Announcement Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E): and SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.)

The TN750 Announcement circuit pack is a service circuit that provides a System 75 customer with an integrated means for recording announcements that can be played back on demand by call processing as part of a calling feature (that is, announcements on hunt group calls). There are 16 Announcement Ports on the Announcement circuit pack. Each port can play any integrated announcement, independently of the other ports. In addition to the 16 Announcement Ports, the Announcement circuit pack also has one Data Line Circuit Port (port 17). The Data Line Circuit Port is used for uploading/downloading the announcement memory to/from the system tape. If there are any errors associated with port 17, refer to DAT-LINE (Data Line Circuit Port) maintenance procedures. If there are any errors associated with any other port, refer to ANN-PT (Announcement Port) maintenance procedures.

The Announcement circuit pack has two processors on it. The first processor, or Angel, controls the circuit pack and communicates with the switch via the control channel on the TDM Bus. The second processor, or Speech Processor (SP), controls the speech memory and announcements. Digital speech is converted from its TDM Bus form to an internal storage form (for recording) and vice versa (for playbacks) by the 140AY device on the circuit pack, which has 16 channels (one for each Announcement Port).

General Notes

Here are a few important general notes that apply to any problem on the Announcement circuit pack. Read these notes before attempting to work on the TN750 Announcement circuit pack or Announcement Ports, especially if the circuit pack needs to be replaced.

1. The Announcement circuit pack retains all integrated announcements *as long* as the circuit pack has power. For this reason, whenever there is a problem with either the Announcement circuit pack or an Announcement Port that may require the circuit pack to be reset, it is always better to try to reset the circuit pack via the reset board CSS command first, and if that does not work, then try to reseal it. Announcements are preserved through a software reset, but they are lost when the circuit pack is reseated. (See Uploading/Downloading Announcements section for details of automatic download of announcements on Announcement circuit pack insertion.)
2. If a customer has announcements on the Announcement circuit pack that cannot be re-recorded easily, then announcements must be saved on the system tape to ensure that they will not be lost (see Note). This should be done as soon as the announcements are recorded on the circuit pack (or whenever they are changed), assuming that the circuit pack is in proper working order.



Note: Unlike translations, announcements are NEVER automatically saved to the system tape.

3. The System Access Terminal (SAT) command, save announcements, replaces the announcement file on tape with the Announcement circuit pack speech memory. Care must be taken not to mistakenly enter this command, thereby destroying a valid file on tape.
4. The SAT command, restore announcements, replaces the Announcement circuit pack speech memory with the announcement file on the system tape. Care must be taken not to mistakenly enter this command, thereby destroying valid speech memory (especially if the system tape does not have a valid announcement file on it).
5. Whenever the Announcement circuit pack is replaced, announcements must always be re-recorded or downloaded to the new circuit pack. Otherwise, call processing will not be able to use the circuit pack.
6. If announcement speech memory is corrupted, announcements should not be saved (that is, if the Announcement Checksum Test #209 fails, or if the speech sounds corrupted on play back). This could ruin a good announcement file on tape and potentially cause errors/alarms on any circuit pack to which the new file is downloaded. However, if the customer does not have a valid announcement file on tape, then announcements can be saved in an effort to try to retain some of them (all of the announcements recorded may not be corrupted).

Announcement Administration

A brief description of the integrated announcement administration is given here to aid in troubleshooting the Announcement circuit pack and its ports. Sometimes it will be necessary to record, play back, and/or delete announcements to resolve an alarm. It may also be necessary to save and restore announcements as part of the maintenance procedures. For a complete description of integrated announcement administration, refer to the following manuals:

- ***DEFINITY Communications System Generic 1 and System 75—Administration and Measurement Reports, 555-200-500***
- ***AT&T System 75 and System 75 XE—implementation, Release 1 Version 3, 555-200-652***
- ***DEFINITY Communications System Generic 1 and System 75—Voice Terminal Operation, 555-200-701***

Announcement Session

Announcements can be recorded, played back, and deleted from an *announcement session*. A station's *class-of-service (COS)* needs to include *console permissions* for that station to be able to enter an announcement session. To enter an announcement session, go off-hook on a station that has console permissions and enter the appropriate *feature access code (FAC)* (administered as *Announcement access code* on the feature-access-codes form). Dial tone should be returned at this point. Enter the extension of the announcement that needs to be recorded, deleted, or played back. Again, dial tone should be heard. To record an announcement, press station keypad digit 1, record after the tone, and hang up when done. To play back an announcement, press station keypad digit 2. To delete an announcement, press station keypad digit 3 (confirmation tone will be given if the delete worked). Announcements can also be played back by simply calling the announcement extension associated with them.

Uploading/Downloading Announcements

Integrated announcements on the TN750 Announcement circuit pack can be *uploaded* to the system tape with the SAT save announcements command. Likewise, integrated announcements can be *downloaded* to the Announcement circuit pack with the SAT restore announcements command. Both of these commands require a free data module of type *netcon* to be administered, and a data module of type *a* cartridge to be in the system's tape drive (must not be write-protected). These commands are useful in maintaining the customer's recorded announcements. Depending on system traffic, announcement uploads/downloads will take from 30 to 45 minutes.

The system will automatically try to download the Announcement circuit pack 10 minutes after it is inserted. This automatic download procedure is aborted if:

1. An announcement is recorded within 10 minutes of circuit pack insertion.
2. An announcement download is invoked sooner with the SAT restore announcements command.
3. There is no announcement and/or netcon data module administered.
4. Either the announcement data module is busy or all the administered netcon data modules are busy.
5. There is no tape in the system.
6. The tape in the system does not have a valid announcement file saved on it.

Note: Unlike translations, there is no provision in System 75 for automatically saving announcements to the system tape.

Hardware Error Log Entries and Test to Clear Values

Announcement Circuit Pack Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test board CSS s
1(a)	o	SAKI Test (#53)	MINOR	ON	
14(b)	1 to 64	Announcement Checksum Test (#209)			
18	0	The circuit pack was busied out	WARNING	OFF	release board CSS
23(c)	o	None	WARNING	OFF	
257(d)	65535	Control Channel test (#52)	MINOR	ON	test board CSS l r 20
	11	None			
	15	None			
	16	None			
	17	None			
513(e)	4352	None			
	4353	None			
	4355	None			
	4357	None			
	17700	None			
	17701	None			
	17702	None			
769(f)	4358	None			
	17703	None			
1025(g)	12800	NPE Audit Test (#50) in R1V3			test board CSS l
1281 (h)	17699	None			
1538(i)	Any	None	MINOR	ON	
1793		Angel-SP Handshake Test (#208)	MINOR	ON	test board Cssh l r 3
	17680	In-line Error			

Announcement Circuit Pack Error Log Entries (Contd)					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
2049		Clock Match Inquiry (#21 2)	MINOR	ON	test board CSS s r 3
	17674	In-line Error			
2305		140AY Loop Around Test (#21 O)	MINOR	ON	test board CSS s r 3
2561		Super Frame Match Inquiry (#21 2)	MINOR	ON	test board CSS s r 3
	17676	In-line Error			
2817(j)		Announcement Checksum Test (#209)	MINOR	ON	test board CSS s r 3
	17682	In-line Error			
	17699	In-line Error			
840(k)	4096	None			
	4097	None			
	4098	None			
	4099	None			
	4100	None			
	4114	None			
	4130	None			
	4146	None			
	4162	None			
	4178	None			
	4194	None			
	4210	None			
	4226	None			
	4242	None			
	4258	None			
	4274	None			
	4290	None			
	4306	None			
	4322	None			
	4338	None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error indicates the circuit pack totally stopped functioning or it was physically removed from the system.

Note: The alarm will be logged approximately 11 minutes after the circuit pack has been removed.

If the circuit pack is not in the system, re-inserting the circuit pack will resolve this error (in the same slot as the error indicates). Or, if the circuit pack is in the system, and the red LED is on, then replace the circuit pack. See the Handling Common Port Circuit Pack section for details of alarming strategy.

Check if the circuit pack is physically in the system (in the same slot as the error indicates). If the circuit pack is there, reset it via the reset board CSS command. If the command is not successful, then reseal the circuit pack. If the red LED stays on, then replace the circuit pack. Refer to Handling Common Port Circuit Pack.

Note Reseating/replacing the circuit pack will result in loss of integrated announcements. Please refer to the previous General Notes.

- (b) Whenever the Announcement Checksum Test (#209) fails, this error will be logged. The aux data indicates the number of the *first bad announcement* found. This number corresponds to the announcement numbers on the announcement form. The extension relating to the announcement can be determined by the SAT display announcement command. This error only appears in the Error Log with error type 2817. Follow the procedures for error type 2817 to troubleshoot error type 14.
- (c) The circuit pack has been logically administered but not physically installed. The alarm will be cleared when the circuit pack is installed.
- (d) This error indicates transient communication problems with this circuit pack. This error is not service-affecting and can be ignored.
- (e) This error indicates the circuit pack has reported a hardware failure on the circuit pack. The circuit pack should be replaced.

Note: Replacing the circuit pack will result in loss of integrated announcements. Please refer to the previous General Notes.
- (f) This error can be ignored, but look for other errors on this circuit pack.
- (g) This error is not service-affecting and can be ignored.
- (h) The Speech Processor (SP) found a fault in the speech main memory (SMM) (that is, it found one or more faulty memory locations). Whenever this error is logged, error 2817 will also be logged [see Note (j)], which will cause the maintenance system to run the Announcement Checksum Test (#209) to determine if the bad memory location was being used by an announcement.
- (i) The circuit pack is out-of-service and may be hyperactive. If the circuit pack is hyperactive then the following may all be true:
 1. The common circuit pack level tests are aborting with error code 2000.
 2. The tests run on the ports of this circuit pack are returning a NO-BOARD indication.

3. A busyout/release of the circuit pack has no effect on test results.

4. A list configuration command shows that the circuit pack and ports are properly installed.

The system will try to restore the circuit pack within 15 minutes. If this error happens again after 15 minutes, replace the circuit pack.

Note Reseating/replacing the circuit pack will result in loss of integrated announcements. Please refer to the previous **General Notes**.

(j) This error is logged with error 1281, aux data 17699. Since that error [see Note (h)] means that a bad speech memory location was found, the announcement checksum error is also logged. This will cause the Announcement Checksum Test (#209) to run, which will determine if the bad memory location has corrupted any recorded announcements. If the checksum test passes, the faulty memory location is currently not being used, and the SP marks the location as faulty, to ensure that future announcements do not attempt to use it.

Note: As memory locations are marked faulty, the amount of available memory decreases, which decreases the total amount of announcement time available on the circuit pack.

(k) This error is not service-affecting and can be ignored.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Control Channel Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Control Channel Loop Around Test (#52) (a)		x	ND
Angel-Speech Processor (SP) Handshake Test (#208)		x	ND
Clock Match Inquiry Test (#21 2)	x	x	ND
Super Frame Match Inquiry Test (#21 1)	x	x	ND
140AY Loop Around Test (#210)	x	x	ND
Announcement Checksum Test (#209)	x	x	ND
Network Processor Element (NPE) Audit Test (#50)		x	ND
SAKI Test (#53) (a)		x	ND

- D = Destructive
- ND = Non-destructive

(a) For a complete description of these tests, please refer to the XXX-BD (Common Port Board) maintenance documentation.



Angel-Speech Processor (SP) Handshake Test (#208)

The Angel-SP Handshake Test checks the integrity of the communication link between the two processors on the Announcement circuit pack. Failure of this test indicates that the Speech Processor is insane and results in the loss of all integrated announcements on the board.

Test #208 Angel-Speech Processor (SP) Handshake Test		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. If error 1538 shows up in the Error Log, follow the outline procedure for that error.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Test failed. Circuit pack cannot be used. Announcement speech memory is cleared on a failure of this test. Therefore, after the problem has been resolved, announcements must be re-recorded or downloaded to the circuit pack. Refer to General Notes at the beginning of this maintenance procedure. 1) Reset the circuit pack via the reset board CSS command and run this test again. If the test continues to fail, reseal the circuit pack and run this test again. If the test still fails, then replace the circuit pack. See Note. 2) If there are recurring alarms on this circuit pack caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Refer to General Notes.
	PASS	The communication link between the two processors on the Announcement circuit pack is functioning properly. User-reported troubles on this circuit pack should be investigated using other circuit pack and port tests. Refer to ANN-PT (Announcement Port) maintenance procedures for a description of the port tests.

Announcement Checksum Test (#209)

Associated with every recorded announcement is a checksum. In this test, the Speech Processor (SP) checks a stored *global checksum* covering all recorded announcements against a calculated one, and returns the results to the maintenance system. If the global checksum fails, then maintenance will request the SP to check each *individual announcement's checksum*.

If the test fails, then it returns the total *number* of bad announcements found. In addition, associated with each failure is an error in the Error Log (error type 14). The aux data indicates the number of the *first bad announcement* found. This number corresponds to the announcement numbers on the announcement form. The extension relating to the announcement can be determined by the SAT display announcement command.

Test #209 Announcement Checksum Test		
Error Code	Test Result	Description / Recommendation
1023	ABORT	There are no announcements currently recorded on the circuit pack.
1024	ABORT	This abort code will be given for the following reasons: 1. An announcement upload or download is in progress. 2. An announcement upload or download is requested when this test is running. 3. A record is in progress. 4. A record request comes in when this test is running. If an announcement upload or download is in progress, a status data-module <announcement data extension> command should show that the announcement data port is connected to a netcon data channel, and the tape drive should be active (to determine the extension of the announcement data module, use the list data-module command). See Note (a) for more information. 1) Wait until the blocking event is finished, and then run this test again. An upload or download takes up to 45 minutes to complete, and a recording session is finished as soon as the station that was making the recording is placed on-hook. 2) If the test continues to abort, and a record or upload/download is not in progress, escalate the problem.

Test #209 Announcement Checksum Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. If error 1538 shows up in the Error Log, follow the outline procedure for that error.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1-64	FAIL	Test failed. The error code indicates the total number of bad announcements that were found. Note: Since the announcements are recorded digitally, it is possible for the Announcement Checksum Test to <i>fail</i> but still have all the announcement's sound uncorrupted. When an individual announcement fails the Checksum Test, always listen to the announcement first before taking any action (an announcement can be played back by dialing the announcement extension associated with the announcement number). If the announcement sounds corrupted, then re-record it or delete it. 1) Look in the Error Log to determine the number of the first bad announcement. Play back the announcement. If the announcement sounds bad, re-record it or delete it. If the error code was greater than 1 (indicating that there is more than one bad announcement), run this test again and repeat this step. 2) If after deleting and re-recording all bad announcements, the Checksum Test still fails, reset the circuit pack using the reset board CSS command and run this test again. 3) If the test still continues to fail, reseal the circuit pack, re-record all announcements, and run this test again. 4) If the test still continues to fail, replace the circuit pack. Note: Replacing the circuit pack will result in loss of integrated announcements. Please refer to the General Notes at the beginning of this maintenance procedure.



Test #209 Announcement Checksum Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	All recorded announcements checksum correctly, indicating that the speech main memory is functioning properly. User-reported troubles on this circuit pack should be investigated using other circuit pack and port tests. Refer to ANN-PT (Announcement Port) maintenance procedures for a description of the port tests.

Note:

- (a) The Announcement circuit pack can exhibit a condition that does not allow recording.

If the circuit pack gets locked into this state (this is an extremely rare condition), two of the Announcement Ports on the circuit pack will be unusable by software, one of which is the record port. Also, Save/Restore Announcements will not work, since the record port looks busy to the circuit pack. Note that software does not have any way of knowing this, and will attempt to use the ports.

If the circuit pack is locked into this state, the following symptoms will be observed:

1. When attempting to record an announcement, a user will hear the proper record tone, but the announcement will not record (they will not know it until the announcement is played back).
2. Performing a test board long when the circuit pack is in this state will yield the following abort codes:
 - Ports 1 AND 9 abort Test 206 with code 1024
 - Ports 1 AND 9 abort Test 205 with code 2000
 - Circuit pack level Tests 209 and 210 abort with code 1024
3. Save/Restore Announcements will time out with:

Error encountered, can't complete request

The Announcement circuit pack lock-up can be cleared REMOTELY by performing a soft reset to the circuit pack:

- busyout board (this command will drop all calls in progress on the Announcement circuit pack)
- reset circuit pack using the reset board CSS command
- release board command.

140AY Loop Around Test (#210)

This test checks the integrity of the record channel on the Announcement circuit pack (Announcement Port 1). The main function of the 140AY device is to accept Pulse Code Modulation (PCM) /Adaptive Differential Pulse Code Modulation (ADPCM) samples and compress/expand the samples using ADPCM. This test connects a tone generator to one port (Announcement Port 1, the recording port) and a tone detector to another one (Announcement Port 9). A tone is generated by the tone generator on the first port and looped through the 140AY device to the second port. The tone detector then responds with a tone present/absent message. The 140AY Loop Around Test is repeated at three different speech compression rates.

Since this test involves sending a tone through two different ports, the Playback Speech Memory Array (PSMA) Test (#206) (see ANN-PT maintenance procedures for a description of this test) is run on the two ports first, to make sure that they are working properly.

Test #210 140AY Loop Around Test		
Error Code	Test Result	Description / Recommendation
1-3	ABORT	Response to the test request was not received within the allowable time period. The error code indicates at which speech compression rate the test aborted (1 being the first rate tested, 3 being the last). 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10	ABORT	The Playback Speech Memory Array (PSMA) Test (#206) failed on Announcement Port 1.
90	ABORT	The Playback Speech Memory Array (PSMA) Test (#206) failed on Announcement Port 9. 1) Refer to ANN-PT maintenance documentation, Test #206.
1000	ABORT	System resources required to run this test are not available. This test needs Announcement Ports 1 and 9 to run. One of those ports may be in use on a valid call. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and ports 1 and 9 are not in use, escalate the problem.

Test #210 140AY Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance procedures to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1007	ABORT	The Announcement circuit pack thinks that port 1 or port 9 is busy. 1) Retry the command at 1 minute intervals for a maximum of 2 times. 2) If the test continues to abort, follow the ANN-PT (Announcement Port) maintenance procedures for ports 1 and 9. 3) If the Announcement Ports pass all their tests, escalate the problem.
1024	ABORT	Announcement circuit pack blocked the test because an announcement download is in progress. If an announcement download is in progress, a status data-module <announcement data extension> command should show that the announcement data port is connected to a netcon data channel, and the tape drive should be active (to determine the extension of the announcement data module, use the list data-module command). See Note (a) for more information. 1) Wait until download is finished (can take up to 45 minutes), and then run the test again. 2) If the test continues to abort and there is no download in progress, escalate the problem.

Test # 210 140AY Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1-3	FAIL	Test failed. The error code indicates at which speech compression rate the test actually failed (1 being the first rate tested, 3 being the last). 1) Reset the circuit pack via the reset board CSS command and run this test again. If the test continues to fail, reseal the circuit pack and run this test again. If the test still fails, then replace the circuit pack. See Note. 2) If there are recurring alarms on this circuit pack caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Please refer to General Notes at the beginning of this maintenance procedure.
	PASS	The record channel on the Announcement circuit pack is functioning properly. User-reported troubles on this circuit pack should be investigated using other circuit pack and port tests. Refer to ANN-PT (Announcement Port) maintenance procedures for a description of the port tests.

Note:

- (a) The Announcement circuit pack can exhibit a condition that does not allow recording.

If the circuit pack gets locked into this state (this is an extremely rare condition), two of the Announcement Ports on the circuit pack will be unusable by software, one of which is the record port. Also, Save/Restore Announcements will not work, since the record port looks busy to the circuit pack. Note that software does not have any way of knowing this, and will attempt to use the ports.

If the circuit pack is locked into this state, the following symptoms will be observed:

1. When attempting to record an announcement, a user will hear the proper record tone, but the announcement will not record (they will not know it until the announcement is played back).

2. Performing a test board long when the circuit pack is in this state will yield the following abort codes:

- Ports 1 AND 9 abort Test 206 with code 1024
- Ports 1 AND 9 abort Test 205 with code 2000
- Circuit pack level Tests 209 and 210 abort with code 1024

3. Save/Restore Announcements will time out with:

Error encountered, can't complete request

The Announcement circuit pack lock up can be cleared REMOTELY by performing a soft reset to the circuit pack:

- **busyout board** (this command will drop all calls in progress on the Announcement circuit pack)
- reset circuit pack using the reset board CSS command
- release board command.

Super Frame Match Inquiry Test (#21 1)

The super frame is a means by which the Speech Processor (SP) stays in synch with the 140AY device on the Announcement circuit pack. If the super frame is out of synch, the SP will not be able to properly process record/playback requests. Both the SP and the hardware generate a super frame pulse. When these two pulses are out of synch, the SP sets a flag to indicate the mismatch. When this test is run, the state of this flag is returned.

Test #211 Super Frame Match Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. If error 1538 shows up in the Error Log, follow the outline procedure for that error.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Test failed. Announcement playbacks should sound corrupted. 1) Reset the circuit pack via the reset board CSS command and then run this test again. If the test continues to fail, replace the circuit pack. See Note. 2) If there are recurring alarms on this circuit pack caused by this test failing, replace the circuit pack even if Step 1) works. See N o t e . Note: Replacing the circuit pack will result in loss of integrated announcements. Refer to the General Notes at the beginning of this maintenance procedure.
	PASS	The Speech Processor can properly process record/playback requests. User-reported troubles on this circuit pack should be investigated using other circuit pack and port tests. Refer to ANN-PT (Announcement Port) maintenance procedures for a description of the port tests.

Clock Match Inquiry Test (#212)

The Clock Match Inquiry Test is supported to determine the state of the clock generation circuitry on the Announcement circuit pack. This circuitry is used for controlling various pieces of the hardware, like the 140AY device. It is also used to synch the Announcement circuit pack with the clock that is on the backplane from the Tone/Clock circuit pack. ,

Test # 212 Clock Match Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. If error 1538 shows up in the Error Log, follow the outline procedure for that error.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Test failed. Announcements recorded or played back while the clock circuitry is not functioning properly will sound distorted. 1) Reset the circuit pack via the reset board CSS command and then run this test again. If the test continues to fail, replace the circuit pack. See Note. 2) If there are recurring alarms on this circuit pack caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Refer to the General Notes at the beginning of this maintenance procedure.
	PASS	Announcement record/playbacks should have clear sound quality. User-reported troubles on this circuit pack should be investigated using other circuit pack and port tests. Refer to ANN-PT (Announcement Port) maintenance procedures for a description of the port tests.

ANN-PT (Announcement Port)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
ANN-PT	MINOR	test port CSSpp I	Announcement Port

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and PP is the 2-digit port number (for example, 01).

The TN750 Announcement circuit pack is a service circuit that provides a System 75 customer with an integrated means for recording announcements that can be played back on demand by call processing as part of a calling feature (that is, announcements on hunt group calls). There are 16 Announcement Ports on the Announcement circuit pack. Each port can play any integrated announcement, independently of the other ports. In addition to the 16 Announcement Ports, the Announcement circuit pack also has one Data Line Circuit Port (port 17). The Data Line Circuit Port is used for uploading/downloading the announcement memory to/from the system tape. If there are any errors associated with port 17, refer to DAT-LINE (Data Line Circuit Port) maintenance procedures. If there are any errors associated with the circuit pack, refer to ANN-BD (Announcement Circuit Pack) maintenance procedures.

The Announcement circuit pack has two processors on it. The first processor, or Angel, controls the circuit pack and communicates with the switch via the control channel on the TDM Bus. The second processor, or Speech Processor (SP), controls the speech memory and announcements. Digital speech is converted from its TDM Bus form to an internal storage form (for recording) and vice versa (for playbacks) by the 140AY device on the circuit pack, which has 16 channels (one for each Announcement Port).

General Notes

Here are some important general notes that apply to any problem on the Announcement circuit pack. The user should read this before attempting to work on the TN750 Announcement circuit pack or Announcement ports, especially if the circuit pack needs to be replaced.

1. The Announcement circuit pack retains all integrated announcements as *long* as the circuit pack has power. For this reason, whenever there is a problem with either the Announcement circuit pack or an Announcement Port that may require the circuit pack to be reset, it is always better to try to reset the circuit pack via the reset board CSS command first, and if that does not work, then try to reseal it. Announcements are preserved through a software reset, but they are lost when the circuit pack is reseated. (See Uploading/Downloading Announcements section for details of automatic download of announcements on Announcement circuit pack insertion.)
2. If a customer has announcements on the Announcement circuit pack that cannot be re-recorded easily, then announcements must be saved on the system tape to ensure that they will not be lost (see Note). This should be done as soon as the announcements are recorded on the circuit pack (or whenever they are changed), assuming that the circuit pack is in proper working order.

Note: Unlike translations, announcements are NEVER automatically saved to the system tape.

3. The System Access Terminal (SAT) save announcements command, replaces the announcement file on tape with the Announcement circuit pack speech. memory. Care must be taken not to mistakenly enter this command, thereby destroying a valid file on tape.
4. The SAT restore announcements command replaces the Announcement circuit pack speech memory with the announcement file on the system tape. Care must be taken not to mistakenly enter this command, thereby destroying valid speech memory (especially if the system tape does not have a valid announcement file on it).
5. Whenever the Announcement circuit pack is replaced, announcements must always be re-recorded or downloaded to the new circuit pack. Otherwise, call processing will not be able to use the circuit pack.
6. If announcement speech memory is corrupted, announcements should not be saved—that is, if the Announcement Checksum Test (#209) fails, or if the speech sounds corrupted on play back. This could ruin a good announcement file on tape and potentially cause errors/alarms on any circuit pack to which the new file is downloaded. However, if the customer does not have a valid announcement file on tape, then announcements can be saved in an effort to try to retain some of them (all of the announcements recorded may not be corrupted).
7. Although Announcement Port 5 and Data Line Circuit Port 17 on the Announcement circuit pack are logically two separate ports, they are physically the same port. Therefore, if one of the ports is in use, the other one will be busy. Also, if Announcement Port 5 is out-of-service, the Data Line Circuit Port will be taken out-of-service. However, if the Data Line Circuit Port is out-of-service, the Announcement Port will remain *in-service*.

Announcement Administration

A brief description of the integrated announcement administration is given here to aid in the troubleshooting the Announcement circuit pack and its ports. Sometimes it will be necessary to record, play back, and/or delete announcements to resolve an alarm. It may also be necessary to save and restore announcements as part of the maintenance procedures. For a complete description of integrated announcement administration, please refer to the following manuals:

- ***DEFINITY Communications System Generic 1 and System 75—Administration and Measurement Reports, 555-200-500***
- ***AT&T System 75 and System 75 XE—implementation, Release 1 Version 3, 555-200-652***
- ***DEFINITY Communications System Generic 1 and System 75—Voice Terminal Operation, 555-200-701***

Announcement Session

Announcements can be recorded, played back, and deleted from an *announcement session*. A station's *class-of-service (COS)* needs to include *console permissions* for that station to be able to enter an announcement session. To enter an announcement session, go off-hook on a station that has console permissions and enter the appropriate feature access code (FAC) . (administered as *Announcement access code* on the feature-access-codes form). Dial tone should be returned at this point. Enter the extension of the announcement that needs to be recorded, deleted, or played back. Again, dial tone should be heard. To record an announcement, press station keypad digit 1, record after the tone, and hang up when done. To play back an announcement, press station keypad digit 2. To delete an announcement, press station keypad digit 3 (confirmation tone will be given if the delete worked). Announcements can also be played back by simply calling the announcement extension associated with them.

Uploading/Downloading Announcements

Integrated announcements on the TN750 Announcement circuit pack can be *uploaded* to the system tape with the SAT save announcements command. Likewise, integrated announcements can be *downloaded* to the Announcement circuit pack with the SAT restore announcements command. Both of these commands require a free data module of type *netcon* to be administered, a data module of type *announcement* (on the Announcement circuit pack) to be administered, and a tape cartridge to be in the system's tape drive (must not be write-protected). These commands are useful in maintaining the customer's recorded announcements. Depending on system traffic, announcement uploads/downloads will take from 30 to 45 minutes.

The system will automatically try to download the Announcement circuit pack 10 minutes after it is inserted. This automatic download procedure is aborted if:

1. An announcement is recorded within 10 minutes of circuit pack insertion.
2. An announcement download is invoked sooner with the SAT restore announcements command.
3. There is no announcement and/or netcon data module administered.
4. Either the announcement data module is busy or all the administered netcon data modules are busy.
5. There is no tape in the system.
6. The tape in the system does not have a valid announcement file saved on it.

Note: Unlike translations, there is no provision in System 75 for automatically saving announcements to the system tape.

Hardware Error Log Entries and Test to Clear Values

Announcement Port Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test port CSSpp s
1		Playback Speech Memory Array (PSMA) Test (#206)	MINOR	ON	test port CSSpp s r 3
18	0	The port was busied out	WARNING	OFF	release port CSSpp
257		Channel Administration Memory Array (CAMA) Test (#205)	MINOR	ON	test port CSSpp l r 3
	17667	In-line error			
513		140AY Channel Sanity Inquiry (#222)	MINOR	ON	test port CSSpp s r 3
	17684	In-line error			
769(a)		None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Note:



(a) This error is logged and the port is alarmed when an alarm is raised on the Announcement circuit pack because of a faulty condition with a common circuit pack resource. Any one of the following alarmed errors on the Announcement circuit pack will cause this error to be logged against the Announcement Port: 1793, 2049, 2305, 2561. Follow the ANN-BD (Announcement Circuit Pack) maintenance procedures to resolve those alarms. When the corresponding circuit pack alarm is cleared, this alarm will clear.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Channel Administration Memory Array (CAMA) Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Channel Administration Memory Array (CAMA) Test (#205)		x	ND
Playback Speech Memory Array (PSMA) Test (#206)	x	x	ND
140AY Channel Sanity Inquiry Test (#222)	x	x	ND

* D = Destructive
ND = Non-destructive

Channel Administration Memory Array (CAMA) Test (#205)

The Channel Administration Memory Array (CAMA) Test stores information used to control the 140AY device. The Angel asynchronously feeds the CAMA with the control information. During the CAMA test, the Angel writes patterns into the CAMA, reads them back, and verifies that they match. If the patterns do not match, the test fails. This test is run periodically by the switch maintenance, and by the Announcement circuit pack in the background.

Test #205 Channel Administration Memory Array (CAMA) Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call.
2000	ABORT	Response to the test request was not received within the allowable time period. See Note (a) for more information.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Test failed. Announcements played back on this port may sound corrupted. 1) Reset the circuit pack via the reset board CSS command and then run this test again. If the test continues to fail, replace the circuit pack. See Note. 2) If there are recurring alarms on this port caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Please refer to the General Notes section.

Test #20 Channel Administration Memory Array (CAMA) Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	This test verifies that the Angel processor can properly set up this port for play backs. User-reported troubles on this circuit pack should be investigated using other port and circuit pack tests. Refer to ANN-BD (Announcement Circuit Pack) maintenance procedures for a description of the circuit pack tests.

Note:

- (a) The Announcement circuit pack can exhibit a condition that does not allow recording.

If the circuit pack gets locked into this state (this is an extremely rare condition), two of the Announcement Ports on the circuit pack will be unusable by software, one of which is the record port. Also, Save/Restore Announcements will not work since the record port looks busy to the circuit pack. Note that software does not have any way of knowing this, and will attempt to use the ports.

If the circuit pack is locked into this state, the following symptoms will be observed:

1. When attempting to record an announcement, a user will hear the proper record tone, but the announcement will not record (they will not know it until the announcement is played back).
2. Performing a test board long when the circuit pack is in this state will yield the following abort codes:
 - Ports 1 AND 9 abort Test 206 with code 1024
 - Ports 1 AND 9 abort Test 205 with code 2000
 - Circuit pack level Tests 209 and 210 abort with code 1024
3. Save/Restore Announcements will time out with:

Error encountered, can't complete request

The Announcement circuit pack lock-up can be cleared REMOTELY by performing a soft reset to the circuit pack:

- busyout board (this command will drop all calls in progress on the Announcement circuit pack)
- reset circuit pack using the reset board CSS command
- release board command.

Playback Speech Memory Array (PSMA) Test (#206)

The PSMA test checks the integrity of a playback channel's interface to the speech memory and the TDM Bus. The Speech Processor has an internal buffer that contains a specific 256 byte sequence. During this test, the byte sequence is "played" through the 140AY device onto the TDM bus. A General Purpose Tone Detector is used to confirm that the proper sequence was played. This test is very important. It is the only test that actually checks an Announcement Port's ability to play back an announcement on the TDM Bus. If the test fails, the tone detector will return the number of bytes that did not match the expected sequence. The larger the number, the more severe the problem is with that port. If this test fails, announcements played over this port will sound corrupted.

Test #206 Playback Speech Memory Array (PSMA) Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the circuit pack is not in use, escalate the problem. .
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance to diagnose any active TDM Bus errors. 1) If the system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate, the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.

Test #206 Playback Speech Memory Array (PSMA) Test (Contd)		
Error Code	Test Result	Description / Recommendation
1024	ABORT	Announcement circuit pack blocked the test because an announcement download is in progress. If an announcement download is in progress, a status data-module <announcement data extension> command should show that the announcement data port is connected to a netcon data channel, and the tape drive should be active (to determine the extension of the announcement data module, use the list data-module command). See Note (a) for more information. 1) Wait until download is finished (could take up to 45 minutes), and then run the test again. 2) If the test continues to abort and there is no download in progress, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1 to 254	FAIL	Test failed. The error code indicates the number of byte count errors found by the tone detector. 1) Reset the circuit pack via the reset board CSS command and then run this test again. If the test continues to fail, replace the circuit pack. See Note. 2) If there are recurring alarms on this port caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Please refer to the General Notes section.

Test #206 Playback Speech Memory Array (PSMA) Test (Contd)		
Error Code	Test Result	Description / Recommendation
255	FAIL	Test failed. The Announcement Port and the tone detector never synchronized. Check for active GPTD-PT errors, and refer to GPTD-PT [General Purpose Tone Detector Port (CPTR)] maintenance procedures to diagnose them first. 1) If there are no active GPTD-PT errors, reset the circuit pack via the reset board CSS command and then run this test again. If the test continues to fail, replace the circuit pack. See Note. 2) If there are recurring alarms on this port caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Please refer to the General Notes section.
	PASS	This port can play announcements. User-reported troubles on this circuit pack should be investigated using other port and circuit pack tests. Refer to ANN-BD (Announcement Circuit Pack) maintenance procedures for a description of the circuit pack tests.

Note:



(a) The Announcement circuit pack can exhibit a condition that does not allow recording.

If the circuit pack gets locked into this state (this is an extremely rare condition), two of the Announcement Ports on the circuit pack will be unusable by software, one of which is the record port. Also, Save/Restore Announcements will not work since the record port looks busy to the circuit pack. Note that software does not have any way of knowing this, and will attempt to use the ports.

If the circuit pack is locked into this state, the following symptoms will be observed:

1. When attempting an announcement record, a user will hear the proper record tone, but the announcement will not record (they will not know it until the announcement is played back).
2. Performing a test board long when the circuit pack is in this state will yield the following abort codes:
 - Ports 1 AND 9 abort Test 206 with code 1024
 - Ports 1 AND 9 abort Test 205 with code 2000
 - Circuit pack level Tests 209 and 210 abort with code 1024

3. Save/Restore Announcements will timeout with:

Error encountered, can't complete request

The Announcement circuit pack lock-up can be cleared REMOTELY by performing a soft reset to the circuit pack:

- **busyout board** (this command will drop all calls in progress on the Announcement circuit pack)
- **reset circuit pack using the reset board CSS command**
- **release board command.**

140AY Channel Sanity Inquiry Test (#222)

The Angel keeps a sanity status bit for each of the 16 channels on the 140AY device. This test queries the Angel to determine the status for a particular channel. If a channel is insane, that implies that announcements cannot be played back on that channel.

Test #222 140AY Channel Sanity Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Test failed. Announcements cannot be played back over this port. 1) Reset the circuit pack via the reset board CSS command and then run this test again. If the test continues to fail, replace the circuit pack. See Note. 2) If there are recurring alarms on this port caused by this test failing, replace the circuit pack even if Step 1) works. See Note. Note: Replacing the circuit pack will result in loss of integrated announcements. Refer to the General Notes section at the beginning of this maintenance documentation.
	PASS	Announcements can be played back over this port. User-reported troubles on this circuit pack should be investigated using other port and circuit pack tests. Refer to ANN-BD (Announcement Circuit Pack) maintenance procedures for a description of the circuit pack tests.

AUX-CAB (Adjunct Processor)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
AUX-CAB	MAJOR	test environment	Adjunct Processor
AUX-CAB	MINOR	test environment	Adjunct Processor
AUX-CAB	WARNING	test environment	Adjunct Processor

The Adjunct Processor maintenance object represents the state of relays connected to an adjunct processor in an Medium cabinet system. These relays are monitored by the TN731 or TN731 B Maintenance circuit pack. There are three instances of Adjunct Processor maintenance objects. System 75 provides Adjunct Processor 1 and Adjunct Processor 2 each two pairs of leads. Closing one pair of leads will cause a major alarm against Adjunct Processor while closing the other pair of leads will cause a minor alarm. System 75 provides for the Adjunct Processor 3 three pairs of leads. Closing one pair of leads will cause a major alarm against Adjunct Processor, closing the other pair of leads will cause a minor alarm, and closing the last pair of leads will cause a warning alarm. The leads may be attached to the same or different devices.

Hardware Error Log Entries and Test to Clear Values

Adjunct Processor Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0	0	Any	Any		test environment s
1	0	Adjunct Processor Query (#120)	MAJOR	OFF	test environment r 3
257	0	Adjunct Processor Query (#120)	MINOR	OFF	test environment r 3
513	0	Adjunct Processor Query (#1 20)	WARNING	OFF	test environment r 3

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery & Battery Charger Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery & Battery Charger Query Test (#5) (a)	x	x	ND
AC Power Query Test (#5) (b)	x	x	ND
OLS Recycle Test (carrier E, D, A,B,C) (#1 26) (c)		x	ND
OLS Query Test (carrier E, D, A,B,C) (#127) (c)	x	x	ND
Emergency Transfer Query Test (#1 24) (d)	x	x	ND
Cabinet sensors Query Test (#1 22) (e)	x	x	ND
Adjunct Processor Query (API ,2,3) (#120)	x	x	ND

•D = Destructive

ND = Non-destructive

- (a) Refer to POWER (Battery & Battery Charger) maintenance documentation for a description of this test.
- (b) Refer to AC-POWER (AC Power) maintenance documentation for a description of this test,
- (c) Refer to CARR-POW (Carrier Port Power Supply) maintenance documentation for a description of this test.
- (d) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a description of this test.
- (e) Refer to CABINET (Cabinet Sensors) maintenance documentation for a description of this test.

Adjunct Processor Query Test (#120)

The Adjunct Processor Query Test requests the state of the Adjunct Processors from the Maintenance circuit pack and reports the results. The test has no affect on the adjunct processor itself.

Test #120 Adjunct Processor Query Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	System resources required to run this test are not available.
2	ABORT	Internal System Error
3	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1-1 27(a)	FAIL	One, or more, of the three Adjunct Processors (including the AP indicated by the PORT field) has activated one or more of the alarm lead pairs. See the Note (a) for a detailed description on how to determine which AP is reporting which alarm. 1) Clear the major/minor/warning problem or problems with the adjunct processor, and rerun the test. 2) If the test still fails, then disconnect the alarm leads from the Maintenance circuit pack, and rerun the test. 3) If the test still fails, then there is a problem with the Maintenance circuit pack (MAINT). Look for and resolve all alarms on MAINT. 4) If the test still fails, escalate the problem.
	PASS	The Maintenance circuit pack is capable of reading the Adjunct Processor, and the lead indicates no trouble. If there are problems with the Adjunct Processor, then the Adjunct Processor is not properly reporting these problems or the Adjunct Processor is not properly connected to another Adjunct Processor. There may be problems with one of the other Adjunct Processors.

See Note (a) on next page.

- (a) The error code represents the sum of all alarms raised by all three Adjunct Processors. The following table lists the value each alarm contributes to the total.

AP	Alarm	Value
AP1	Major	1
AP1	Minor	2
AP2	Major	4
AP2	Minor	8
AP3	Major	16
AP3	Minor	32
AP3	Warning	64

To determine which alarms are active on which Adjunct Processor, use the following rules:

Start with the largest value in the table above. If the error code is greater than or equal to this value, then the corresponding alarm is present. If the alarm is present then subtract the value from the error code value and repeat this procedure with the next highest value in the table. Repeat this until the error code value is reduced to 0.

For example, if the error code value is 58:

- Start with the highest value in the table, 64. 58 is not greater than or equal to 64, so we DO NOT have an AP3 Warning Alarm and we DO NOT subtract any value from 58.
- Continue with the next highest value in the table, 32. 58 is greater than or equal to 32, so we DO have an AP3 Minor alarm and we DO subtract 32 from 58 leaving us 26.
- Continue with the next highest value in the table, 16. 26 is greater than or equal to 16, so we DO have an AP3 Major alarm and we DO subtract 16 from 26 leaving us 10.
- Continue with the next highest value in the table, 8. 10 is greater than or equal to 8, so we DO have an AP2 Minor alarm and we DO subtract 8 from 10 leaving us 2.
- Continue with the next highest value in the table, 4. 2 is not greater than or equal to 4, so we DO NOT have an AP2 Major alarm and we DO NOT subtract any value from 2.
- Continue with the next highest value in the table, 2. 2 is greater than or equal to 2, so we DO have an AP1 Minor alarm and we DO subtract 2 from 2 leaving us 0.
- At this point we stop, and have determined that we have an AP3 Major, an AP3 Minor, an AP2 Minor, and an AP1 Minor alarm.

AUX-TRK (Auxiliary Trunk Port), AUX-BD (Auxiliary Trunk Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
AUX-TRK	MINOR	test port CSSpp l	Auxiliary Trunk Port
AUX-TRK	WARNING	test port CSSpp s	Auxiliary Trunk Port
AUX-BD	MINOR (b)	test board CSS s	Auxiliary Trunk Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to the XXX-BD (Common Port Board) maintenance documentation for AUX-BD errors.

The auxiliary trunk (TN763) may be used to provide for the following: music-on-hold, , loudspeaker paging (voice and coded chimes), dictation, automated wake-up with Audichron, and recorded announcement.

Music-on-hold is administered by change system-parameters features. Loudspeaker paging can be administered by change paging loudspeaker or by add trunk-group (CPE). The change paging loudspeaker is used for System 75 provided paging; the add trunk group is used for access to other (CPE) provided paging. The translation for code chiming is administered by change paging code-calling-ids. Recorded announcement and dictation is administered by add trunk-group (CPE). Automated wake-up is administered by change system-parameters hospitality and uses all four ports on a TN763B circuit pack.

Music-on-hold provides audible feedback to a held, parked, or otherwise split away party indicating that they are still connected. The feedback can be customer furnished music, recorded message, or other audible indication. Since the music-on-hold port is always busy, some of its port tests will always abort.

The Loudspeaker' Paging feature provides voice and/or code calling chime paging. If multiple paging zones are provided at a customer's premises, the Loudspeaker Paging feature gives a user the option of paging to a particular zone or to all zones. If a zone is being used for one type of page, it cannot be used at that time for the other one.

For System 75 provided zone paging, each zone needs an auxiliary trunk port and a 278A or 89A Control Unit with associated amplifier. When voice and coded chime paging are both provided, they can share the same hardware. In addition, music can be connected to the Control Unit to broadcast music whenever the amplifiers are not being used for loudspeaker paging.

An Auxiliary Trunk circuit pack contains four ports and uses DTMF (touch-tone) signaling. A different hardware interface between the switch and the auxiliary equipment is used for the four types of signaling that the Auxiliary Trunk circuit pack supports.

The interface used for System 75 loudspeaker paging consists of the following three pairs:

- . The Tip-Ring (T-R) pair used for voice transmission
- .The S (S-S1) pair that carries answer supervision and/or make busy information
- .The S2 (S2-S21) pair that provides the external equipment with a seizure indication.

The interface used for recorded announcement, dictation, and other loudspeaker paging consists of the following two pairs:

- The Tip-Ring (T-R) pair used for voice transmission
- The S (S-S1) pair that carries answer supervision and/or make busy information.

The interface used for music-on-hold consists of one pair:

- The Tip-Ring (T-R) pair used for voice transmission.

The interface used for automatic wake-up using an Audichron unit consists of the following two pairs:

- The Tip-Ring (T-R) pair used for voice transmission
- The S (S-S1) pair that carries the sync signal.

Hardware Error Log Entries and Test to Clear Values

Auxiliary Trunk Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
1(a)	57481	None	None		
15(b)	Any	Audit Update (#36)	None		test port CSSpp s r l
18	0,	busyout port Cssp1)	WARNING	OFF	release port CSSpp
1 or 769(c)	57482	None	None		
257		Hybrid/Conference Circuit Test (#33)	MINOR	ON	test port CSSpp l r 3
513		NPE Crosstalk Test (#6)	MINOR	ON	test port CSSpp l r 3
1025		Diagnostic Test—Auxiliary Trunk (#1 14)	WARNING	ON	test port CSSpp s r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) Error type 1 with aux data 57481 indicates a port fault. Use an empty port if one is available until the circuit pack can be replaced.

- (b) This is a software audit error that does not indicate any hardware malfunction. Run short test sequences and investigate associated errors (if any).
- (c) Error type 1 or 769 with aux data 57482 indicates a fault on signaling lead, which is an off-board error. This error should only occur with System 75 loudspeaker paging. If the trunk is being used for another application other than System 75 loudspeaker paging, check that the administration is correct. Otherwise, check the wiring to the external equipment connected to the auxiliary trunk and check the external equipment.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Loop Around* and *Conference Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Loop Around and Conference Test (#33)		x	ND
NPE Crosstalk Test (#6)		x	ND
Diagnostic Test (#1 14)	x	x	ND
Audit Update Test (#36)	x	x	ND

•D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1) Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. This problem may be caused by bad tone detectors. 1) Test all Tone/Clock circuit packs, and solve any errors on these circuit packs before any action is taken on the Auxiliary Trunk circuit pack. 2) If the test fails again, replace the Auxiliary Trunk circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and examining station, trunk, or external wiring.

Loop Around and Conference Test (#33)

This test checks the reflective loop around and conference capabilities of an auxiliary trunk port circuit. The test uses 404-Hz, 1004-Hz, and 2804-Hz tones. Each tone is separately transmitted through the loop and checked. All of the above tests are performed on-board.

Test #33 Loop Around and Conference Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states). You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #33 Loop Around and Conference Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	FAIL	The conference capabilities of the port failed. 1) If no service problems exist on the port, continue to use the port until the circuit pack can be replaced.
129	FAIL	The reflective 404-Hz tone test failed, no transmission was detected to or from the port. The problem may be off-board.
131	FAIL	The reflective 1004-Hz tone test failed, no transmission was detected to or from the port. The problem may be off-board.
133	FAIL	The reflective 2804-Hz tone test failed, no transmission was detected to or from the port. The problem may be off-board. 1) To make sure the problem is on-board, disconnect the port from the auxiliary equipment and retry test. 2) If the test fails again, replace the circuit pack. Otherwise, if the test passed after disconnecting the port from the auxiliary equipment, the problem is off-board. Check the wiring and connections to the auxiliary equipment and retry the test after reconnecting the port to the auxiliary equipment. If the test fails, check the auxiliary equipment.
	PASS	Loop Around and Conference Test is successful. This port is functioning properly.

Audit Update Test (#36)

This test will send updates of the Auxiliary Trunk port translation for all ports on the Auxiliary Trunk circuit pack that have been translated. The update is non-disruptive and guards against possible corruption of translation data contained on the circuit pack. No response message is expected from the circuit pack once it receives translation updates. The port translation data includes:

- Trunk type
- DTMF time slot
- Termination R/RC
- Gain, high/low
- End-to-end signaling, tone and pause duration
- Trunk state, idle/active/unavailable.

Test #36 Audit Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1006	ABORT	Port is in out-of-service state as a result of being busied out. This audit cannot be run. 1) Retry the command once the port is in service (that is, release port Cspdp has been run).
2100	ABORT FAIL	Could not allocate the necessary system resources to run this test. Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	This test passed. Translation information was successfully updated on the circuit pack.

Diagnostic Test—Auxiliary Trunk Test (#1 14)

The system software sends a message to the on-board microprocessor to operate a relay in the port circuit. If ground is detected, the test passes.

Test #114 Diagnostic Test—Auxiliary Trunk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1, minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #114 Diagnostic Test—Auxiliary Trunk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	This test failed to detect ground. 1) Try the test once more. 2) If the test fails again, replace circuit pack.
	PASS	This test passed. Ground was detected.

CABINET (Cabinet Sensors)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
CABINET	MAJOR	test environment	Cabinet Sensors
CABINET	MINOR	test environment	Cabinet Sensors

Note: CABINET alarm is only valid in a System 75. For information about System 75 XE, refer to the DC-POWER maintenance documentation.

Each System 75 Medium Cabinet is equipped with six fans and a fan speed control unit known as the AHD1 circuit pack designed to keep the temperature within the cabinet below 15°C (27°F). Air is drawn in by the three fans located in the front of the cabinet. The air is then channeled upwards through a filter and carriers A, B, and C and out the top of the cabinet. Air is drawn in by the three fans located in the back of the cabinet as well. The air is then channeled down through a filter and carriers D and E and out the bottom of the cabinet. The AHD1 circuit pack monitors five of the six temperature sensors located throughout the Medium Cabinet and uses the output of these sensors to adjust fan speed and to report air flow problems. The TN731 or TN731B Maintenance circuit pack directly monitors the sixth sensor (S1) to report temperature problems. The CABINET (Cabinet Sensors) maintenance object represents the air flow and temperature problems reported by AHD1 circuit pack and the Maintenance circuit pack.

The fans and AHD1 circuit pack obtain their power from the -48V DC supply of the 0LS631 BR in the A carrier. The power goes from the OLS(s) to the current limiter card (982LS), over a wiring harness from the A carrier to the back of the fan unit, through the AHD1 circuit pack, and then to the fans. The repair scenarios that follow rely on the technician's ability to distinguish between high fan speed and low fan speed. The only way to distinguish between the fan speeds is by the sound of the fans. When operating at high speed, the fans make a higher pitched sound than when they run at low speed. The technician must have learned through prior experience with System 75 what the fans sound like in low and high speed.

Figure 6-6 shows a Medium Cabinet system and the location of the temperature sensors S1 through S4 (there are actually two S3 sensors and two S4) as well as the location of the fans, the AHD1 circuit pack, and the filters. Figure 6-6 also shows other environment-related components of a Medium Cabinet system that can be ignored for this section on Cabinet Sensors. Sensor S1 informs the Maintenance circuit pack when the temperature at the top of the cabinet reaches 65°C (149°F). Sensor S2 is not monitored by any circuit pack. However, when the temperature at the top of the cabinet reaches 70°C (158°F), this sensor will cause the Power Distribution Unit to shut down power to the entire cabinet. At this point, Emergency Transfer will be invoked, and no other system functions will be provided.

The S3 and S4 sensors constantly report the temperature at the air exhaust in the cabinet (top and bottom-S3 sensors) and at the air intake (fans—S4 sensors). The AHD1 circuit pack uses this information to determine fan speed and air flow alarm state. If there is at least a 15°C (27°F) air temperature difference between the air exhaust and air intake, AND the air exhaust temperature is greater than 50°C (122°F), then all the fans are turned up to high speed. If this condition exists, the AHD1 circuit pack reports an air flow problem which results in a Minor alarm against Cabinet Sensors.

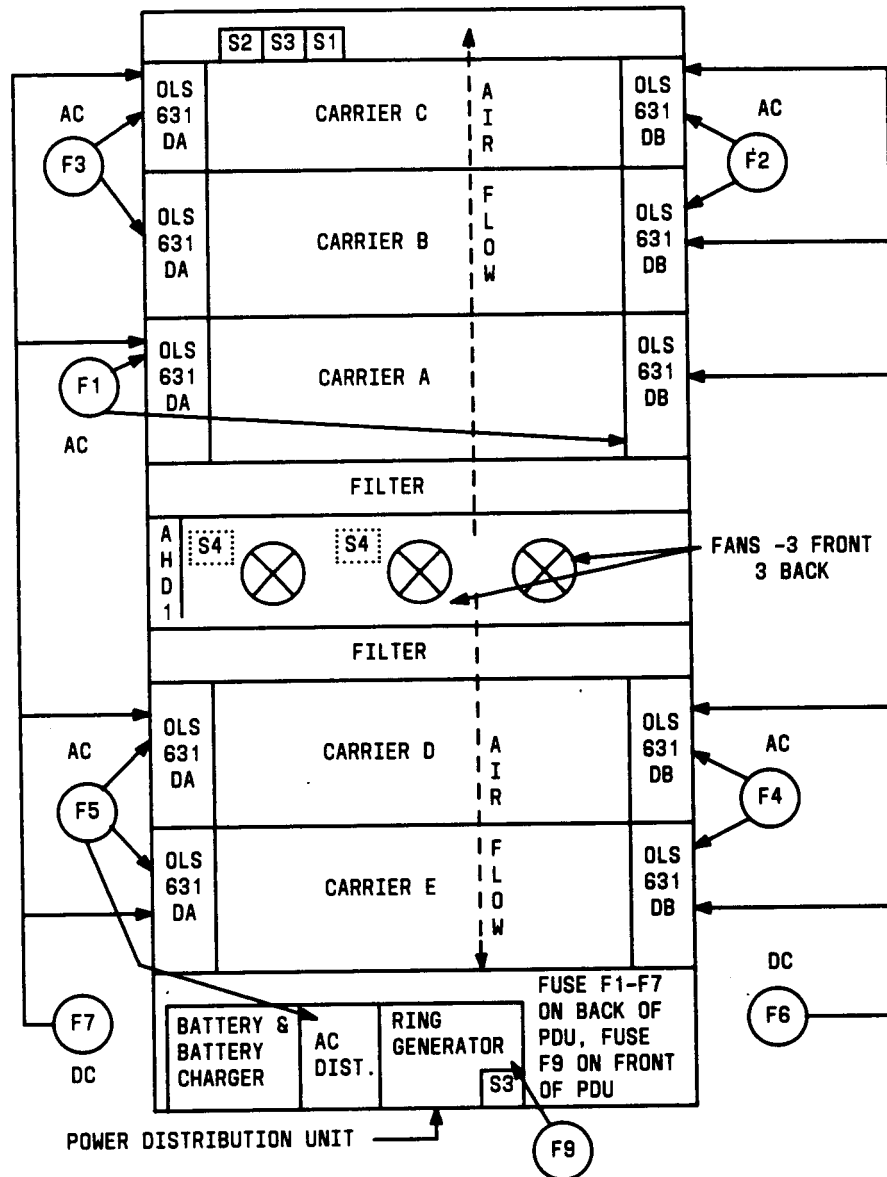


Figure 6-6. Medium Cabinet Environment Components (Sensors)

Replacement Procedures for Cabinet Sensors Problems

AHD1 Fan Speed Controller Circuit Pack Replacement Procedure

1. Refer to “Chapter 3. Routine Maintenance Procedures” for details on removing power from the system.
2. Remove the fan assembly cover by pulling the cover outward.
3. Loosen and remove the retaining screw nearest the power plug on the front fan located to the extreme left.
4. Disconnect the power plug from the fan.
5. Loosen and remove the other retaining screw on the fan.
6. Remove the fan from the fan assembly.

Caution: DO NOT TOUCH! Resistors on the circuit pack are hot.

7. Lift the latch on the AHD1 fan speed controller circuit pack.
8. Using the latch as a handle, pull the circuit pack up and out of its holder.
9. Insert a replacement AHD1 circuit pack, and push down on the” latch until the latch snaps in place.
10. Position the fan, and reconnect the fan power plug.
11. Insert and tighten the retaining screws.
12. Replace the fan assembly cover.
13. Refer to “Chapter 3. Routine Maintenance Procedures” for details on restoring power to the switch.

Fan Replacement Procedure

If some, but not all, of the fans are operating, first check for properly fastened connectors; then replace fans as follows:

1. To replace a fan located at the front of the switch cabinet, remove the fan assembly cover by pulling the cover outward. To replace a fan located at the rear of the switch cabinet, use a No. 10 slot screwdriver or 5/16-inch (8mm) wrench, and remove the panel covering the fan assembly.
2. Loosen and remove the retaining screw nearest the power plug on the defective fan.

Danger: 48-volt power is present on the fan plug.

3. Disconnect the power plug from the defective fan.
4. Loosen and remove the other retaining screw on the fan.
5. Remove the fan from the fan assembly.
6. Position the replacement fan and reconnect the fan power plug.
7. Insert and tighten the retaining screws.
8. Replace the fan assembly cover or panel.

Hardware Error Log Entries and Test to Clear Values

Cabinet Sensors (CABINET) Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test environment s
1	0	Cabinet Sensors Query (#122)	MINOR	ON	test environments r 3
257	0	Cabinet Sensors Query (#1 22)	MAJOR	ON	test environments r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery & Battery Charger Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery & Battery Charger Query Test (#5) (a)	x	x	ND
AC Power Query Test (#5) (b)	x	x	ND
OLS Recycle Test (carrier E, D, A,B,C) (#1 26) (c)		x	ND
OLS Query Test (carrier E, D, A,B,C) (#1 27) (c)	x	x	ND
Emergency Transfer Query Test (#1 24) (d)	x	x	ND
Cabinet Sensors Query Test (#1 22)	x	x	ND
Adjunct Processor Query Test (AP 1,2,3) (#1 20) (e)	x	x	ND

•D = Destructive

ND = Non-destructive

- (a) Refer to POWER (Battery & Battery Charger) maintenance documentation for a description of this test.
- (b) Refer to AC-POWER (AC Power) maintenance documentation for a description of this test.
- (c) Refer to CARR-POW (Carrier Port Power Supply) maintenance documentation for a description of this test.
- (d) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a description of this test.
- (e) Refer to AUX-CAB (Adjunct Processor) maintenance documentation for a description of this test.

Test description(s) and recommended maintenance procedures follow for all errors that can occur during craft-demanded testing.

Cabinet Temperature Query Test (#122)

This test queries the Maintenance circuit pack for the status of the cabinet sensors in the cabinet.

Test # 122 Cabinet Temperature Query Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	System resources required to run this test are not available.
2	ABORT	Internal System Error
3	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort with error code 2000, check for system powering problems with the A carrier. Look for and resolve all AC-POWER alarms, then repeat the test. 3) If the test continues to ABORT with error code 2000, check for and resolve MAINT (Maintenance/Tape Processor) errors, then repeat the test. 4) If the test continues to ABORT with error code 2000, escalate the problem.

Test #122 Cabinet Temperature Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
1	FAIL	The AHD1 circuit pack has reported an air flow problem. The temperature difference between the air intake and the air exhaust is at least 15°C (27°F) AND the absolute temperature at the top of the cabinet is at least 50°C (122°F) (referred to as the 15°C/50°C criteria). The fans should be running at high speed. 1) If none of the fans are running, then; a) Look for and resolve all alarms against the CARR-POW (Carrier Port Power Supply). b) Verify 48V DC is available to the fan units. Check the fan unit wiring harness connector. Check that there is 48V DC between pins 3,9,11 and 2,8,10. If there is a 48V DC at the connector, there should be power to the fans. If the fans are not running, replace the AHD1. If the fans still do not run, escalate the problem. If there is not a 48V DC at the connector, then the current limiter card (982LS) is probably defective. Replace the current limiter card. If the fans still do not run, escalate the problem. 2) If only a few of the fans are not running, then replace the defective fans. 3) if all the fans can be started, then wait 5 minutes and rerun the test. If the test fails again, proceed to Step 4.

Test #122 Cabinet Temperature Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
		4) If the fans are not at high speed, then measure the cabinet temperature at the air intake and the air exhaust at the top of the cabinet. a) If the 15°C/50°C criteria is met, then there is a problem with either the AHD1 circuit pack or the fans that is preventing the fans from operating at high speed. Replace the AHD1 circuit pack and/or the fans. If this succeeds in getting the fans to run at high speed, wait 5 minutes to give the cabinet time to cool down. Then, rerun the test, and start over with this repair scenario. If the problem persists, escalate the problem. b) If the 15°C/50°C criteria, is not met, "then the Maintenance circuit pack (MAINT) is incorrectly reporting this condition. Look for and resolve all errors on these maintenance objects first, and then rerun the test. If the test still fails, then escalate the problem. 5) If the fans are running at the high speed, then check the items on the list that follows. Any one of the items could be restricting or redirecting the flow of air within the cabinet. a) Check both filters. If a filter is dirty or clogged, the filter should be cleaned or. replaced. The filters can be either (1) washed with soap and water or (2) vacuumed b) Make sure there is nothing (other than circuit packs) in the carrier slots that could be restricting the air flow. c) Make sure there are no missing (blank) circuit pack or carrier faceplates. Install/Replace them as necessary. d) Make sure that the cabinet door is properly closed. The door must be closed for the fans to be able to properly cool the cabinet. Wait 5 minutes to give the fans a chance to cool down the cabinet. Rerun the test. If the tests still fails, proceed to Step 6.

Test #122 Cabinet Temperature Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
		6) At this point, there should be nothing impeding the air flow, and the fans should be running at high speed. Check the temperatures for the 15°C/50°C criteria. a) If the 15°C/50°C criteria exists, then a temperature problem does exist, and the fans (at high speed) should cool down the switch. Wait 5 minutes, and rerun the test. If the test still fails, the ambient room temperature is probably too high, and the room should be cooled. b) If the 15°C/50°C criteria does not exist, then the AHD1 circuit pack, the fans, or the S3 or S4 sensors are defective. Replace these items one at a time (in the order listed). Rerun the test between each replacement. If this does not clear the problem, then follow normal escalation procedures.
2	FAIL	The Maintenance circuit pack (MAINT) has reported a temperature problem because the S1 sensor has detected a temperature of at least 65°C (149°F). The entire cabinet is in danger of being powered down if the temperature reaches 70°C (158°F). 1) If none of the fans are running, then: a) Look for and resolve all alarms against the CARR-POW (Carrier Port Power Supply). b) Verify 48V DC is available to the fan units. Check the fan unit wiring harness connector. Verify that there is 48V DC between pins 3,9,11 and 2,8,10. If there is 48V DC at the connector, there should be power to the fans. If the fans are not running, replace the AHD1. If the fans still do not run, follow normal escalation procedures. If there is not 48V DC at the connector, then the current limiter card (982LS) is probably defective. Replace the current limiter card. If the fans still do not run, escalate the problem. c) If only a few of the fans are not running, then replace the defective fans. d) If all the fans can be started, then wait 5 minutes, and rerun the test. e) If the test fails again, proceed to Step 2.

Test #122 Cabinet Temperature Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
		2) Check the temperature at the top of the cabinet. If the temperature is at least 65°C (149°F), then the ambient room temperature is too high, and the fans cannot cool the system. Unless the room temperature is reduced, the system is going to shut down soon. If the temperature is less than 65°C, then: a) The Maintenance circuit pack (MAINT) may be incorrectly reporting this condition. First, look for and resolve ail errors on these maintenance objects. Then, rerun the test. If this test fails again, return to Step 1. If there are no errors, then continue. b) The sensor S1 may be incorrectly reporting the temperature at the top of the cabinet. Replace sensor S1, and rerun the test. If the test still fails, then escalate the problem.
3	FAIL	The AHD1 circuit pack has reported both air flow and temperature problems. Resolve the airflow error first. Then, correct the temperature error as described previously.
	PASS	The AHD1 circuit pack has not reported any temperature or air flow problems. The temperatures at the air exhaust at the top of the cabinet and the air intake at the bottom of the cabinet can be measured and the results compared against the criteria described previously. If a problem has been reported, then troubleshoot this problem using the procedures for the FAIL cases described previously.

CARR-POW (Carrier Port Power Supply)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
CARR-POW (a)	MAJOR	recycle carrier C	Carrier Port Power Supply

(a) Recycle the carrier indicated by the PORT field in the Alarm Log.

Every carrier in System 75 must be supplied with +5V, -48V, and -5V DC power for the various circuit packs to operate properly. This power is supplied to the carriers as follows: AC from a wall outlet comes into the Power Distribution Unit (PDU), which distributes the power via a set of fuses (FI-F7) to the Off-Line Switchers (OLSS). Each carrier in System 75 R1V3 is equipped with two OLSSs—the 631 OLS AR and the 631 OLS BR, which together with a TN736 or TN752 supply the required voltages to the carrier. The OLSS provide the -48V and +5V and the TN736 or TN752 provides the -5V. Figure 6-7 illustrates the position of the OLSS and the PDU and shows which OLS each fuse controls (Figure 6-7 also shows other Environment maintenance-related items that can be ignored for this section on Carrier Port Power Supply). Figure 6-8 shows the position of the fuses on the PDU and describes how to replace a fuse.

The CARR-POW (Carrier Port Power Supply) maintenance object represents the pair of OLSS that powers each carrier in a Medium Cabinet system. If a problem is reported by hardware for an OLS on a port carrier, the system can recycle the pair of OLSS in a port carrier; however, if the problem is reported on a control carrier, the system cannot recycle the pair of OLSS in a control carrier. Carrier A is the control carrier, and carriers B, C, D, and E are the port carriers.

Recycling a carrier turns off the pair of OLSS, and turns them back on 1 second later.

Warning: Recycling carriers will disrupt service for all circuit packs on the carrier.

System 75 RIV3 can also support neon message waiting lamps on analog voice terminals. If this is required, then the carrier(s) that contains the TN769 Analog Neon circuit packs must, also be supplied with 165V to power the neon lights. The 165V can only be supplied by a TN752 Power Supply circuit pack. Table 6-A lists all OLSS and power-related circuit packs for System 75 and indicates the voltages they can supply. Figures 6-9 and 6-10 show a schematic of each type of OLS.

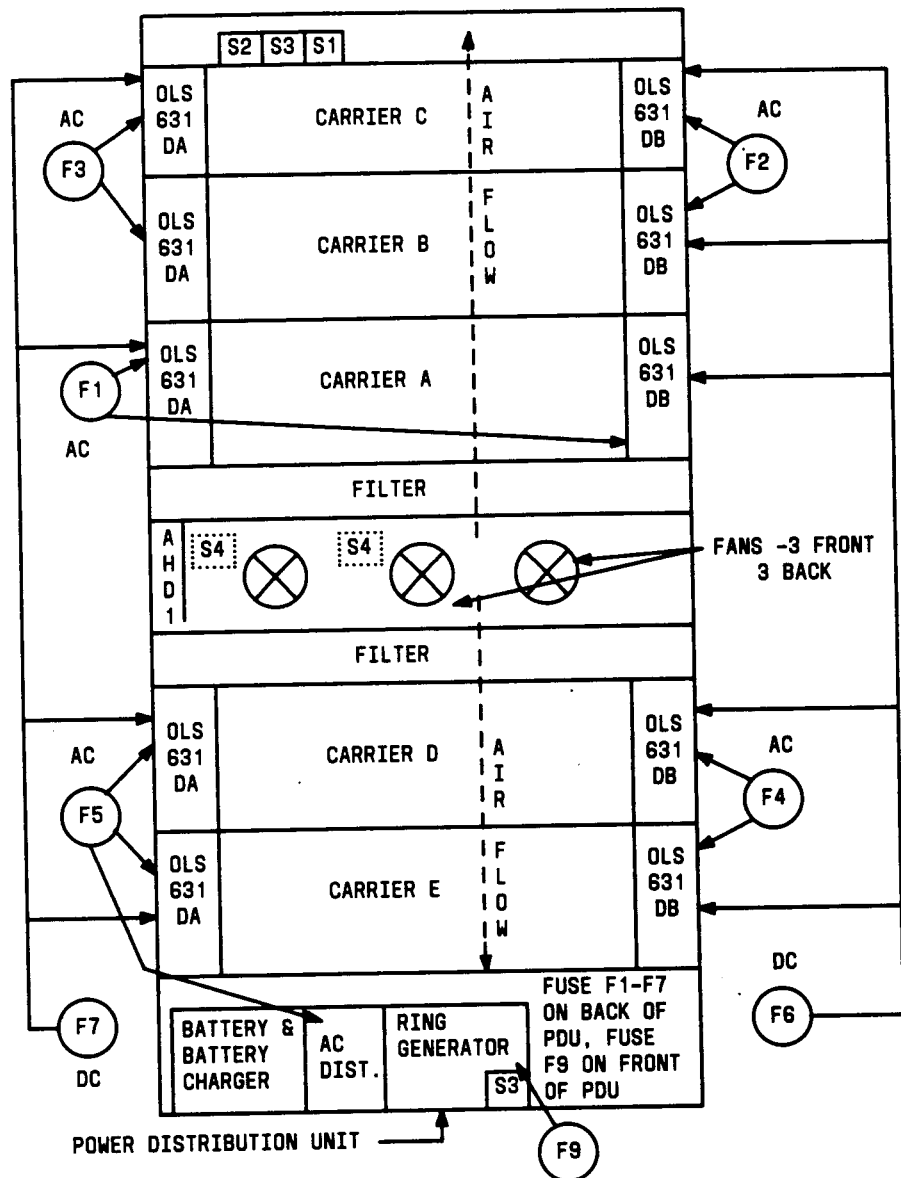
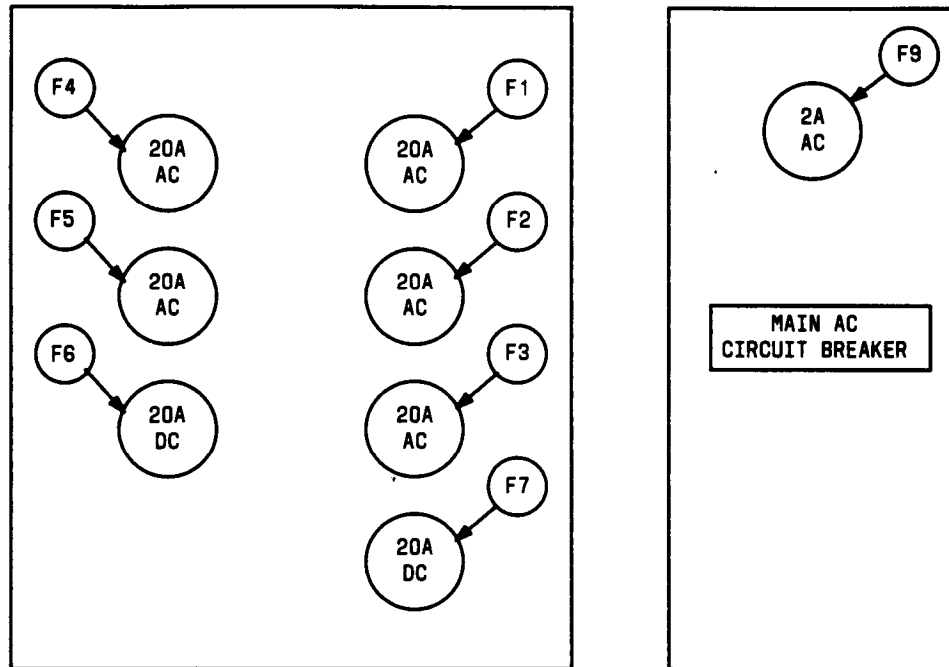


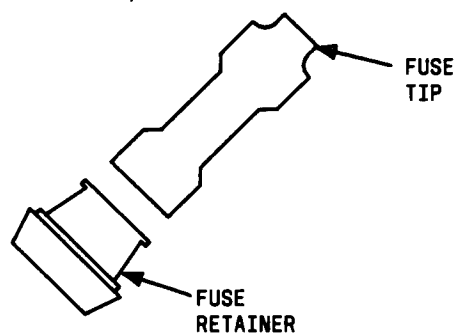
Figure 6-7. Medium Cabinet Environment Components (OLS and PDU)



BACK OF POWER DISTRIBUTION UNIT

FRONT OF POWER DISTRIBUTION UNIT

FUSE FE (5A AC), IS LOCATED ON THE BACK OF THE POU ABOVE THE CONVENIENCE OUTLET AND IS NOT SHOWN FOR CLARITY.



FUSES F1-F7 ARE ILLUSTRATE AT THE LEFT. WHEN REPLACING ONE OF THESE FUSES, CARE MUST BE TAKEN TO INSTALL THEM FUSE TIP FIRST. FUSES F8-F9 ARE SYMMETRICAL AND CAN BE INSERTED EITHER WAY.

Figure 6-8. Medium Cabinet Fuse Location and Replacement

Table 5-A. Voltages Supplied by Power Supplies

Power Supply	+5	-48V	-5V	165V	Cabinet Position	Release
OLS631 WA	yes	no	no	no	Left Side	pre-R1V3
OLS631 WB	no	yes	no	no	Right Side	pre-R1V3
OLS631 AR	yes	no	no	no	Left Side	R1V3
OLS631 BR	no	yes	no	no	Right Side	R1V3
TN736	no	no	yes	no	port slot	R1V3
TN752	no	no	yes	yes	port slot	R1V3

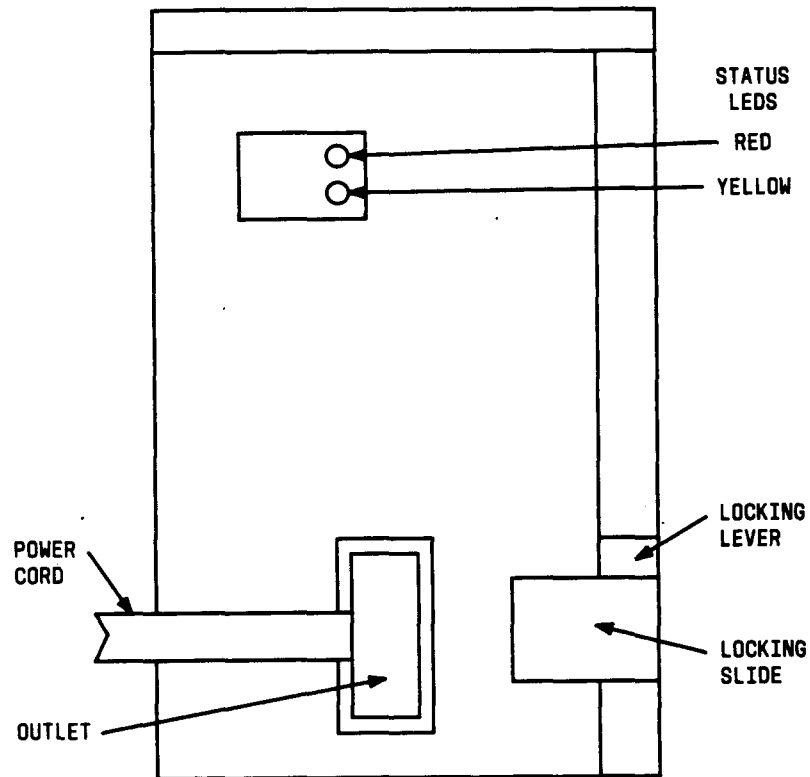


Figure 6-9. System 75 631WA or 631WB OLS

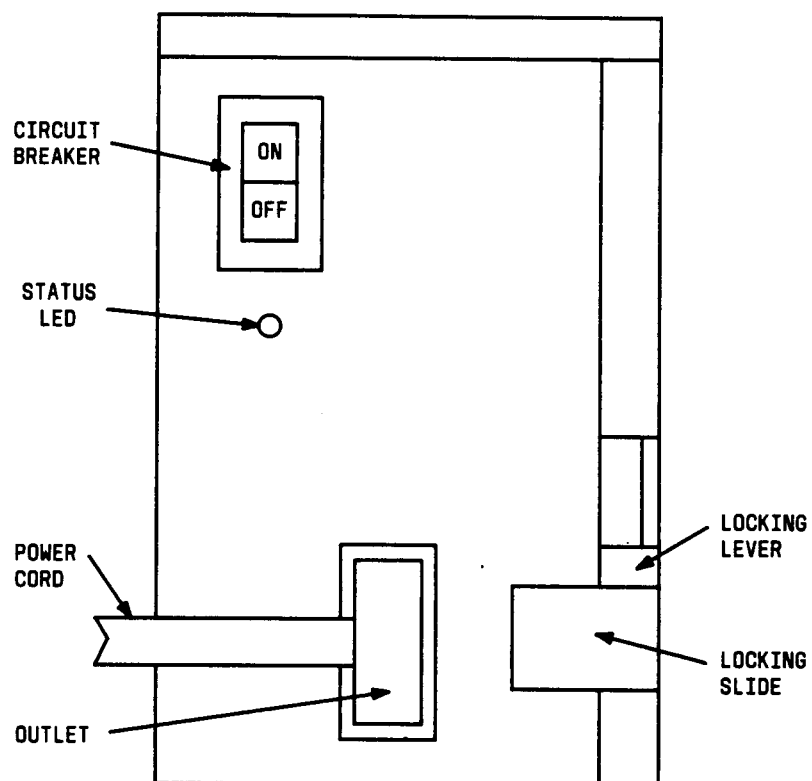


Figure 6-10. System 75 631AR or 631BR OLS

OLS Replacement Procedures

The procedure for replacing the Off-Line Switchers (OLSS) is given below.

Replacing an 0LS631AR or 0LS631BR

If the OLS to be replaced is in a control carrier, then refer to the section entitled “Removing and Restoring Power” in Chapter 3 before replacing the OLS.

To replace the OLS, follow the procedure below:

1. Set the power switch to OFF and unplug the power cord.
2. Move the locking slide on the power unit to its leftmost position and unlatch the locking lever.
3. Remove the power unit from the carrier.
4. Before installing the replacement power unit in the carrier, turn the power unit on its side and operate rocker switches 1 through 4 on the dip switch as follows:

Switch	631 AR Position	631 BR Position
1	open	open
2	closed	closed
3	open	open
4	closed	open

Note: In the open position, the rocker is down on the side opposite the number. In the closed position, the rocker is down on the side adjacent to the number.

5. Move the locking slide on the replacement power unit to the extreme left position and open the locking lever.
6. Insert the power unit into the carrier until some resistance is felt.
7. Lift the locking lever upward until it latches.
8. Move the locking lever slide on the power unit to the extreme right position.
9. Connect the power cord and set the power switch to ON.

Replacing a TN736 or TN752

If the TN736 or TN752 to be replaced is in a control carrier, then refer to the “Removing and Restoring Power” section in Chapter 3 before replacing these circuit packs. Replacing either TN736 or TN752 will interrupt the -5 volt supply to the carrier. This will cause all Analog circuit packs in the carrier to fail their Loop Around tests and may cause failures in circuit packs in the control complex. To replace TN736 or TN752, see the procedures described in the “Handling Port Circuit Packs” section in Chapter 3. Once the new circuit pack is replaced, Test #33 can be run on the CO-TRK and Test #47 can be run on the ANL-LINE. Test #33 and Test #49 should clear any alarms raised on the Analog circuit packs in the

carrier due to the loss of -5 volt power.

Hardware Error Log Entries and Test to Clear Values

Carrier Port Power Supply (CARR-POW) Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test environment s
1	0 or 1	OLS Recycle Test (#1 26) or OLS Query Test (#1 27)	MAJOR	ON	test environment r 2

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery & Battery Charger Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery & Battery Charger Query Test (#5) (a)	x	x	ND
AC Power Query Test (#5) (b)	x	x	ND
OLS Recycle Test (carrier E, D, A,B,C) (#126) (c)		x	ND
OLS Query Test (carrier E, D, A,B,C) (#1 27) (c)	x	x	ND
Emergency Transfer Query Test (#1 24) (d)	x	x	ND
Cabinet Sensors Query Test (# 122)	x	x	ND
Adjunct Processor Query Test (AP 1,2,3) (#1 20) (e)	x	x	ND

•D = Destructive
ND = Non-destructive

- (a) Refer to POWER (Battery & Battery Charger) maintenance documentation for a test description.
- (b) Refer to AC-POWER (AC Power) maintenance documentation for a test description.
- (c) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a test description.
- (d) . Refer to CABINET (Cabinet Sensors) maintenance documentation for a test description.
- (e) Refer to AUX-CAB (Adjunct Processor) maintenance documentation for a description of this test.

OLS Recycle Test (X126)

This test is destructive because it requires all circuit packs in the recycled carrier to be removed and inserted. These actions cause all calls originating or terminating on circuit packs in this carrier to be dropped. The pair of OLSS in the specified carrier is recycled. Both OLSS in the carrier are turned off for 1 second and then back on again. After the OLSS have been turned back on, the test queries the Maintenance circuit pack for the status of the pair of OLSS in the specified carrier. If both OLSS are on and functioning, then the test passes. If not, the test fails, and BOTH OLSS are turned off.

Test # 126 OLS Recycle Test		
Error Code	Test Result	Description / Recommendation
	ABORT	System resources required to run this test are not available or , response to the test request was not received within the allowable time period or Internal System Error. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1 (Carrier E), 2 (Carrier D), 4 (Carrier A), 8 (Carrier B), 16 (Carrier C)	FAIL	There is a problem with one or both OLSS on the recycled carrier. 1) Since the OLS Recycle Test failed, both OLSS in the recycled carrier should have been powered off by the system software. Both OLSS should be showing a red status LED instead of a green one. Since the OLS Query Test is a subset of the OLS Recycle Test, the OLS Query Test (#127) should also fail. Run the OLS Query Test by using the test environment command. If the test fails, follow the repair procedures described for Test #127, else escalate.
	PASS	Both OLSS in the recycled carrier when detected as good.

Off Line Switcher (OLS) Query Test (#127)

This test queries the Maintenance circuit pack for the status of the pair of OLSS in the specified carrier. If both OLSS are on and functioning, then the test passes, else it fails.

Test #127 Off Line Switcher (OLS) Query Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	System resources required to run this test are not available.
2	ABORT	Internal System Error
3	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort with error code 2000, check for system powering problems with the A carrier. Look for and resolve all AC-POWER alarms, then repeat the test. 3) If the test continues to ABORT with error code 2000, check for and resolve MAINT (Maintenance/Tape Processor) errors, then repeat the test. 4) If the test continues to ABORT with error code 2000, escalate the problem.

Test #127 Off Line Switcher (OLS) Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
	FAIL	There is a problem with one or both OLSS on the tested carrier. 1) For each OLS that has all status LED(s) OFF, check the AC input to the OLS at the OLS outlet (see Figures 6-8 and 6-9). If there is no AC, then check the appropriate fuses (see Figure 6-7) for the affected OLS. If the fuse(s) are blown out, replace the fuses (see Figure 6-8). If the fuses blow out again or AC does not show up at the OLS outlet, then there is probably a power wiring problem in the cabinet. Follow normal escalation procedures. 2) At this point, AC should be present at the OLS outlet. Use the recycle carrier C command (where C is the appropriate carrier) in an attempt to bring back the OLSS for this carrier. If the test passes, the trouble is cleared. If the test does not pass one, or both, OLS in the tested carrier is defective. If only one OLS is defective, then the status LED(s) on the healthy OLS will light green for a moment. When the Recycle Test determines that both OLSS are defective, the software will turn off power to both the good and defective OLSS. This will cause the status LED(s) on the good OLS to light red. 3) Unplug both OLSS, and wait approximately 1 minute to allow the OLSS to cool down. Plug in the OLSS. If either OLS is operating properly (that is, the status LEDs show green), then replace the defective OLS(s)." See "OLS Replacement Procedures" in this section. 4) If the replaced OLSS still do not operate properly, then a circuit pack or a defective voice terminal connected to a circuit pack in the affected carrier may be causing an electrical load that is preventing the OLS from operating properly. Unseat all the circuit packs in the carrier. a) If both OLSS show a green status LED, then the OLSS are healthy and the problem is with one of the circuit packs. Reinsert the circuit packs one at a time. If the status LED shows red after reinserting a circuit pack, then replace the defective circuit pack. If the status LED still shows red, then remove the amphenol connector on the back of the slot containing this circuit pack. If the status LED shows green, then the problem is with one of the voice terminals or the wiring to one of the voice terminals on this slot. If the status LED still shows red, then escalate the problem. b) If either OLS still shows a red status LED, then check for bent pins and cable placement in the affected carrier. If no other problems can be found, then escalate the problem.
	PASS	Both OLSS in the tested carrier were detected as healthy.

CO-TRK (CO Trunk), CO-BD (CO Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
CO-TRK	MINOR	test port CSS I	CO Trunk
CO-TRK	WARNING	None	CO Trunk
CO-BD	MINOR (b)	test board CSS s	CO Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to the XXX-BD (Common Port Board) maintenance documentation.

Central Office (CO) trunks are 2-wire analog lines to the CO that support both incoming and outgoing calls. The CO Trunk circuit pack provides eight ports for loop-start or ground-start CO, foreign exchange (FX), or Wide Area Telecommunications (WATS) trunks. The circuit pack is an interface between the 2-wire analog line from the CO and the system's (4-wire) Time Division Multiplex Bus (TDM).

LOOP START OPERATION

Idle State - Tip = ground, Ring = CO Battery

A. Outgoing Call

- 1. PBX Off-Hook (Seize Message): Closes the Tip-Ring Loop**
 - a. CO Response: DC loop current + Dial tone**
- 2. PBX On-Hook (Drop Message): Open Tip-Ring loop, no loop current**
 - a. CO Response: CO goes to idle state (see Note)**

B. Incoming Call

- 1. CO Applies Ringing Voltage**
 - a. PBX Response: Detect ringing current**
- 2. PBX Off-Hook (Answer Message): Close loop**
 - a. CO Response: Trip ringing, provide loop current**
- 3. PBX On-Hook (Drop Message): Open Tip-Ring loop, no loop current**
 - a. CO Response: CO goes to idle state (see Note)**

Note: CO does not normally provide an On-Hook (Disconnect) signal.

GROUND START OPERATION

Idle state - Tip = open, Ring = CO Battery

A. Outgoing Call

- 1. PBX Off-Hook (Seize Message): Places ground on Ring**
 - a. CO Response: Places ground on Tip**
 - b. PBX Response: close the loop**
 - c. CO Response: provide loop current**
 - d. PBX response: dial out digits**
- 2. PBX On-Hook first (Drop Message): Open the Tip-Ring Loop, no loop current**
 - a. CO Response: Open circuit on Tip**
- 3. CO On-Hook first (Disconnect): Open circuit on Tip, no loop current.**
 - a. PBX Response: Open Tip-Ring loop**

B. Incoming Call

- 1. CO Off-Hook (Seizure): CO applies ground on Tip**
 - a. PBX Response: make trunk busy for outgoing calls**
- 2. CO Ringing: CO applies ringing voltage**
 - a. PBX Response: Detect ringing, ring destination**
- 3. PBX Off-Hook (Answer Message): Close loop**
 - a. CO Response: Trip ringing, provide loop current**
- 4. PBX On-Hook first (Drop Message): Open the Tip-Ring Loop, no loop current**
 - a. CO Response: Open circuit on Tip**
- 5. CO On-Hook first (Disconnect): Open circuit on Tip, no loop current.**

Hardware Error Log Entries and Test to Clear Values

CO Trunk (CO-TRK)			Error Log Entries		
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test port CSSpp s
1(a)	57347	None	MINOR	OFF	
15(b)	Any	Port Audit Update Test (#36)			
18	o	busyout trunk <grp/mbr>	WRN	OFF	release trunk <grp/mbr>
257(a)	50176	None	WRN	OFF	
257(a)	57345	None	WRN	OFF	
257(a)	57360	None	WRN	OFF	
2571a)	57376	None	WRN	OFF	
257(b)	57408	None	WRN	OFF	
257(a)	57424	None	WRN	OFF	
513(a)	57364	None	MINOR	ON	
769(a)	57392	None	MINOR	OFF	
1025		Demand Diagnostic Test (#3)	MINOR	ON	test port CSSpp s r 2
1281		Demand Diagnostic Test (#3)	MINOR	ON	test port CSSpp s r 3
1537		Dial Tone Test (#O)	MINOR	OFF	test port CSSpp l r 2
1793		Loop Around and Conference Test (#33)	MINOR	ON	test port CSSpp l r 3
2049		NPE Crosstalk Test (#6)	MINOR	ON	test port CSSpp l r 3
2561 (c)	57345	None			
2817(c)	57360	None	MINOR	OFF	
3073(c)	57376	None			
3329(c)	57408	None			
	57424	None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) These are in-line errors that have no specific test associated with them. Refer to the table on the next page for an explanation and appropriate action.
- (b) This is a software audit error that does not indicate any hardware malfunction. Run short test sequence and investigate any associated errors (if any).
- (c) Aux data 57345—Single polarity ringing current
 Aux data 57376—No loop current on incoming call
 Aux data 57408—No tip ground detected on outgoing call
 Aux data 57424—No loop current on outgoing call

These errors will cause the Dial Tone Test (#O) to run and are only considered a problem if the Dial Tone Test fails (in which case error type 1537 will also show up). In this case the trunk may be put in ready-for-service state (shown as “disconnected” by status command), which allows only incoming calls. Run the Dial Tone Test (#O) and follow its procedures.

CO Trunk Errors with NO Tests			
Error Type	Aux Data	Description and System Action	Craft Action
1	57347	Port error—Ringing without ground. This error is detected on an incoming call on a ground-start CO trunk. The CO trunk circuit pack has not detected a Tip ground before ringing current is detected. This may indicate that the ground detector is not working. However, the call will be accepted.	See Note 1.
257	50176	Battery reversal detected—This is usually caused by the CO (often seen with step-by-step and cross-bar offices in connection with outgoing calls). This is detected if the direction of the loop current changes from normal to reverse for at least 40 msec. Could occur if the trunk was just installed and for some reason the Tip and Ring wires were reversed at the PBX. If battery reversals occur during dialing, wrong numbers may result. The CO should be asked to remove the battery reversal option.	Refer problem to CO.
257 or 2561	57345	Single polarity ringing current—Check for other errors. This error results from abnormal ringing current, but does not prevent the incoming call from being accepted. One cause may be that the reverse current detector associated with the port is failing. (Will not be detected by any tests.) The other cause may be that normal current is not detected. In this case, neither incoming nor outgoing calls can be completed, and the dial tone test will also fail.	

CO Trunk Errors with NO Tests {Contd}			
Error Type	Aux Data	Description and System Action	Craft Action
257 or 2817	57360	Ground but no ringing—This error occurs on an incoming call on a ground-start trunk. If ringing is not detected within 5 seconds of the Tip being grounded, the call is still accepted. If the CO is a No. 5ESS® switch type, ringing delays of more than 5 seconds during heavy traffic are fairly common.	Check for other errors.
257 or 3073	57376	No loop current on incoming call —The incoming destination has already answered and no loop current has been detected. If this is a hard fault, the Dial Tone Test and all outgoing calls should also fail.	Check for other errors.
257 or 3329	57408	Trunk error—No Tip ground detected on outgoing call. This error occurs when an attempt is made to seize a ground-start CO trunk for an outgoing call and Tip ground is not detected, or the caller hangs up before Tip ground is detected.	See Notes 1 and 2.
257 or 3585	57424	No loop current on outgoing call—This error occurs when an attempt is made to seize a loop or ground-start trunk for an outgoing call. An error occurs if loop current is not detected or the caller hangs up before it is detected.	See Note 3.
513	57364	Ground detector stuck active—After several occurrences, an on-board minor alarm is generated.	Run short test. If test aborts with error code 1000, disconnect Tip and Ring and repeat short test. If test still aborts, replace circuit pack. If test passes, refer problem to CO. If any other error code is received, pursue that problem.

CO Trunk Errors with NO Tests (Contd)			
Error Type	Aux Data	Description and System Action	Craft Action
769	57392	CO not releasing after call is dropped from PBX end. After several occurrences, an off-board warning alarm is generated.	Refer problem to CO.
2561	57345	See Error 257. Aux 57345	
2817	57360	See Error 257, Aux 57360	
3073	57376	See Error 257, Aux 57376	
3329	57408	See Error 257, Aux 57408	
3585	57424	See Error 257. Aux 57424	

Notes:

1. At the SAT, busy out the affected port, and run a long test. Observe the test results. If any tests fail, refer to the description of the tests and the associated error codes. Release the port. If users continue to report troubles, check for other errors and make test calls to determine whether the problem should be escalated or referred to the CO.
2. At the SAT, busy out the affected port, and run a long test. If CO Demand Diagnostic Test #3 passes and this error keeps occurring, refer problems to CO. Release the port.
3. At the SAT, busy out the affected port, and run a long test. If Dial Tone Test #O passes, ignore this error. Release the port.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Crosstalk Test (#6)		x	ND
Dial Tone Test (#O)		x	ND
Diagnostic Test (#3)	x	x	ND
Loop Around and Conference Test (#33)		x	ND
Audit Update Test (#36)	x	x	ND

- D = Destructive
- ND = Non-destructive

Dial Tone Test (#0)

This test attempts to seize a port and checks for the return of a dial tone.

Test #0 Dial Tone Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If the system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #O Dial Tone Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port has been seized by a user for a valid call. Use the status trunk command to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1005	ABORT	Trunk has been administered as incoming-only; dial tone can only be obtained on outgoing trunks. This is a normal condition.
2000	ABORT	Response to the test was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Trunk was seized, but dial tone could not be detected. 1) Check for errors on TONE-BD or TONE-PT. Clear any errors found and repeat test. 2) If error has still not cleared, refer problem to CO.
2002	FAIL	Seizure portion of test failed due to hardware problem. Fault is usually caused by a disconnected trunk. 1) Check trunk wiring to ensure good connection; repeat test if wiring correction made. 2) Locate another identical CO trunk and swap its wiring with one under test. Repeat test on both trunks and determine if problem follows trunk or remains at original port. If problem follows trunk, refer problem to CO. If problem remains at port, replace circuit pack and repeat test. 3) If replacing circuit pack does not clear failure, escalate the trouble report.
1009	PASS	Detected tone was not pure dial tone. No action required.
	PASS	Trunk was seized, and dial tone was detected. User-reported troubles on this port should be investigated by using other port tests and by examining trunk or external wiring.

CO Demand Diagnostic Test (#3)

Port circuit pack relays are operated and checks are made to see if the port can detect and apply ground on the Tip lead. This test also verifies that there is no external ground on the Ring lead. In the absence of other failures, the circuit pack should be replaced only if this test fails with the CO line disconnected.

Test #3 CO Demand Diagnostic Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port has been seized by a user for a valid call. Use the status trunk command to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1005	ABORT	Test not applicable to present configuration. This is a normal condition.
1018	ABORT	Test has been disabled via administration.
2000	ABORT	Response to the request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #3 CO Demand Diagnostic Test (Contd)		
Error Code	Test Result	Description / Recommendation
	FAIL	Failure to detect ground or faulty ground detected on Ring lead. 1) Repeat test with CO line removed. 2) If test fails, replace the circuit pack. 3) If test passes, refer problem to CO.
	PASS	This test verifies that the port is able to apply ground for outgoing calls and detect ground for incoming calls; however, it does not provide information on whether a CO line is actually connected. User-reported troubles on this port should be investigated by using other port tests and by examining trunk or external wiring.

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the section on Status Commands in Chapter 4 for a full description of all possible states). You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated by using other port tests, and by examining trunk or external wiring.

Loop Around and Conference Circuit Test (#33)

This test checks the reflective loop around and conference capabilities of a CO port circuit. The test uses 404-Hz, 1004-Hz, and 2804-Hz tones. Each tone is transmitted separately through the loop and checked.

Test #33 Loop Around and Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
7 129 131 133	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Conference Circuit Test aborted.
	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 33 Loop Around and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port has been seized by a user for a valid call. Use the status trunk command to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7, 129, 131, or 133	FAIL	The conference capabilities of the port failed (Error Code 7). The reflective 404-Hz Tone Test failed. No transmission was detected to or from the port (Error Code 129). The reflective 1004-Hz Tone Test failed. No transmission was detected to or from the port (Error Code 131). The reflective 2804-Hz Tone Test failed. No transmission was detected to or from the port (Error Code 133). 1) Check for errors on TONE-BD or TONE-PT. If there are errors, take appropriate actions. 2) If all the ports on the circuit pack fail the Reflective Loop Around Test, a -5V power problem is indicated. When -5V power has been lost, the Loop Around Test will fail on all Analog Port circuit packs and Trunk circuit packs in that carrier. Check a red LED on the TN736 or TN752 circuit pack; if it is on, this indicates a problem within the circuit pack. See CARR-POW (Carrier Port Power Supply) maintenance documentation for a description of the power supplies and replacement procedures. 3) Rerun the test. 4) If the test fails, place a test call to check quality and clarity of connection. If OK, the CO circuit pack need not be replaced immediately. If the test call is not OK, then replace the CO circuit pack.
	PASS	CO Trunk Loop Around and Conference Test is successful. 1) User-reported troubles on this port should be investigated by using other port tests and by examining trunk or external wiring.

Port Audit Update Test (#36)

This test will send updates of the CO port translation for all ports on the circuit pack that have been translated. The update is non-disruptive and guards against possible corruption of translation data contained on the circuit pack. No response message is expected from the circuit pack once it receives translation updates. The port translation data includes: ground or loop start trunk, tone or rotary dialing trunk, rotary dialing inter-digit timing, network balance R/RC, and disconnect timing.

Test #36 Port Audit Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1006	ABORT	The port is in an out-of-service state. This test cannot be run. 1) Retry the command once the port is in service.
2100	ABORT FAIL	Could not allocate the necessary system resources to run the test. Internal system error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If test continues to fail, escalate the problem.
	PASS	This test passed. Translation information was successfully updated on the circuit pack. User-reported troubles on this port should be investigated by using other port tests and by examining trunk or external wiring.

CONFIG (System Configuration)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
CONFIG	None	None	System Configuration

The CONFIG (System Configuration) maintenance object oversees logical insertion and removal of circuit packs (CPS) in the system. When Switch Control detects that a CP is present in a port slot, it informs System Configuration and System Configuration queries the CP to determine the type and vintage of the CP. Similarly, when Switch Control detects that a CP has been removed from a port slot, it informs System Configuration.

There are no alarms or tests for System Configuration, but two types of errors are logged to the Hardware Error Log.

Hardware Error Log Entries and Test to Clear Values

System Configuration Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	None
2-117 (a)	0	None	None	None	None
1002-1117 (b)	0	None	None	None	None

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) This error indicates that some port CP in the system did not respond to a CP type inquiry. Follow the procedures outlined in (b) to determine if there is an error.
- (b) This error indicates that some port CP in the system did not respond to a vintage inquiry.

As a result of either of these errors, a port CP may be physically inserted in a port slot, but the system may not recognize its existence. The Error Type field specifies the location of the port CP that caused the error as given in the following table. If the Error Type field is greater than 1000, subtract 1000 from the Error Type field before consulting the table.

Once the port CP location has been determined from the following table, use the list configuration ail command to determine if the CP is inserted. If not, insert the CP. If the CP has already been inserted but the error persists, replace the CP.

Err Type	Port CP Location	Err	Port CP Location	Err	Port Type Location
1	GAMUT CP*	41	D08	78	B13
2	E01	42	D09	79	B14
3	E02	43	D10	80	B15
4	E03	44	D11	81	B16
5	E04	45	D12	82	B17
7	E06	47	D14	84	B19
8	E07	48	D15	85	B20
9	E08	49	D16	88	A1 1
10	E09	50	D17	89	A1 2
11	E10	51	D18	90	A13
12	E1 1	52	D1 9	91	A14
13	E12	53	D20	98	Co1
14	E13	56	A03	99	C02
15	E14	57	A04	100	C03
16	E1 5	58	A05	101	C04
17	E16	59	A06	102	C05
18	E17	60	A07	103	C06
19	E1 8	61	A08	104	C07
20	E19	62	A09	105	C08
21	E20	63	A10	106	C09
26	Network Control	66	B01	107	C10
28	Interface 3	67	B02	108	C11
29	Tone/Clock	68	B03	109	cl 2
30	A01	69	B04	110	C13
31	A02	70	B05	111	C14
34	D01	71	B06	112	C15
35	D02	72	B07	114	C17
36	D03	73	B08	113	C16
37	D04	74	B09	115	C1 8
38	D05	75	B10	116	C19
39	D06	76	B11	117	C20
40	D07	77	B12	other	Unknown Port Circuit Location

•Development laboratory only.

DATA-BD (Network Control Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (b)	Full Name Of MO
DATA-BD	WARNING	test network-control	Network Control Circuit Pack
DATA-BD	MINOR	test network-control	Network Control Circuit Pack

The TN727 Network Control circuit pack contains the following maintenance objects: the SW-CTL (Switch Control), four DATA-CHLs (Network Control Data Channels), the DATA-CON (Network Control Data Channel Control), and the generic hardware that interfaces with the TDM Bus (DATA-BD). The generic hardware (DATA-BD) is the subject of this section.

All circuit packs that have an interface with the TDM Bus have a common set of generic hardware that provides the TDM Bus interface. Consequently, these circuit packs share a common set of tests that verify the integrity of the generic hardware. The circuit packs and common set of tests that they share are described in XXX-BD (Common Port Board). Because the Network Control circuit pack has this common set of hardware, it is classified in the XXX-BD documentation as a service port circuit pack.

Two important characteristics make maintenance on the DATA-BD object different than the maintenance on other XXX-BD (Common Port Board) objects. First, because the Network Control circuit pack has the Switch Control (SW-CTL) on it, it must always be physically installed in the system. Therefore, the DATA-BD object is always logically administered. Second, because the Network Control circuit pack is a Switch Processing Element circuit pack, it has no CSS designation. Therefore, the DATA-BD object cannot be operated on by Craft via test board CSS, reset board CSS, busyout board CSS, or release board CSS commands. The only Craft access to the DATA-BD object is via the test network-control [short | long] command.

Hardware Error Log Entries and Test to Clear Values

Network Control Circuit Pack Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test data-module <ext> s
1(a)	0	Data Channel Reset Test (#107)	MINOR	ON	test data-module <ext> I
23(b)	0	None	WARNING	OFF	
257	Any	Control Channel Test (#52)	MINOR	ON	test network-control s r 20
	Any	N			
513(d)	Any	None			
513(d)		None			
513(d)		N			
513d		None			
769(e)	4358	None			
1025 f)	4363	NPE Audit Test (#50)			test network-control s
1538(g)		Data Channel Reset Test (#107)	MINOR	ON	test data-module <ext> I
	Any	None			
3840 h)		None			
3840 h		None			
3840 h		None			
3840(h)		None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

(a) This error indicates the DATA-BD portion of the Network Control circuit pack stopped functioning. Since the Network Control circuit pack cannot be reset via the reset board CSS command, the Data Channel Reset Test (#1 07) in the long test sequence for the DATA-CHLs and DATA-CON must be used to reset it as follows:

1. Issue the list data command to determine if one or more Network Control DATA-CHLs is administered. (A Network Control DATA-CHL is identified by a type value of "Netcon".)
2. If a Network Control DATA-CHL is not administered, administer using the add data-module [<ext> ; next] command.
3. From the form resulting from the list data command, choose a Network Control DATA-CHL whose port field value indicates that it is on the same carrier (A or B) as the Network Control circuit pack to be reset.

4. Issue the test data-module <ext> long command using the extension for the DATA-CHL chosen in Step 3.

If the red LED stays on, then replace the circuit pack.

Warning: Whenever a TN727 Network Control (Netcon) circuit pack is reseated or replaced, the correct date and time setting must be manually entered and verified.

To reset the date and time, issue the set time command at the SAT. After *carefully* entering the desired information, issue the display time command to verify the accuracy of the date and time.

- (b) The circuit pack has been logically administered but not physically installed. The alarm will be cleared when the circuit pack is installed.
- (c) This error indicates transient communication problems with this circuit pack. This error is not service-affecting and can be ignored.
- (d) This error indicates the circuit pack has reported a hardware failure on the circuit pack. The circuit pack should be replaced.
- (e) This error can be ignored, but look for other errors on this circuit pack.
- (f) This error is not service-affecting and can be ignored.
- (g) This error indicates the DATA-BD portion of the Network Control circuit pack is out-of-service. Since the Network Control circuit pack cannot be reset via the reset board CSS command, the Data Channel Reset Test (#1 07) in the long test sequence for the DATA-CHL and DATA-CON must be used to reset it as follows:
 1. Issue the list data command to determine if one or more Network Control DATA-CHLs are administered. (A Network Control DATA-CHL is identified by a type value of "Netcon".)
 2. If not, administer a Network Control DATA-CHL using the add data-module [<ext> | next] command.
 3. From the form resulting from the list data command, choose a Network Control DATA-CHL whose port field value indicates that it is on the same carrier (A or B) as the Network Control circuit pack to be reset.
 4. Issue the test data-module <ext> long command using the extension for the DATA-CHL chosen in Step 3.

If the error happens again within 15 minutes, replace the circuit pack.

- (h) This error is not service-affecting and can be ignored.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Audit Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Audit Test (#50)		x	ND
Control Channel Loop Around Test (#52)	x	x	ND

* D = Destructive
ND = Non-destructive

Note: Refer to DATA-CHL (Network Control Channel) and SW-CTL (Switch Control) maintenance documentation for other tests associated with DATA-BD maintenance.

NPE Audit Test (#50)

The system sends a message to the on-board microprocessor to update the network connectivity information for all the Network Processing Elements (NPEs) on the circuit pack.

Test #50 NPE Audit Test		
Error Code	Test Result	Description / Recommendation
none or 2100	ABORT	Could not allocate the necessary system resources to run this test.
1019	ABORT	Test already in progress.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	The circuit pack's NPEs have been updated with their translation.

Control Channel Loop Around Test (#52)

This test queries the circuit pack for its circuit pack code and vintage and verifies its records.

Test #52 Control Channel Loop Around Test		
Error Code	Test Result	Description / Recommendation
none or 2100	ABORT	Could not allocate the necessary system" resources to run this test.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail. escalate the modlem.
	PASS	Communication with this circuit pack is successful.

DATA-CHL (Network Control Data Channel)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
DATA-CHL	WARNING	release data-module<ext>	Network Control Data Channel
DATA-CHL	MINOR	test data-moduie<ext>	Network Control Data Channel

(a) <ext> is the extension of the Data Channel to be tested. The extension can be determined by issuing the list data-module command from the SAT. In System 75 R1V3, the resulting form will provide a mapping from the "AX)(pp" designation of the Data Channel to its corresponding extension, where "pp" indicates which one of the four Data Channels is alarmed ("01", "02", "03", or "04").

Warning: The "test data-module <ext> long" will drop all sessions on all of the network controller ports. Refer to Data Channel Reset Test (#107).

Network Control Data Channel Maintenance

The TN727 Network Control circuit pack contains the following maintenance objects: the SW-CTL (Switch Control), four DATA-CHLs (Network Control Data Channels), the DATA-CON (Network Control Data Channel Control), and the generic hardware that interfaces with the TDM Bus (DATA-BD). The DATA-CHLs are the subject of this section. The DATA-CON (Data Channel Control) is also described.

Together the four DATA-CHLs and the DATA-CON provide a data communications interface that allows data terminal equipment connected to port circuit packs to communicate with software applications running on the System 75. The DATA-CON represents the interface to the control channel of the TDM Bus. Each DATA-CHL represents a dial-up/dial-out asynchronous communication port that interfaces to the TDM Bus. The DATA-CON supports the signaling required to establish and tear down a connection between the terminal equipment and a software application. Data is transported between the terminal equipment and the software application over the connection established over the DATA-CHL. See Figure 6-11.

Network Control DATA-CHLs may be used to support the following features and functions:

- Establishment of a connection over which to log SMDR (System Management Detail Recording) data to a printer or other storage unit. This connection is called the SMDR Link.
- Establishment of connection(s) over which to log PMS (Property Management System), Automatic Wakeup, and Emergency Access to Attendant data to a Journal printer. This connection is called the Journal Printer Link (JRN-LNK).
- Establishment of a connection to a customer-owned PMS (Property Management System). This connection is called the PMS Link (PMS-LNK).
- Establishment of connection(s) for up to two secondary SATs (System Access Terminals).

- Saving announcements from the Announcement circuit pack (ANN-BD) to tape.
- Restoring announcements from tape to the Announcement circuit pack (ANN-BD).
- Maintenance testing of the DATA-CHLs and DATA-CON.

From the viewpoint of administration, the four DATA-CHLs on a Network Control circuit pack are numbered 01 through 04.

If a DATA-CHL or the DATA-CON becomes defective on the Network Control in a System 75 with a single processing element (PE), the Network Control circuit pack cannot be replaced without powering the system down.

Figure 6-11 illustrates the logical decomposition of Network Control Data Channels (DATA-CHL) and the Data Channel Control (DATA-CON) into software and hardware components. It also shows the interface to the switch software via the memory bus and to terminal equipment via the TDM Bus and port circuit packs.

As indicated in the figure, DATA-CHLs 1 and 2 share a common Dual Port RAM (DPR) and TDM Bus interface hardware and DATA-CHLs 3 and 4 share a common DPR and TDM Bus interface hardware. Thus, if DATA-CHL 1 is defective, then DATA-CHL 2 is likely to be defective and vice versa. Similarly, if DATA-CHL 3 is defective, then DATA-CHL 4 is likely to be defective and vice versa.

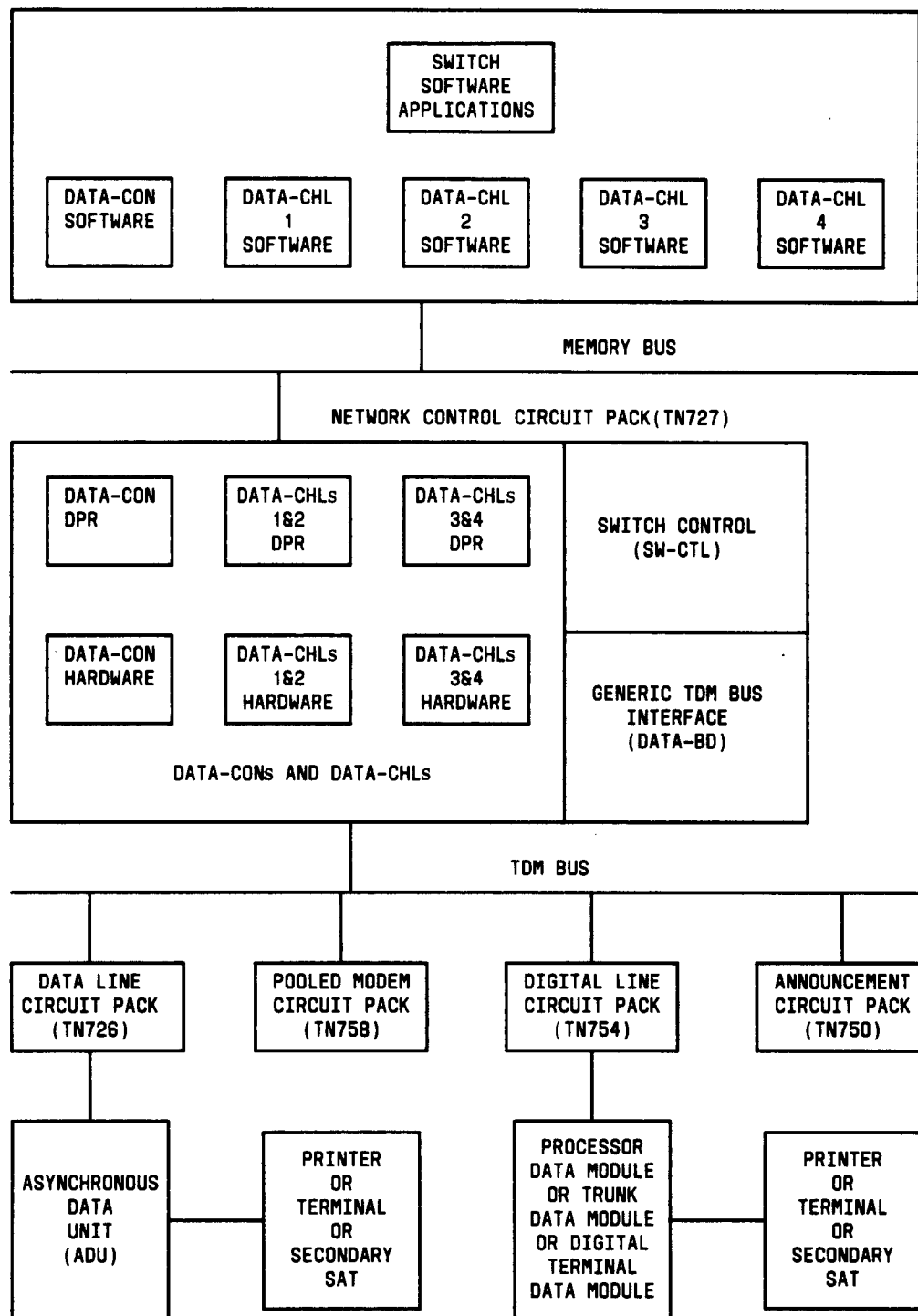


Figure 6-11. Data Channel Control (DATA-CON) and Data Channels (DATA-CHLs)

Status of Network Control Data Channels

To perform maintenance testing on the Network Control DATA-CHLs, the DATA-CHLs cannot be busy with one of the functions previously described. A series of Craft commands can be used to determine if the DATA-CHLs are busy and, if so, to determine the function for which they are being used. This series of Craft commands is outlined below and should be done before testing the DATA-CHLs.

Issue the list data-module command to determine the extensions for the administered Network Control DATA-CHLs. (A Network Control DATA-CHL is identified by a type value of "Netcon".) For each Network Control DATA-CHL on the Active SPE, determine if the DATA-CHL is busy by issuing the status data-module <ext> command using the DATA-CHL's extension. If the DATA-CHL is busy, the Service State field in the resulting form will be in service/active. However, the form will not indicate the reason the DATA-CHL is busy. This must be determined using other Craft commands. "

Use the procedures below to determine whether busy Network Control DATA-CHLs are being used for SMDR, Journal Printer, or PMS Links. If a DATA-CHL is busy with one of these links, then, to test the DATA-CHL, the link must be busied out using busyout smdr-link, busyout journal-printer wakeup-log, busyout journal-printer pros-log, or busyout pms-link, respectively. Don't issue any of these busyout commands unless instructed to do so while investigating Error Codes according to the "Craft-Demanded Tests: Descriptions and Error Codes" sub-section. If one of these links must be busied out to perform maintenance testing, restore the link to service according to JRNL-LNK (Journal Printer Link) maintenance or PMS-LNK (PMS Link) maintenance, respectively.

If a DATA-CHL is busy but is not being used for one of these links, then it is being used for a secondary SAT connection or for maintenance testing. If it is being used for a secondary SAT connection, then, in order to test the DATA-CHL that the connection is using, the DATA-CHL must be busied out using busyout data-module <ext>.

Note: The busyout data-module <ext> command causes the connection over the associated DATA-CHL to be dropped. Don't issue this busyout command unless instructed to do so while investigating Error Codes according to "Craft-Demanded Tests: Descriptions and Error Codes".

If the DATA-CHL must be busied out in order to perform maintenance testing, the secondary SAT connection must be re-established by re-dialing the DATA-CHL.

SMDR Links

1. Issue the status smdr-link command to see if an SMDR Link has been established. If the Link State field is "Up", then the SMDR Link may be using one of the Network Control DATA-CHLs.
2. Issue the display system features command and go to the SMDR sub-section on page 2 of the resulting form. Note the values in the Primary Output Extension and Secondary Output Extension fields. If the values are extensions, then the SMDR Link is using one of the Network Control DATA-CHLs.

3. For each of the extensions in the Primary Output Extension and Secondary Output Extension fields, issue the status data-module <ext> command using the extension. Note the value in the Connected Ports field of the resulting form. If there is a port value in the field, then the indicated port is a Network Control DATA-CHL.
4. Issue the list data-module command, locate each port indicated previously in the Connected Ports fields, and determine if that port has a type value of "netcon". If so, then there is an SMDR Link over that DATA-CHL.

Journal Printer Links

1. Issue the status journal-link wakeup-log and status journal-link pros-log commands to see if one or both of these Journal Printer Links have been established. If the Link State field is "Up" for either of these, then that Journal Printer Link may be using one of the Network Control DATA-CHLs.
2. Issue the display system hospitality command and note the values in the Extension of Journal/Schedule Printer and Extension of PMS Log Printer fields. If either of these values are extensions, then that Journal Printer Link is using one of the Network Control DATA-CHLs.
3. For each of the extensions in the Extension of Journal/Schedule Printer and Extension of PMS Log Printer fields, issue the status data-module <ext> command using the extension. Note the value in the Connected Ports field of the resulting form. If there is a port value in the field, then the indicated port is a Network Control DATA-CHL.
4. Issue the list data-module command, locate each port indicated previously in the Connected Ports fields, and determine if that port has a type value of "netcon". If so, then there is a Journal Printer Link over that DATA-CHL.

. PMS Link

1. Issue the status pros-link command to see if a PMS Link has been established. If the Link State field is "Up", then the PMS Link may be using one of the Network Control DATA-CHLs.
2. Issue the display system hospitality command and note the value in the Extension of PMS field. If this value is an extension, then the PMS Link is using one of the Network Control DATA-CHLs.
3. For the extension in the Extension of PMS field, issue the status data-module <ext> command using the extension. Note the value in the Connected Ports field of the resulting form. If there is a port value in the field, then the indicated port is a Network Control DATA-CHL.
4. Issue the list data-module command, locate the port indicated previously in the Connected Ports field, and determine if that port has a type value of "netcon". If so, then there is a PMS Link over that DATA-CHL.

Hardware Error Log Entries and Test to Clear Values

Network Control Data Channel Error Log					Entries
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value (a)
0†	0	Any	Any	Any	test data-module <ext> s
0(b)	0	None	MINOR	ON	
1	Any	Local Loop Back Test (#1 11)	MINOR	ON	test data-module <ext> s r 3
257	Any	Remote Maintenance Loop Around Test (#1 09)	MINOR	ON	test data-module <ext> s r 5
513	Any	Crosstalk Test (#1 10)	MINOR	ON	test data-module <ext> s r 3
769	Any	Dual Port RAM Test (#1 08)	MINOR	ON	test data-module <ext> l r 3
18	0	busyout data-module <ext>	WARNING	OFF	release data-module <ext>

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

(a) <ext> is the extension of the DATA-CHL to be tested. The extension can be determined by issuing the list data-module command from the SAT. In System 75 R1V3, the resulting form will provide a mapping from the “AXXPP” designation of the DATA-CHL to its corresponding extension, where “pp” indicates which one of the four DATA-CHLS is alarmed (“01”, “02”, “03”, or “04”).

(b) Each DATA-CHL on the Network Control circuit pack has been alarmed because the circuit pack level MO, DATA-BD, has been alarmed. Look for any alarms against DATA-BD and resolve them.

Craft-Demanded Tests: Descriptions and Error Codes

There are two Craft test commands that include the Network Control DATA-CHLs. The test data-module <ext> [short | long] command tests the single DATA-CHL that has the extension specified by <ext>. The test network-control [a | b] [short | long] command tests each administered DATA-CHL that resides on the Network Control circuit pack in the specified carrier.

Always investigate tests in the order presented in the tables below when inspecting errors in the system. By clearing error codes associated with the *Data Channel/ Reset Test (#107)*, for example, you may also clear errors generated from other tests in the testing sequence.

Tests for test data-module <ext> Command			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Data Channel Reset Test (#1 07) (a)		x	D
Data Channel Dual Port Ram Test (#108) (a)		x	D
Data Channel Remote Maintenance Loop Around Test (#109)	x	x	ND
Data Channel Local Loop Back Test (#111)			ND
Data Channel Crosstalk Test (#110)	x	x	ND

* D = Destructive
ND = Non-destructive

(a) Determine if SMDR, Journal Printer, and/or PMS Links are using the DATA-CHLs and busy out these links if it is necessary to use the test network-control [a ; b] long command.

Tests for test network-control [a ; b] Command			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Control Channel Test (Common Port Board)(#52)(a)		x	ND
NPE Audit Test (Common Port Board) (#50) (a)	x	x	D
Data Channel Reset Test (#1 07)		x	ND
Data Channel DPR Test (#108)		x	D
Data Channel Maintenance Loop Around Test (#1 09)	x	x	ND
Data Channel Crosstalk Test (#1 10)	x	x	ND
Data Channel Local Loop Back Test (#1 11)	x	x	ND
Switch Control Reset Test (#93)		x	D
EPN Maintenance Circuit Pack Interface Test (#325) (b)		x	D
Time-of-Day Clock Test (#95) (b)		x	ND
Control Channel Interface Test (#92) (b)	x	x	ND
Control Channel Transmission Test (#94) (b)	x	x	ND
EPN Maintenance Circuit Pack Interface Test (#324) (b)	x	x	ND

* D = Destructive
ND = Non-destructive

(a) Refer to DATA-BD (Network Control Circuit Pack) maintenance documentation for a description of these tests.

(b) Refer to SW-CTL (Switch Control) maintenance documentation for a description of these tests.

Data Channel Reset Test (#107)

This test is destructive.

This test resets the entire data communications interface provided by the DATA-CON and the four DATA-CHLs.

It does this by resetting the hardware and software composing the DATA-CON and all four DATA-CHLs.

All existing connections over the DATA-CHLs are dropped.

Test #107 Data Channel Reset Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available.
	ABORT	An ABORT has one of two different meanings: a. System resources required to run this test are not available b. Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The circuit pack failed to reset. 1) Execute the command again. 2) If the problem persists, replace the TN727 Network Control circuit pack as described in "Chapter 3. Routine Maintenance Procedures". After the Network Control circuit pack has been replaced, its Time-of-Day Clock must be set using the set time command.
	PASS	The circuit pack initializes correctly.

Data Channel Dual Port RAM Test (#1 OS)

This test is destructive.

This is a coordinated test of the dual port RAM that is shared between the hardware and software composing the DATA-CON. Control messages and data are passed through this dual port RAM to establish and tear down connections over the DATA-CHLs. This test requests each side to read and write the dual port RAM, first one at a time and then simultaneously in alternate locations.

This test prevents any control stimuli from being received from or sent to the TDM Bus control channel preventing the establishment of new connections over the DATA-CHLs. However, existing connections will not (and cannot) be dropped.

Test # 108 Data Channel Dual Port Ram Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The DATA-CON dual port RAM is not functioning correctly. Either the software cannot correctly read from it and/or write to it or the hardware cannot correctly read from it and/or write to it, or both. Connections cannot be established over the DATA-CHLs. 1) Execute the command again. 2) If the problem persists, replace the TN727 Network Control circuit pack. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command.
	PASS	The DATA-CON dual port RAM is functioning. Connections can be established over the DATA-CHLs.

Data Channel Remote Maintenance Loop Around Test (#109)

This test verifies the integrity of the entire DATA-CHL, that is, the software, dual port RAM, and hardware that compose it. It verifies that a connection can be established over the DATA-CHL and that the DATA-CHL can correctly send and receive data over the connection (that is, over the TDM Bus). The test actually involves two DATA-CHLs: the DATA-CHL that is the target of the test and a second, arbitrary, unbusy DATA-CHL. A connection is set up by placing a call out from the arbitrary DATA-CHL and into the target DATA-CHL. Data is looped over the connection in each direction; that is, the target DATA-CHL is tested as both a sender of data and a receiver of data. The test checks that the data received by one DATA-CHL is the same as the data that was sent by the other DATA-CHL.

Because it establishes a connection between two Network Control DATA-CHLs across the TDM Bus, this test does more than just verify the integrity of the target DATA-CHL. It also verifies the integrity of the DATA-CON (by establishing the connection) and of the TDM Bus and Tone/Clock circuit pack (by sending and receiving data).

If this test aborts or fails, it is impossible to determine from this test alone whether the defective DATA-CHL is the target DATA-CHL or the arbitrarily chosen DATA-CHL or if the problem lies with the DATA-CON, TDM Bus, or Tone/Clock circuit pack. The results of running Tests #107, #108, #110, and #111 on the DATA-CHL can be used to determine whether the target DATA-CHL is defective.

Finally, recall from the description of Figure 6-11 that DATA-CHLs 1 and 2 share a common Dual Port RAM (DPR) and TDM Bus interface hardware and DATA-CHLs 3 and 4 share a common DPR and TDM Bus interface hardware. Thus, if this test finds that DATA-CHL 1 is defective, then DATA-CHL 2 is likely to be defective and vice versa. Similarly, if this test finds that DATA-CHL 3 is defective, then DATA-CHL 4 is likely to be defective and vice versa.

Note: If an Error Code is encountered that recommends that an SMDR, Journal Printer, and/or PMS Link be busied out, restore each busied out link to service according to JRNL-LNK (Journal Printer Link) maintenance or PMS-LNK (PMS Link Maintenance), respectively, before concluding work on the problem.

Test #109 Data Channel Remote Maintenance Loop Around Test		
Error Code	Test Result	Description / Recommendation
4	ABORT	For this test, an Error Code of 4 can have one of two different meanings: a. The target DATA-CHL is busy and therefore not available for use. b. Internal System Error 1) Note the results of Tests #110 and #111 in the short test sequence for the target DATA-CHL. If the results of Tests #110 and #111 are both PASS, then there is a high probability that the target DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) Determine if the target DATA-CHL is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. If so, check for errors on the function that is using the DATA-CHL. If there are no errors, there is a high probability that the DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 3) If the target DATA-CHL is in use for some other function, busy out the function (SMDR Link, Journal Printer Link, PMS Link) or the DATA-CHL (secondary SAT connection only). 4) Retry the command at 1 minute intervals for a maximum of 5 times. 5) If the test continues to abort, escalate the problem. 6) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
30 31 32 33 40 41 70 75	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 109 Data Channel Remote Maintenance Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1000	ABORT	For this test, an Error Code of 1000 can have one of several different meanings: a. The target DATA-CHL is busy and therefore not available for use. b. No other DATA-CHLs are administered and therefore not available to place the call to the target DATA-CHL. c. All other DATA-CHLs are busy and therefore not available to place the call to the target DATA-CHL. d. System resources required to run this test are not available. e. Internal System Error 1) Note the results of Tests #110 and #111 in the short test sequence for the target DATA-CHL. If the results of Tests #110 and #111 are both PASS, then there is a high probability that the target DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) Determine if the target DATA-CHL is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. If so, check for errors on the function that is using the DATA-CHL. If there are no errors, there is a high probability that the DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 3) If the target DATA-CHL is in use for some other function, busy out the function (SMDR Link, Journal Printer Link, PMS Link) or the DATA-CHL (secondary SAT connection only). 4) Issue the list data-module command to determine if other DATA-CHLs are administered. If no other DATA-CHLs are administered, administer at least one at this time. 5) Determine if the DATA-CHLs OTHER THAN the target DATA-CHL are all in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. If so, and if it is necessary to completely test the target DATA-CHL, use the following preference guidelines to free one of the DATA-CHLs for testing.

Test #109 Data Channel Remote Maintenance Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
		1. If a DATA-CHL is being used for a secondary SAT connection, busyout that DATA-CHL. II. Otherwise, if a DATA-CHL is being used for a PMS Link, busyout the PMS Link. III. Otherwise, if a DATA-CHL is being used for a Journal Printer Link, busyout the Journal Printer Link. IV. Otherwise, if a DATA-CHL is being used for an SMDR Link, busyout the SMDR Link. 6) Retry the command at 1 minute intervals for a maximum of 5 times. 7) If the test continues to abort, escalate the problem. 8) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
1006	ABORT	For this test, an Error Code of 1006 can have one of several different meanings: a. No other DATA-CHLs are administered and therefore not available to place the call to the target DATA-CHL. b. All other DATA-CHLs are busy and therefore not available to place the call to the target DATA-CHL. c. System resources required to run this test are not available. d. Internal System Error 1) Note the results of Tests #110 and #111 in the short test sequence for the target DATA-CHL. If the results of Tests #110 and #111 are both PASS, then there is a high probability that the target DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) Issue the list data-module command to determine if other DATA-CHLs are administered. If no other DATA-CHLs are administered, administer at least one at this time. 3) Determine if the DATA-CHLs OTHER THAN the target DATA-CHL are all in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. If so, and if it is necessary to completely test the target DATA-CHL, use the following preference guidelines to free one of the DATA-CHLs for testing.

Test #109 Data Channel Remote Maintenance Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
		1. If a DATA-CHL is being used for a secondary SAT connection, busyout that DATA-CHL. II. Otherwise, if a DATA-CHL is being used for a PMS Link, busyout the PMS Link. III. Otherwise, if a DATA-CHL is being used for a Journal Printer Link, busyout the Journal Printer Link. IV. Otherwise, if a DATA-CHL is being used for an SMDR Link, busyout the SMDR Link. 4) Retry the command at 1 minute intervals for a maximum of 5 times. 5) If the test continues to abort, escalate the problem. 6) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
1018	ABORT	Test disabled via software patch. 1) Escalate to next tier level for instructions on enabling test.
2000	ABORT	Internal System Error
2003	ABORT	Internal System Error
2004	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
40 41 2000	FAIL	In the case of Error Codes 40 and 41, the Remote Maintenance Loop Around Test failed because the data received over the connection did not match the data sent over the connection (data was corrupted). In the case of Error Code 2000, the Remote Maintenance Loop Around Test failed because the data looped over the connection was not received (data was lost). However, because it involves two DATA-CHLs, the test's failure is not sufficient to indict either one of the two DATA-CHLs as defective. 1) Determine which of the DATA-CHLs are in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels.

Test #109 Data Channel Remote Maintenance Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
		2) Note the test results for Tests #110 and #111 in the short test sequence for the target DATA-CHL and refer to Steps 3, 4, and/or 5 to determine the appropriate actions to take based on those results. 3) If the result of Test #110 is PASS and the result of Test #111 is PASS for the target DATA-CHL, then the most likely problem is that the arbitrarily chosen DATA-CHL is defective. •Run the short test sequence for each DATA-CHL that is not in use for some other function. Note the test results for Tests #110 and #111 for each of them. •If the results of Tests #110 and #111 are both FAIL for at least one of the other DATA-CHLs, investigate the possibility of a defective arbitrarily chosen DATA-CHL. a. Issue the remove data-module <ext> command for each DATA-CHL for which the results of tests #110 and #111 were both FAIL to remove the DATA-CHL from operation. b. Repeat the test. c. Replace the Network Control circuit pack at your earliest convenience. Replace the circuit pack as described in “Chapter 3. Routine Maintenance Procedures”. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. •If the results of Tests #110 and #111 are not both FAIL for any one of the other DATA-CHLs that are not in use for some other function, investigate the possibility of a defective TDM Bus as described in Step 4. 4) If the result of Test #110 is FAIL and the result of Test #111 is PASS for the target DATA-CHL, then the most likely problem is that the TDM Bus or Tone/Clock circuit pack is defective. •Check for the existence of TDM Bus (TDM-BUS) and/or Tone/Clock circuit pack (TONE-BD, TONE-PT, and TDM-CLK) errors and alarms. If they exist: a. Refer to the corresponding maintenance documentation to clear the errors and alarms. b. Repeat the test.

Test #109 Data Channel Remote Maintenance Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
		• If TDM Bus (TDM-BUS) and/or Tone/Clock circuit pack (TONE-BD, TONE-PT, and TDM-CLK) errors and alarms do not exist, investigate the possibility that the target DATA-CHL, the DATA-CON, or the Network Control circuit pack is defective as described in Step 5. 5) If the result of Test #110 is either PASS or FAIL and the result of Test #111 is FAIL for the target DATA-CHL, then the most likely problem is that the target DATA-CHL is defective, the DATA-CON is defective, or the TN727 Network Control circuit pack is defective. • Busycut all functions that are using the Network Control DATA-CHLs. Note: All functions must be busied out because Test #107 is destructive and will terminate all established connections over the DATA-CHLs. • Issue the test data-module <ext> long command for the target DATA-CHL. Note the test results for Tests #107 and #108. a) If the result of Test #107 is FAIL, then the TN727 Network Control circuit pack is defective. 1. Replace the Network Control circuit pack immediately. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. II. Repeat the test. b) If the result of Test #107 is PASS and the result of Test #108 is FAIL, then the DATA-CON is defective. 1. Although all DATA-CHLs are unusable, the SW-CTL is still operational. Based on the customer's use of DATA-CHLs, replace the Network Control circuit pack at the customer's convenience. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. II. Repeat the test.

Test #109 Data Channel Remote Maintenance Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
		c) If the result of Test #107 is PASS and the result of Test #108 is PASS, then the target DATA-CHL is defective. 1. Issue the remove data-module ext> command for the target DATA-CHL to remove it from operation. II. Replace the Network Control circuit pack at your earliest convenience. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. 6) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
	PASS	The target DATA-CHL, DATA-CON, TN727 Network Control circuit pack, TDM Bus (TDM-BUS), and Tone/Clock circuit pack (TONE-BD, TONE-PT, TDM-CLK) are functioning. Connections can be established over the DATA-CHLs.

Data Channel Crosstalk Test (#110)

This test verifies the integrity of the entire DATA-CHL, that is, the software, dual port RAM, and hardware that composes it. However, unlike the Remote Maintenance Loop Around Test (#109) described previously, the test only involves the single DATA-CHL that is the target of the test. A loop around connection is established over the TDM Bus from the DATA-CHL back to itself. Data is looped over the connection in each direction; that is, the DATA-CHL is tested as both a sender of data and a receiver of data. The test checks that the data received by the DATA-CHL is the same as the data that was sent by the DATA-CHL.

Because it establishes a loop around connection from the Network Control DATA-CHL back to itself across the TDM Bus, this test does more than just verify the integrity of the target DATA-CHL. It also verifies the integrity of the DATA-CON (by establishing the connection) and of the TDM Bus and Tone/Clock circuit pack (by sending and receiving data).

If this test aborts or fails, it is impossible to determine from this test alone whether the target DATA-CHL is defective or if the problem lies with the DATA-CON, TDM Bus, or Tone/Clock circuit pack. The results of running Tests #107, #108, and #111 on the DATA-CHL can be used to determine whether the target DATA-CHL is defective.

Finally, recall from the description of Figure 6-11 that DATA-CHLS 1 and 2 share a common Dual Port RAM (DPR) and TDM Bus interface hardware and DATA-CHLS 3 and 4 share a common DPR and TDM Bus interface hardware. Thus, if this test finds that DATA-CHL 1 is defective, then DATA-CHL 2 is likely to be defective and vice versa. Similarly, if this test finds that DATA-CHL 3 is defective, then DATA-CHL 4 is likely to be defective and vice versa.

Note: If an Error Code is encountered that recommends that an SMDR, Journal Printer, and/or PMS Link be busied out, restore each busied out link to service according to Journal Printer Link Maintenance (JRNL-LNK) or PMS Link Maintenance (PMS-LNK), respectively, before concluding work on the problem.

Test #110 Data Channel Crosstalk Test		
Error Code	Test Result	Description / Recommendation
4	ABORT	For this test, an Error Code of 4 can have one of two different meanings: a. The target DATA-CHL is busy and therefore not available for use. b. Internal System Error 1) Determine if the target DATA-CHL is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. If so, check for errors on the function that is using the DATA-CHL. If there are no errors, there is a high probability that the DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) If the target DATA-CHL is in use for some other function, busyout the function (SMDR Link, Journal Printer Link, PMS Link) or the DATA-CHL (secondary SAT connection only). 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem. 5) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
14 16 40 70 75	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate. the problem.

Test #110 Data Channel Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1000	ABORT	For this test, an Error Code of 1000 can have one of several different meanings: a. The target DATA-CHL is busy and therefore not available for use. b. System resources required to run this test are not available. c. Internal System Error 1) Determine if the target DATA-CHL is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. If so, check for errors on the function that is using the DATA-CHL. If there are no errors, there is a high probability that the DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) If the target DATA-CHL is in use for some other function, busyout the function (SMDR Link, Journal Printer Link, PMS Link) or the DATA-CHL (secondary SAT connection only). 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem. 5) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
1002	ABORT	For this test, an Error Code of 1002 can have one of two different meanings: a. System resources required to run this test are not available. b. Internal System Error
1006	ABORT	System resources required to run this test are not available. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1018	ABORT	Test disabled via software patch. 1) Escalate to next tier level for instructions on enabling test.

Test #110 Data Channel Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Internal System Error
2003	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
40 2000	FAIL	In the case of Error Code 40, the Crosstalk Test failed because the data received over the connection did not match the data sent over the connection (data was corrupted). In the case of Error Code 2000, the Crosstalk Test failed because the data looped over the connection was not received (data was lost). 1) Determine which of the DATA-CHLs is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels. 2) Note the test result for Test #111 in the short test sequence for the target DATA-CHL and refer to Steps 3 and/or 4 to determine the appropriate actions to take based on those results. 3) If the result of Test #111 is PASS, then the most likely problem is that the TDM Bus or Tone/Clock circuit pack is defective. • Check for the existence of TDM Bus (TDM-BUS) and/or Tone/Clock circuit pack (TONE-BD, TONE-PT, and TDM-CLK) errors and alarms. If they exist: a. Refer to the corresponding maintenance documentation to clear the errors and alarms. b. Repeat the test. • If TDM Bus (TDM-BUS) and/or Tone/Clock circuit pack (TONE-BD, TONE-PT, and TDM-CLK) errors and alarms do not exist, investigate the possibility that the target DATA-CHL, the DATA-CON, or the Network Control circuit pack is defective as described in Step 4. 4) If the result of Test #111 is FAIL, then the most likely problem is that the target DATA-CHL, the DATA-CON, or the TN727 Network Control circuit pack is defective. • Busycut all functions that are using the Network Control DATA-CHLs.

Test #110 Data Channel Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
		Note: All functions must be busied out because Test #107 is destructive and will terminate all established connections over the DATA-CHLs. • Issue the test data-module <ext> long command for the target DATA-CHL. Note the test results for Tests #107 and #108. a) If the result of Test #107 is FAIL, then the TN727 Network Control circuit pack is defective. 1. Replace the Network Control circuit pack immediately. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. II. Repeat the test. b) If the result of Test #107 is PASS and the result of Test #108 is FAIL, then the DATA-CON is defective. 1. Although all DATA-CHLs are unusable, the SW-CTL is" still operational. Based on the customer's use of DATA-CHLs, replace the Network Control circuit pack at the customer's convenience. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. II. Repeat the test. c) If the result of Test #107 is PASS and the result of Test #108 is PASS, then the target DATA-CHL is defective. 1. Issue the remove data-module <ext> command for the target DATA-CHL to remove it from operation. II. Replace the Network Control circuit pack at your earliest convenience. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. 5) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.

Test #110 Data Channel Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	The target DATA-CHL, DATA-CON, TN727 Network Control circuit pack, TDM Bus (TDM-BUS), and Tone/Clock circuit pack (TONE-BD, TONE-PT, TDM-CLK) are functioning. Connections can be established over the target DATA-CHL.

Data Channel Local Loop Back Test (#III)

This test verifies the integrity of the dual port RAM that is shared between the software and hardware that composes the DATA-CHL. The dual port RAM is placed in local loop back mode such that data to be sent by the DATA-CHL is instead looped back to be received by the DATA-CHL. The loop back is done within the dual port RAM; that is, the data is never sent over the TDM Bus. The test checks that the data received by the DATA-CH L is the same as the data that was sent by the DATA-CHL.

This test actually does more than just verify the integrity of the target DATA-CHL. Because it is the DATA-CON that actually puts the Dual Port RAM in local loop back mode and loops the data from the Dual Port RAM back into the Dual Port RAM, the test also verifies the integrity of the DATA-CON.

If this test aborts or fails, it is impossible to determine from this test alone whether the target DATA-CHL is defective or if the problem lies with the DATA-CON. The results of running Tests #107 and #108 on the DATA-CHL can be used to determine whether the target DATA-CHL is defective.

Finally, recall from the description of Figure 6-11 that DATA-CHLs 1 and 2 share a common Dual Port RAM (DPR) and TDM Bus interface hardware and DATA-CHLs 3 and 4 share a common DPR and TDM Bus interface hardware. Thus, if this test finds that DATA-CHL 1 is defective, then DATA-CHL 2 is likely to be defective and vice versa. Similarly, if this test finds that DATA-CHL 3 is defective, then DATA-CHL 4 is likely to be defective and vice versa.

Note: If an Error Code is encountered that recommends that an SMDR, Journal Printer, and/or PMS Link be busied out, restore each busied out link to service according to SMDR Link maintenance, JRNL-LNK (Journal Printer Link) maintenance, or PMS-LNK (PMS Link) maintenance, respectively, before concluding work on the problem.

Test # 111 Data Channel Local Loop Back Test		
Error Code	Test Result	Description / Recommendation
4	ABORT	For this test, an Error Code of 4 can have one of two different meanings: a. The target DATA-CHL is busy and, therefore, not available for use. b. Internal System Error 1) Determine if the target DATA-CHL is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described in Status of Network Control Data Channels previously. If so, check for errors on the function that is using the DATA-CHL. If there are no errors, there is a high probability that the DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) If the target DATA-CHL is in use for some other function, busyout the function (SMDR Link, Journal Printer Link, PMS Link) or the DATA-CHL (secondary SAT connection only). 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem. 5) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
40 70 75	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #111 Data Channel Local Loop Back Test (Contd)		
Error Code	Test Result	Description / Recommendation
1000	ABORT	For this test, an Error Code of 1000 can have one of several different meanings: a. The target DATA-CHL is busy and therefore, not available for use. b. System resources required to run this test are not available. c. Internal System Error 1) Determine if the target DATA-CHL is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described in Status of Network Control Data Channels previously. If so, check for errors on the function that is using the DATA-CHL. If there are no errors, there is a high probability that the DATA-CHL is not defective. Proceed with the remaining steps only if it is necessary to completely test the target DATA-CHL. 2) If the target DATA-CHL is in use for some other function, busyout the function (SMDR Link, Journal Printer Link, PMS Link) or the DATA-CHL (secondary SAT connection only). 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem. 5) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
1006	ABORT	For this test, an Error Code of 1006 can have one of several different meanings: a. System resources required to run this test are not available. b. Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1018	ABORT	Test disabled via software patch. 1) Escalate to next tier level for instructions on enabling test.
2000	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #111 Data Channel Local Loop Back Test (Contd)		
Error Code	Test Result	Description / Recommendation
2003	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
40 2000	FAIL	In the case of Error Code 40, the Local Loop Back Test failed because the data received over the connection did not match the data sent over the connection (data was corrupted). In the case of Error Code 2000, the Local Loop Back Test failed because the data looped over the connection was not received (data was lost). 1) Determine which of the DATA-CHLs is in use for some other function (that is, SMDR Link, Journal Printer Link, PMS Link, or secondary SAT connection) as described previously in Status of Network Control Data Channels section. 2) The most likely problem is that the target DATA-CHL or the DATA-CON is defective. • Busyout all functions that are using the Network Control DATA-CHLs. Note: All functions must be busied out because Test #107 is destructive and will terminate all established connections over the DATA-CHLs. • Issue the test data-module <ext> long command for the target DATA-CHL. Note the test results for Tests #107 and #108. a) If the result of Test #107 is FAIL, then the TN727 Network Control circuit pack is defective. 1. Replace the Network Control circuit pack immediately. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. II. Repeat the test.

Test #11 Data Channel Local Loop Back Test (Contd)		
Error Code	Test Result	Description / Recommendation
		b) If the result of Test #107 is PASS and the result of Test #108 is FAIL, then the DATA-CON is defective. 1. Although all DATA-CHLs are unusable, the SW-CTL is still operational. Based on the customer's use of DATA-CHLs, replace the Network Control circuit pack at the customer's convenience. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. II. Repeat the test. c) If the result of Test #107 is PASS and the result of Test #108 is PASS, then the target DATA-CHL is defective. 1. Issue the remove data-module <ext> command for the target DATA-CHL to remove it from operation. II. Replace the Network Control circuit pack at your earliest convenience. After the Network Control circuit pack has been replaced, its Time-of-Day clock must be set using the set time command. 3) Restore any busied out SMDR, Journal Printer, or PMS Link to service before moving on to another activity.
	PASS	The target DATA-CHL and DATA-CON are functioning. Connections can be established over the target DATA-CHL.

DATA-CON (Network Control Data Channel Control)

MO Name As It Appears In Alarm Log	Alarm Level	initial Craft Command To Run (a)	Full Name Of MO
DATA-CON	MINOR	None	Network Control Data Channel Control

The TN727 Network Control circuit pack contains the following maintenance objects: the SW-CTL (Switch Control), four DATA-CHLs (Network Control Data Channels), the DATA-CON (Network Control Data Channel Control), and the generic hardware that interfaces with the TDM Bus (DATA-BD). The DATA-CON is the subject of this section. The DATA-CHLs are also described.

Together the four DATA-CHLs and the DATA-CON provide a data communications interface that allows data terminal equipment connected to port circuit packs to communicate with software applications running on the System 75. The DATA-CON represents the interface to the control channel of the TDM Bus. Each DATA-CHL represents a dial-up/dial-out asynchronous communication port that interfaces to the TDM Bus. The DATA-CON supports the signaling required to establish and tear down a connection between the terminal equipment and a software application. Data is transported between the terminal equipment and the software application over the connection established over the DATA-CH L. See Figure 6-12.

From an external (user) point of view, the DATA-CON is not directly accessible via a Craft command, that is, there is no object command word that represents it. Instead, the DATA-CON is tested under the guise of the DATA-CHLs that it controls. The test data-module <ext> [short | long] command tests the DATA-CON along with the DATA-CHL designated by <ext> but all Test Results are associated with the DATA-CHL maintenance name

From an internal (system software) point of view, the DATA-CON uses the same set of tests as the DATA-CHLs. Therefore, the DATA-CON will assume the same Error Type and Aux Data values as the DATA-CHLs in the Hardware Error Log. It will also be alarmed at the same Alarm Level (that is, MINOR, ON BOARD) in the Alarm Log. In both logs, the maintenance name is DATA-CON.

Figure 6-12 illustrates the logical decomposition of DATA-CHLs and the DATA-CON into software and hardware components. It also shows the interface to the switch software via the memory bus and to terminal equipment via the TDM Bus and port circuit packs.

As indicated in the figure, DATA-CHLs 1 and 2 share a common Dual Port RAM (DPR) and TDM Bus interface hardware and DATA-CHLs 3 and 4 share a common DPR and TDM Bus interface hardware. Thus, if DATA-CHL 1 is defective, then DATA-CHL 2 is likely to be defective and vice versa. Similarly, if DATA-CHL 3 is defective, then DATA-CHL 4 is likely to be defective and vice versa.

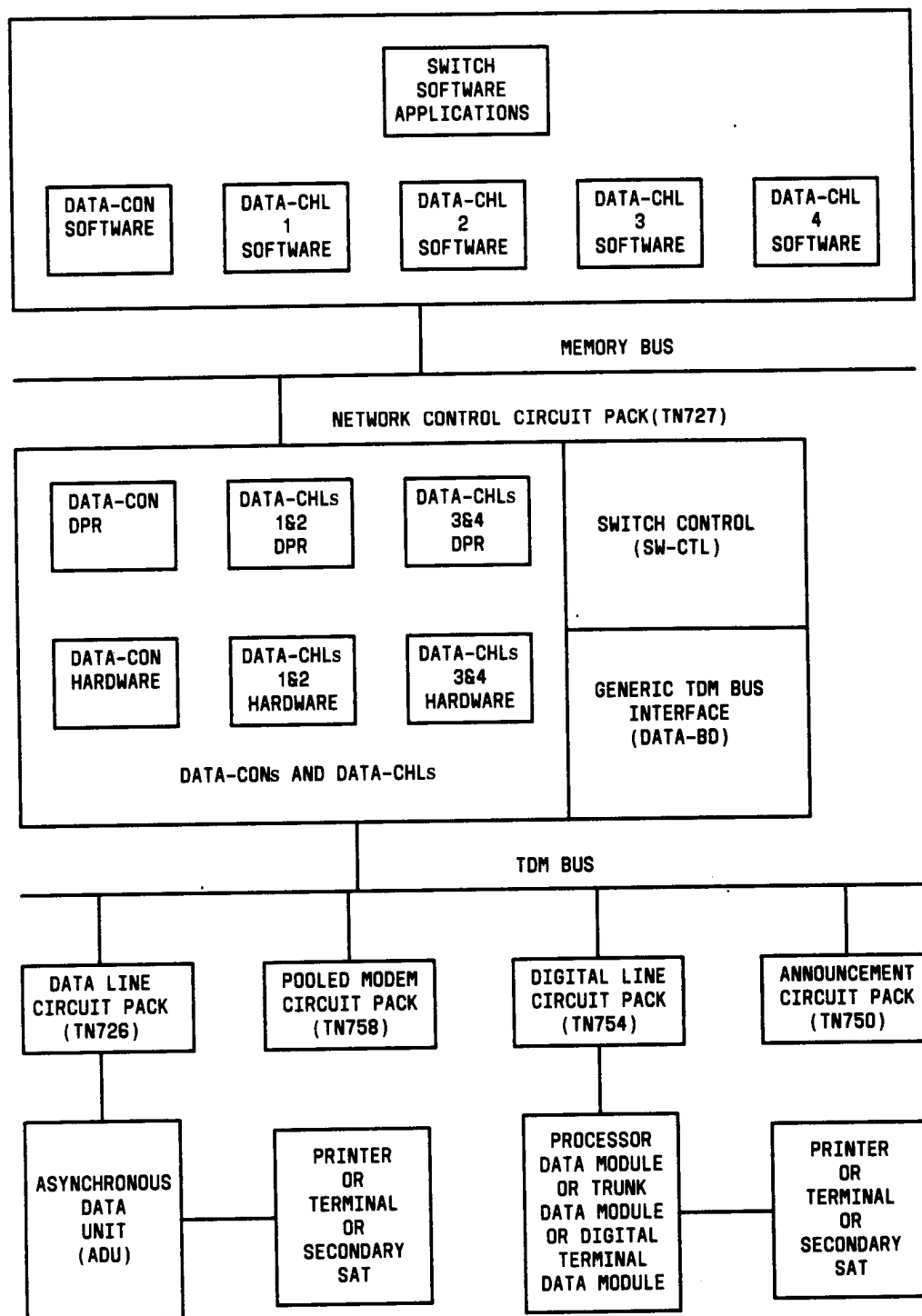


Figure 6-12. Data Channel Control (DATA-CON) and Data Channels (DATA-CHLs)

Hardware Error Log Entries and Test to Clear Values

Network Control Data Channel Control Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value (a)
0†	0	Any	Any	Any	None
1		Local Loop Back Test (#1 11)	MINOR	ON	None
257	Any	Remote Maintenance Loop Around Test (#1 09)	MINOR	ON	None
513		Crosstalk Test (#1 10)	MINOR	ON	None
769	Any	Dual Port RAM Test (#1 08)	MINOR	ON	None

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) As previously described, the DATA-CON is not directly accessible via a Craft command so there is no Test to Clear value that can be used to directly clear errors and alarms raised against the DATA-CON. However, since the DATA-CON and the DATA-CHLs share the same set of tests (that is, test the same set of hardware, firmware, and software), DATA-CON errors and alarms will be accompanied by DATA-CHL errors and alarms.

Therefore, the strategy to clear DATA-CON errors and alarms is to first clear all DATA-CHL errors and alarms. After DATA-CHL errors and alarms have been cleared, allow approximately 60 minutes for maintenance software to run internally and to automatically clear the DATA-CON errors and alarms.

Craft-Demanded Tests: Descriptions and Error Codes

Since the DATA-CON uses the same set of tests as the DATA-CHLs, refer to the Craft-Demanded Tests: Descriptions and Error Codes in the DATA-CHL (Network Control Data Channel) maintenance for a description of the tests and their associated error codes.

DAT-LINE (Data Line Circuit Port), DT-LN-BD (Data Line Circuit Pack)

MO Name As H Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
DAT-LINE	MINOR	test port CSSpp I	Data Line Circuit Port
DT-LN-BD	MINOR (b)	test board CSSpp I	Data Line Circuit Pack

Notes:

- (a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, etc.); and pp is the 2-digit port number (for example, 01).
- (b) If there are any errors associated with the Data Line circuit pack, refer to the XXX-BD (Common Port Board) maintenance documentation.

Data Line Circuit Port Maintenance

The TN726 Data Line circuit pack is a port circuit that provides connectivity from System 75 to asynchronous customer-provided equipment (CPE) having RS232-compatible serial interfaces. There are eight Data Line Circuit Ports on the Data Line circuit pack. If errors are associated with the Data Line circuit pack (DT-LN-BD), refer to the XXX-BD (Common Port Board) maintenance procedures.

Data Line Circuit Ports are administered via the SAT add data-module command. The data module type is data-line. The SAT list data-module command will list all administered data modules in the system.

The TN750 Announcement circuit pack has one Data Line Circuit Port on it. The Data Line Circuit Port is used for saving and restoring announcements. For a description of this feature, refer to ANN-BD (Announcement Circuit Pack) maintenance documentation. Also, if there are errors associated with the Announcement circuit pack, refer to the ANN-BD (Announcement Circuit Pack) maintenance documentation.

Note: If the tests for the Data Line Circuit Port in question pass and there are still user-reported problems, then there is probably an external problem. Test the asynchronous data unit (ADU), following the procedures outlined in *USER MANUAL 23A ASYNCHRONOUS DATA UNIT, 555-401-701*. If the ADU appears to be working properly, then check the external wiring, and finally the customer equipment.

Hardware Error Log Entries and Test to Clear Values

Data Line Circuit Port Error Log Entries					
Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
1		Digital Loop Around Test (#171)	MINOR	ON	test port CSSpp s r 2
15(a)	Any	Audit Update Test (#36)			
18	0	The port was busied out	WARNING	OFF	release port CSSpp
257		Conference Circuit Test (# 7)	MINOR	ON	test port CSSpp l r 2
513		NPE Crosstalk Test (# 6)	MINOR	ON	test port CSSpp l r 2
769 b)	40983	None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This is a software audit error that does not indicate any hardware malfunction. Run short test sequence and investigate any associated errors (if any).
- (b) This error is logged when the Data Line circuit pack finds an error with the transmit/receive circuitry of an administered Data Line Circuit Port on circuit pack insertion. Reseat the circuit pack. If this error still occurs, replace the circuit pack.

Craft Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Digits/ Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Digital Loop Around Test (#1 71)	x	x	ND
NPE Crosstalk Test (#6)		x	ND
Conference Circuit Test (#7)		x	ND
Audit Update Test (#36)	x	x	ND

- D = Destructive
- ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use status data-module to determine when the port is available for testing. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port has been seized by a user for a valid call. Use status data-module to determine when the port is available for testing. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1020	ABORT	The test did not run due to an already existing error on this port (error type 769). 1) Reseat the circuit pack and look in the Error Log. If error type 769 still occurs on this port, replace the circuit pack.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests, examining the ADU, external wiring, and customer equipment.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The Conference Circuit Test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a tone detector port. If the level of the tone is within a certain range, the test passes.

Test #7 Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use status data-module to determine when the port is available for testing.
1004	ABORT	The port has been seized by a user for a valid call. Use status data-module to determine when the port is available for testing. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1020	ABORT	The test did not run due to an already existing error on this port (error type 769). 1) Reseat the circuit pack and look in the Error Log. If error type 769 still occurs on this port, replace the circuit pack.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
Any	FAIL	The NPE of the tested port did not conference the tones correctly. This will cause noisy and unreliable connections. 1) Replace circuit pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests, examining the ADU, external wiring, and customer equipment.

Audit Update Test (#36)

This audit makes sure that the hardware state of the Data Line Circuit Port is consistent with the system translations. When this audit is run, the port is queried for the switchhook state, and the software state is updated according to the returned value. Also, the data line options are sent down to the port.

Test #36 Audit Update Test		
Error Code	Test Result	Description / Recommendation
1006	ABORT	The test did not run due to an already existing error on this port (error type 769). 1) Reseat the circuit pack and look in the Error Log. If error type 769 still occurs on this port, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test.
7	ABORT	Internal System Error
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	The hardware port state is consistent with the software state. User-reported troubles on this port should be investigated using other port tests, examining the ADU, external wiring, and customer equipment.

Digital Loop Around Test (#171)

The Digital Loop Around Test checks the Data Line Circuit Port's ability to transmit and receive data on the TDM Bus. Data is sent through Network Control Data Channel 3 (data channel port 3) over the TDM Bus, internally looped through the Data Line Circuit Port back onto the TDM Bus, and received again by Network Control Data Channel 3.

If data channel 3 is in use or not administered, this test will abort. This test may fail if Network Control Data Channel 3 is not functioning properly [if there are any DATA-CHL errors in the Error Log, refer to the DATA-CHL (Network Control Data Channel) maintenance documentation to clear them up first]. This test will pass regardless of any customer equipment that might be connected to the port, as long as the port is not in use by the equipment.

Test # 171 Digital Loop Around Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use status data-module to determine when the port is available for testing. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1005	ABORT	. Network Control Data Channel 3 is not administered. This port is required to run this test. 1) Verify that data channel 3 is not administered with the list data-module command. Administer data channel 3 with the add data-module command, and run this test again. 2) If data channel 3 is administered and the test continues to abort, escalate the problem.
1016	ABORT	Network Control Data Channel 3 is busy. The port may be in use on a valid call. Use status data-module to determine when the port is available for testing. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #171 Digital Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1020	ABORT	The test did not run due to an already existing error on this port (error type 769). 1) Reseat the circuit pack and look in the Error Log. If error type 769 still occurs on this port, replace the circuit pack.
2003	ABORT	Failed to receive an off-hook from the Data Line Circuit Port. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, reset the circuit pack and run Test #171 again. 3) If the test still aborts, replace the circuit pack.
2004	ABORT	Failed to receive an off-hook from the Network Control Data Channel. 1) Look for DATA-CHL errors in the Error Log. If present, refer to DATA-CHL (Network Control Data Channel) maintenance documentation. ‘ 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
2005	ABORT	The handshake between the data channel and the data line port failed. 1) Look for DATA-CHL errors in the Error Log. If present, refer to DATA-CHL (Network Control Data Channel) maintenance documentation. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, reset the circuit pack and run Test #171 again. 4) If the test still aborts, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #171 Digital Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
	FAIL	The test failed because the data received did not match the data sent. This indicates that there is a fault somewhere in the transmit/receive path to the TDM Bus, which will probably result in data corruption over this port. This test may fail if Network Control Data Channel 3 is not functioning properly. 1) Look for DATA-CHL errors in the Error Log. If present, refer to DATA-CHL (Network Control Data Channel) maintenance documentation and resolve the problem. 2) Repeat Test #171. 3) If the test fails again, replace the Data Line circuit pack.
2000	FAIL	The test failed waiting for the transmitted data to be looped back. 1) Look for DATA-CHL errors in the Error Log. If present, refer to DATA-CHL (Network Control Data Channel) maintenance documentation and resolve the problem. 2) Repeat Test #171. 3) If the test fails again, replace the Data Line circuit pack.
	PASS	The port can correctly transmit/receive data. User-reported troubles on this port should be investigated by examining the ADU, external wiring, and customer equipment.

DC-POWER (XE Power)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
DC-POWER	MAJOR	test environment	XE Power

The DC-POWER maintenance object represents all the environmental maintenance for an XE system. It includes AC Power and all the Carrier Port Power Supplies in the port network. If the hardware detects a problem with any one of these elements, it reports the information to the system software through a single lead. The system software cannot differentiate between different environmental failures.

If there is an active DC-POWER alarm, but the system is functioning normally with limited capability, there may be one or more port carriers that has lost power. (This can be checked by using the list config all command which will show "no board" for all circuit packs on those carriers.) In this case, check for power supply problems on these carriers and take corrective action.

Note: If a Carrier Port Power Supply is physically removed from a carrier in a single-carrier cabinet system, there will not be a DC-POWER alarm. Removal of the Carrier Port Power Supply is equivalent to the carrier that is physically not there. These two situations cannot be distinguished by the DC-POWER maintenance.

An XE system has minimal Nominal Power Holdover (NPH). For a complete description of NPH, refer to the AC-POWER (AC Power) maintenance documentation. NPH provides full powering for 1/4 of a second and power to the control complex for an additional 2 minutes.

Hardware Error Log Entries and Test to Clear Values

XE Power Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test environment s
513	0	XE Power Query (#5)	MAJOR	ON	test environment r 2

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *XE Power Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
XE Power Query Test (#5)	x	x	ND
Emergency Transfer Query Test (#1 24) (a)	x	x	ND
External Alarm Lead Query Test (#1 20) (b)	x	x	ND

* D = Destructive
ND = Non-destructive

- (a) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a description of this test.
- (b) Refer to EXT-DEV (External Alarm Lead) maintenance documentation for a description of this test.

XE Power Query Test (#5)

This test queries the Maintenance/Tape Processor (MAINT) about the status of the XE Power in an XE system. This test can only detect power problems in carriers in the port network for which the Carrier Port Power Supply is physically present.

Test #5 XE Power Query Test		
Error Code	Test Result	Description / Recommendation
	ABORT	System resources required to run this test are not available or response to the test request was not received within the allowable time period or Internal System Error. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	There is currently a problem with the environment of the XE system. 1) The power supply to any one of the carriers may have been lost. a) Verify, and if necessary restore, AC power at the wall outlet for each carrier. b) Rerun the test. If the test still fails, proceed to Step 2. 2) One of the WP-91 153 power units for one of the carriers may be defective. a) If a WP-91 153 power unit does not have its yellow status LED on, then replace the power unit. b) The system will perform a Cold II restart after the power supply is replaced. Wait for the Cold II restart to finish (the login prompt will appear on the SAT). c) Rerun the test. If the test still fails, proceed to Step 3. 3) The Maintenance/Tape Processor (MAINT) may be incorrectly reporting this error. Resolve all alarms on these MOs, and rerun the test. If the test still fails, follow normal escalation procedures.
100	FAIL	The switch currently has an XE Power problem. 1) Follow the repair steps outlined for error code 1.
	PASS	The Maintenance/Tape Processor (MAINT) has reported no problem with the XE Power.

DID-TRK (DID Trunk), DID-BD (DID Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
DID-TRK	MINOR	test port CSSpp I	DID Trunk
DID-TRK	WARNING	None	DID Trunk
DID-BD	MINOR (b)	test port CSSpp s	DID Circuit Pack

Notes:

- (a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . etc.); and pp is the 2-digit port number (for example, 01).
- (b) Some of the alarms that are logged due to DID test failures may be related to circuit pack problems that are reported during common circuit pack testing phase. Refer to the XXX-BD (Common Port Board) maintenance documentation.

Direct Inward Dial (DID TN753) trunks, coming from the Central Office (CO), allow outside parties to call directly to an extension in System 75. The DID trunk circuit pack supports eight incoming-only ports. Each port provides an interface between 2-wire analog line from the CO and the System 75. The DID port will receive three to five digits from the CO which will be used to directly connect an outside caller to the called station without assistance from an attendant.

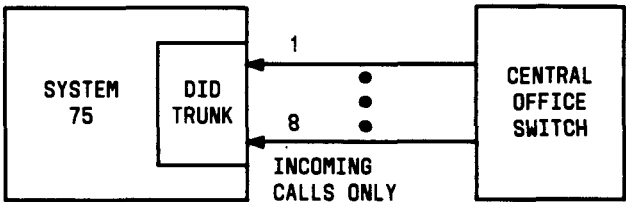


Figure 6-13. DID Trunk Interactions

For each call, the CO switch signals System 75 by opening and closing individual DID loops (one of the eight ports) and causing the starting or stopping of loop current.

A DID trunk operation involves three significant aspects:

1. Transmission—deals with the interface requirements regarding all AC signals. Transmission includes gain, analog to digital encoding, and digital to analog decoding.
2. Signaling—involves interpretation of DC signals appearing on Tip and Ring to and from the CO. These signals include off-hook, on-hook, and dial pulse detection.
3. Switch Connection—involves the connection between the trunk circuitry and the TDM Bus of System 75. It operates the time slot connection to the TDM Bus.

Four tests are implemented to diagnose the health of a DID trunk. All of them test on-board circuitry only. They are:

1. **Loop Around and Conference Circuit Test**—verifies the “transmission operation” of the circuit pack. It verifies that signals are transmitted to and from each port (loop around within the port) and tests the conference capabilities of all ports.

This test may fail due to noise induced by adjacent electric power lines. Customers having this problem should resolve it with their local power company. To temporarily alleviate the alarm caused by the failure of this test, the test may be disabled from trunk administration Test field (this also disables the Port Diagnostic Test).

2. **NPE Crosstalk Test**—verifies the “switch connection” operation of the circuit pack. It verifies that the trunk circuitry only talks on the selected time slot on the TDM Bus, and never crosses over to time slots reserved for other connections.
3. **Port Diagnostic Test**—the battery feed circuitry is tested for switchhook detection.
4. **Port Audit Update Test**—updates the DID translation information on individual ports of the DID trunk. The port translation data consists of signaling parameters whose values depend on the CO switch connected to the trunk. These parameters include:
 - wink (signal indicating PBX is ready to receive digits) or immediate start,
 - dial tone or rotary dialing trunk,
 - rotary dialing inter-digit timing,
 - network balance R/RC, and
 - disconnect timing.

Additional in-line testing is performed while a call is in progress, thus in-line errors may occur during operation. See Loop Around and Conference Circuit Test (#33) for a description of these errors. These errors may be reproduced by using the trunk (making a call) and checking their occurrence in the Hardware Error Log.

Problems detected during signaling may be caused by faults off-board (in the CO switch or connections) for which a warning alarm is raised.

Before a maintenance test can be run on a port, the port must be idle. If an incoming call seizes the port which is being tested by maintenance, the test will be aborted and the incoming call will proceed.

For transmission and signaling standard specification, refer to the Digital PBX Standard document RS-4648.

Hardware Error Log Entries and Test to Clear Values

DID Trunk Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
0(a)	0	None	WRN	ON	
1(b)	16384	None	WRN	OFF	
(c)	57476	None	WRN	OFF	
(d)	57477	None	WRN	OFF	
(e)	57483	None	WRN	OFF	
15	Any	Audit Update (#36)	None		s r 1
18	0	busyout trunk <grp/mbr>	WRN	OFF	release trunk <grp/mbr>
257(f)	57472	None	WRN	OFF	
(g)	57473	None	WRN	OFF	
(h)	57474	None	WRN	OFF	
(i)	57475	None	WRN	OFF	
513(j)	57392	None	MIN	OFF	
510(k)	57393	None	None		
769		Port Diagnostic (#35)	MIN	ON	s r 3
1025		Loop Around and Conference (#33)	MIN	ON	l r 3
1281		NPE Crosstalk (#6)	MIN	ON	l r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

A common trouble on DID trunks which reports no errors or alarms occurs when the CO busies out the port (disconnects port). This situation occurs when the CO thinks there are problems with the DID port. In this case, no incoming calls will be possible through this port. This problem can be diagnosed (other than outside callers unable to call in complaints) by listing measurements on lightly used trunks. If a particular port is detected as not being used, a call to the CO will be necessary to get the connection back in service.

(a) Circuit pack was alarmed without logging errors. The system is unable to communicate with the circuit pack. The possible causes include: a circuit pack failure, TDM Bus corruption, or the circuit pack is removed. For more information related to this problem, refer to theXXX-BD (Common Port Board) errors.

(b) Digit time-out—This condition occurs when the tone detector times out waiting for digits.

1. Verify trunk administered wink/immediate-start and rotary/tone-dial parameter.
2. Test the trunk by using BUTT set.

3. Refer problem to CO.
- (c) Rotary dial before wink—This occurs when the CO starts dialing before the PBX sends wink on a wink-start trunk.
1. Verify trunk administered wink/immediate-start parameter."
 2. Refer problem to CO.
- (d) Rotary dial too early—This occurs when the CO starts dialing too soon after seizure on an immediate-start trunk.
1. Verify trunk administered wink/immediate-start parameter.
 2. Refer problem to CO.
- (e) Rotary dial pulse during wink—This occurs when the CO sends rotary dial digits too soon . after seizure on a wink-start trunk.
1. Verify trunk administered wink/immediate-start parameter.
 2. Refer problem to CO.
- (f) Rotary dial break too long—Rotary dial pulse on-hook longer than 105 msec.
1. Test the trunk by performing an incoming test call.
 2. Refer problem to CO.
- (g) Rotary dial break too long—Rotary dial rate is below 8 pulses per second.
1. Verify trunk administered interdigit-timing parameters.
 2. Refer problem to CO.
- (h) Rotary dial break too short—Rotary dial rate is above 12 pulses per second.
1. Verify trunk administered interdigit-timing parameters.
 2. Refer problem to CO.
- (i) Digit detection (Interdigit time too short)—CO is starting new rotary dial digit within 150 msec of previous digit.
1. Verify trunk administered interdigit-timing parameters.
 2. Refer problem to CO.
- (j) Loop current active—CO not releasing trunk after PBX disconnect. Occurs when the PBX end drops first and the CO does not release the trunk within 4 minutes.
1. Verify the interface to the network with a hand voice terminal set. If calls are placed correctly, then refer problem to the CO.

2. If unable to place calls or this equipment is not available, check the status on port by using the trunk status command. If active but not connected, disconnect bridging clips at the network interface. Check status on the trunk; if trunk goes idle, then replace clips. If the trunk is still active but unable to place calls, refer problem to the CO.
- (k) Late CO trunk release—This event only occurs after the occurrence of error type 513. The CO released the trunk 4 minutes after the PBX dropped the call. This event decrements the severity (error count) of error type 513, or may mean the problem related to error type 513 has been fixed.

1—Verify that error type 513 does not occur again. Refer to Error 513.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *TRK NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
TRK NPE Crosstalk Test (#6)		x	ND
TRK Port Diagnostic Test (#35)	x	x	ND
TRK Loop Around and Conference Circuit Test (#33)		x	ND
TRK Port Translation Update Test (#36)	x	x	ND

* D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is active but the port is not in use (no calls), then check the Error Log for error type 513 (see Loop Around and Conference Circuit Test for description of this error and required actions). The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. This problem may be caused by bad tone detectors. 1) Test all tone circuit packs, and solve any errors on these circuit packs before any action is taken on the DID circuit pack. 2) Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and examining station, trunk, or external wiring.

Loop Around and Conference Circuit Test (#33)

This test checks the reflective and non-reflective loop around and conference capabilities of a DID port circuit. The test uses 404-Hz, 1004-Hz, and 2804-Hz tones. This is an on-board test only, each tone is separately transmitted to and from the port (loop around within the port) and checked.

This test may fail due to noise induced by adjacent electric power lines. Customers having this problem should resolve it with their local power company. To temporarily alleviate the alarm caused by the failure of this test, the test may be disabled from trunk administration Test field [this also disables the Port Diagnostic Test (#35)].

Test # 33 Loop Around and Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is active but the port is not in use (no calls), then check the Error Log for error type 513. The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.

Test #33 Loop Around and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states). You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via software patch.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #33 Loop Around and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
3	FAIL	The non-reflective 1004-Hz tone test failed, echo was detected from the port. The port may still be operational, or the problem may be off-board.
7	FAIL	The conference capabilities of the port failed. The port may still be operational, or the problem may be off-board (connections or co).
129	FAIL	The reflective 404-Hz tone test failed, poor quality transmission was detected to or from the port. The problem may be off-board.
131	FAIL	The reflective 1004-HZ tone test failed, poor quality transmission was detected to or from the port. The problem may be off-board.
133	FAIL	The reflective 2804-Hz tone test failed, poor quality transmission was detected to or from the port. The problem may be off-board. 1) To make sure the problem is on-board, disconnect port from the CO and retry test. Do this in coordination with the CO, or do it after busy hours; otherwise, the CO may put the connection out-of-service. 2) If retry fails, replace the circuit pack. 3) If retry passes and no troubles have been reported, then disable the test. If retry passes and troubles have been reported, refer problems to the CO. Note: This test may fail due to noise induced by adjacent electric power lines. Customers having this problem should resolve it with their local power company. To temporarily alleviate the alarm caused by the failure of this test, the test may be disabled from the trunk administration test field (this also disables the Port Diagnostic Test).
	PASS	DID trunk Loop Around and Conference Test is successful. This port is functioning properly. 1) If users are reporting troubles, examine loop connections to the port and refer problem to the CO.

Port Diagnostic Test (#35)

This test checks a port's battery feed circuitry. The battery feed circuitry is tested for on/off-hook detection, battery shut down, and battery reversal (WINK) capabilities.

Test #35 Port Diagnostic Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem,
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states). You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is active but the port is not in use (no calls), then check the Error Log for error type 513. The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.

Test #35 Port Diagnostic Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 5 for a full description of all possible states). You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via administration. 1) Escalate the problem to the next tier level.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	F A I L	Battery feed test failed. This port is out-of-service. 1) Replace circuit pack.
	PASS	Current flow was detected for this port. 1) User-reported troubles on this port should be investigated using other port tests and examining connections. 2) Refer problem to the CO.

Port Audit Update Test (#36)

This test will send updates of the DID port translation for all ports on the circuit pack that have been translated. The update is non-disruptive and guards against possible corruption of translation data contained on the circuit pack. No response message is expected from the circuit pack once it receives translation updates. The port translation data includes: wink or immediate start trunk, dial tone or rotary dialing trunk, rotary dialing inter-digit timing, network balance R/RC, and disconnect timing.

Test #36 Port Audit Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1006	ABORT	The port is in out-of-service state. This test cannot be run. 1) Retry the command once the port is in service.
2100	ABORT	Could not allocate the necessary system resources to run the test.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If test continues to fail, escalate the problem.
	PASS	This test passed. Translation information was successfully updated on the circuit pack. 1) If signaling troubles are reported (error types 1, 257, or 513 in Error Log), verify translation information for this Port. 2) Refer-problem to the CO.

DIG-LINE (Digital Station), DIG-BD (GPP Circuit Pack)

MO Name As H Appears In Alarm Log	Alarm Level	Initial Craft Command To Run(a)	Full Name Of MO
DIG-LINE	MINOR	test port CSSpp l	Digital Station
DIG-LINE	WARNING	test port CSSpp s	Digital Station
DIG-BD	MINOR (b)	test board CSS s	GPP Circuit Pack

Notes:

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . etc.); and pp is the 2-digit port number (for example, 01). ,

(b) Refer to the XXX-BD (Common Port Board) maintenance documentation.

The Digital Line circuit pack is a port circuit pack that supports eight digital ports, each port having two logical information channels (primary information channel, and secondary information channel). Digital voice terminals always communicate on the primary information channel. Thus, there can only be one digital voice terminal per physical port (therefore, at most eight digital voice terminals per circuit pack).

Only the TN754 Vintage 14 or later circuit pack can be used in out-of-building applications.

If the secondary logical channel is to be used at all, it must be used for a DTDM (Digital Terminal Data Module). A DTDM is used to connect a data terminal to the secondary information channel. All other devices that can currently be served by the Digital circuit pack communicate on the primary information channel.

Figure 6-14 illustrates one physical connection (solid line) between a Digital circuit pack and a voice terminal and DTDM. Each physical connection allows for two information channels, as stated above, plus one signaling channel. Each Digital Line circuit pack can support up to eight of these PHYSICAL connections to different voice terminals (and DTDMs if available).

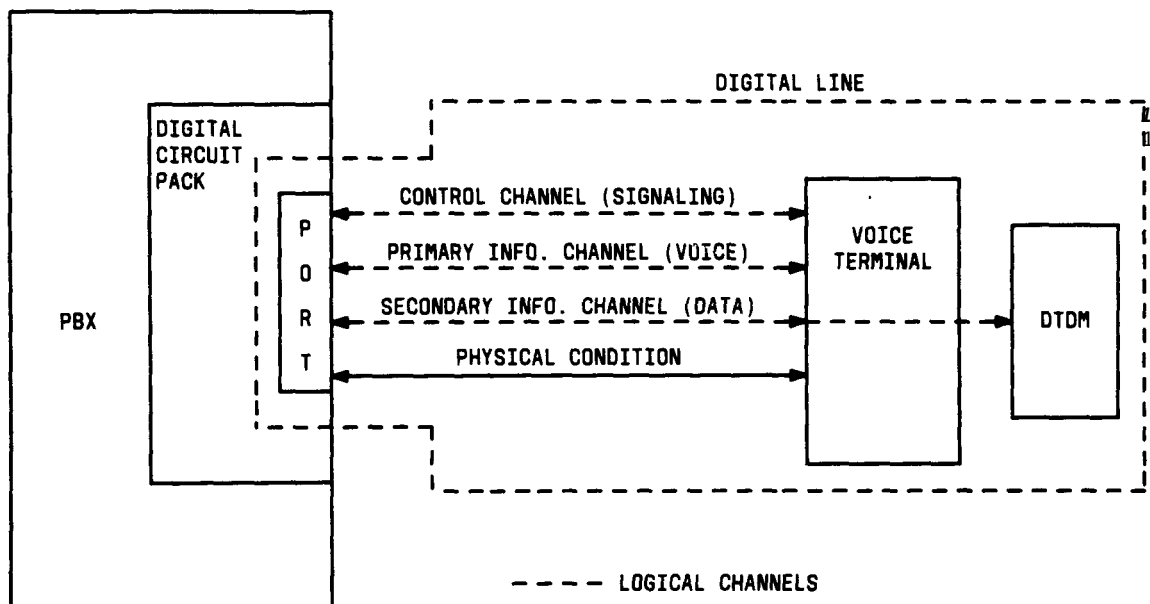


Figure 6-14. Digital Station Interactions

Please note that this section is referring only to the Digital Line maintenance that is performed, and that the Digital Line maintenance is closely related to, and interacts with, the Digital circuit pack maintenance in some instances. Some of the results of maintenance testing of the Digital Line may be affected by the “health” of the Digital circuit pack. This interaction should be kept in mind when investigating the cause of reports of Digital Line problems.

There are instances in this section where the service state of a station is mentioned. It is helpful to understand what is meant by the different service states that may exist. An explanation of these service states follows:

- **Out of Service**—The port, and thus the station, have been removed from service. A busy-out of a port would cause it to be out-of-service.
- **Ready for Service**—Once a port on the circuit pack has been put into service, the voice terminal must communicate that it is present. The time between these two events is the time when the terminal is in the ready-for-service state.
- **In Service**—Once the system has received a message from the voice terminal communicating that it is present, the station is put into the in-service state. The terminal can also be forced into the in-service state if it goes off-hook while it is in the ready-for-service state.

Hardware Error Log Entries and Test to Clear Values

Digital Station (DIG-LINE) Error Log Entries					
Type	Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
0(a)	0	None			
1(b)	40987	None	WARNING	OFF	
1(c)	1220	None	WARNING	OFF	
15(d)	Any	None			
18(e)	0	busyout port Ccsspp	WARNING	OFF	release port CSSpp
257(f)	40971	None			
513	0	Station (Digital) Audits (#1 7)			test port CSSpp s r 6
767(g)	40964	None			
769(h)	40963	None	WARNING	OFF	
769(h)	40988	None	WARNING	OFF	
1281		Station (Digital) Audits (#1 7)	WARNING	OFF	test port CSSpp s r 4
		None	WARNING	OFF	
1793		Voice & Ctrl. Local Loop (#13)	MINOR	ON	test port CSSpp l r 3
2049		NPE Crosstalk (#9)	MINOR	ON	test port CSSpp l r 3
2305(j)	32770	None			
2305(k)	40967	N o n e			
3840(l)	40965 41029				

†† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error code appears in the Error Log only if the Digital port circuit pack has been removed since the Error Log was last cleared. Make sure that the circuit pack has been re-inserted.
- (b) Could experience a noisy port or link. This is an off-board problem detected by the port circuit. Check for faulty wiring or a defective voice terminal, or move voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired after a pre-determined amount of time.
- (c) This error type and aux data will occur when at least 15 off-board problems have been detected with the link to the terminal. When an error with the link is detected, an on-board counter is incremented. The aux data will contain the value of this counter divided by 15. The user could experience a noisy port or link. This is an off-board problem detected by the port circuit. Check for faulty wiring or a defective voice terminal, or move voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired after a pre-determined amount of time.

- (d) This is an internal type error that occurs when an audit request fails. The aux data (i) is the internal id of the maintenance object that failed.
- (e) This error type is logged when the port in question is busied out by maintenance personnel. Make sure port is released from busy out.
- (f) Problems transmitting to the voice terminal. This is usually an on-board problem and can be ignored if no user complaints are received.
- (g) This is an in-line event that produces this error type when a favorable response is received from running the Electronic Power Feed Test (#1 1). No craft action is necessary. This alarm will be resolved with the passing of time.
- (h) This error type is a result of an unfavorable response to the Electronic Power Feed/ Positive Temperature Coefficient Test (#1 1). For aux data 40988, this error type indicates that the EPF/PTC circuit has been turned off due to an overcurrent condition. For a TN754 Vintage 13 or earlier, the EPF circuit senses an overcurrent condition at the voice terminal.

1. Check for a short in the wiring, a damaged jack, an incorrect type of voice terminal, or a defective voice terminal.

For a TN754 Vintage 14 or later and a TN784, the PTC will open if there is a short on the power line for 1/2 second or longer. The voice terminal is probably not operating properly.

1. Unplug the voice terminal for 30 seconds and then plug the terminal back in.
2. If the voice terminal still does not operate, then check for a short in the wiring, a damaged jack, an incorrect type of voice terminal, or a defective voice terminal. Once the problem has been resolved, the alarm will be retired after a pre-determined amount of time.
3. If the problem cannot be resolved by one of the steps above, then replace the circuit pack.

- (i) An in-line maintenance error has generated an off-board warning due to some problem with the link to the voice terminal. This can be ignored if no user complaints are received. Otherwise, make sure the voice terminal is connected, check for faulty wiring, check for a defective voice terminal, and move voice terminal to a jack that is closer to the switch (in terms of feet of wiring between the jack and the switch). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired after a pre-determined amount of time.
- (j) This indicates that the station went off-hook while it was in the ready-for-service state. Use the status station command to determine the state of the station. The off-hook should have moved the station to ready-for-service. No craft action is necessary.
- (k) This is the resulting code that is generated when the link between the circuit pack and the voice terminal is successfully reset. No craft action is necessary.
- (1) No terminal hooked up to the Digital circuit pack. No maintenance action is necessary.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Voice and Control Channel Local Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Voice and Control Channel Local Loop Around Test (#1 3)		X	ND
Digital Line NPE Crosstalk Test (#9)		X	ND
Digital Line Electronic Power Feed/Positive Temperature Coefficient Test (#1 1)		X	ND
DIG-LINE Station Lamp Updates Test (#1 6)	X	X	ND
Station (Digital) Audits Test (#1 7)	" X	X	ND

* D = Destructive

ND = Non-destructive

Digital Line NPE Crosstalk Test (#9)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is part of a port's long test sequence and takes about 20 to 30 seconds to complete. Crosstalk testing is performed on both the primary information channel (voice) and the secondary information channel (data) associated with each digital station port. If this test fails on either channel, the station and the DTDM are taken out-of-service.

Test #9 Digital Line NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
2	ABORT	During testing of DTDM, system resources may not have been available. Also, the port may have been busy during the test. 1) Check if port is being used. Disconnect, if possible, by toggling. Disconnect button on DTDM. See Warning. Retry command after 1 minute. Warning: This will drop the call in progress. 2) If the test continues to abort after 5 times, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary resources for this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #9 Digital Line NPE Crosstalk (Contd)		
Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to "abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #9 Digital Line NPE Crosstalk (Contd)		
Error Code	Test Result	Description / Recommendation
1020	ABORT	Test disabled via background testing. Use status station to determine when station is available for testing.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
ANY	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. This problem may be caused by bad tone detectors or tone generators. 1) Look for TTR-LEV errors in the Error Log. If present, refer to the TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to the TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to fail, escalate the problem.
	PASS	The port is correctly using its allocated time slots. 1) To be sure that this is not an intermittent problem, repeat this test up to a maximum of 10 times to make sure it continues to pass. 1) To be sure that this is not an intermittent problem, repeat this test up to a maximum of 10 times to make sure it continues to pass. 2) If complaints exist, examine the station, connections, and wiring.

Digital Line Electronic Power Feed/Positive Temperature Coefficient Test (#1 1)

For a TN754 Vintage 13 and earlier, this is an Electronic Power Feed Restoral Test. In this test the processor requests that the EPF be turned on for a given port. An attempt is made to turn on the power supply to the station. If no current is being drawn, this probably indicates that the station is not connected. If an overcurrent condition is sensed (that is, too much current is being drawn), this may indicate a short in the loop. Depending on what condition is sensed, a message is returned stating that either the EPF was turned on successfully with no problems or that an overcurrent condition is sensed. This test is repeated again 5 seconds later.

For a TN754 Vintage 14 or later, this is a Positive Temperature Coefficient Restoral Test. In this test the processor requests that the PTC be turned on for a given port and an attempt is made to turn on the power supply to the station. If an overcurrent condition is sensed, this probably indicates a short on the power line which will cause the PTC to open and disconnect the voice terminal. Since the PTC does not have a self-restoral capability, the voice terminal must be manually unplugged for 30 seconds and then plugged back in to restore the PTC. Depending on what condition is sensed, a message is returned stating that either the PTC was turned on successfully with no problem or that an overcurrent conditioned is sensed. This test is repeated again 5 seconds later.

Test #	11 Line	Electronic Power Feed/Positive Temperature Coefficient Test
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	1) Although this test will never return a FAIL result, after running this test the Error Log be checked for any entries with error types 767 or 769 to examine the real results. 2) If error type 767 appears in the Error Log, this should indicate that the test sensed no problems with the power to the station. To verify that the station is powered up correctly, run a self-test on the station, if available, and check that all the feature buttons are operating. 3) If error type 769 appears in the Error Log, this indicates some problem with the power to the station. The craft should check for a short in the wiring, a damaged jack, a defective voice terminal, or an incorrect type of terminal. The message to turn on the power to the station was successfully sent to the port.

Voice and Control Channel Local Loop Test (#13)

These on-board tests check the information and control channels between the SPE and the Digital Line port circuit. The SPE sends a message to loop around both the information and control channels for the port. First, the primary information (voice) Channel Loop Back Test is run. The test is performed by sending a digital count from the Tone/Clock circuit pack on the primary information channel time slot and receiving the same digital count with a general purpose tone detector.

While the primary information channel is still looped around, the Control Channel Loop Around Test is performed. This test consists of sending four different transparent patterns to the on-board microprocessor, receiving them back, and comparing them.

The Loop Around Test for the secondary information (data) channel is then performed. This test is the same as the primary information Channel Loop Around Test and is performed only if a DTDM is administered.

A Conference Test is done next for the primary information channel. This test is the same as Conference Test #6.

Only one value (Pass, Fail, or Abort) is generated as a result of four tests run. If any test fails or aborts, the sequence is stopped.

Test #13 Voice and Control Channel Local Loop Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #13 Voice and Control Channel Local Loop Test (Contd)		
Error Code	Test Result	Description / Recommendation
1001	ABORT	System resources required to run this test are not available. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for. TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to “determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #13 Voice and Control Channel Local Loop Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	FAIL	Conference Test failed on primary channel. In some cases, user may not notice disruption in service. In extreme cases, Conferencing feature may not work at all.
14	FAIL	The primary voice channel is not transmitting properly. User impact may range from noticing nothing to not being able to use this port.
15	FAIL	The control channel between the processor and digital circuit pack is not transmitting properly. User impact may range from noticing nothing to not being able to use the port. Could also be disruptive to other users.
16	FAIL	The secondary voice channel is not transmitting properly. User impact may range from noticing nothing to not being able to use this port. 1) Run circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack using the test board CSS short command. 2) Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3) If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Digital Line circuit pack.
	PASS	Voice and Control Channel Local Loop Test passed. All channels are transmitting properly. 1) To be sure that this is not an intermittent problem, repeat this test up to a maximum of 10 times to make sure it continues to pass. 2) If complaints still exist (noisy connections for voice, bad data for data transfer), examine the station, connections, and wiring.

DIG-LINE Station Lamp Updates Test (#16)

This test lights all lamps on the terminal as specified. The lamp updates will run only if the station is in-service. The status of the station is checked and the lamp updates are blocked from taking place if the station is not in the in-service state. This test does not affect the status of the message waiting lamp.

Test #16 DIG-LINE Station Lamp Updates Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1,3	ABORT	Station may be in ready-for-service or out-of-service state. 1) Use status station command to verify state of station. 2) Make sure the terminal is connected. 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station or status attendant command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 16 Dig-Line Station Lamp Updates Test (Contd)		
Error Code	Test Result	Description / Recommendation
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	1) Observe the station lamps being lit when running the test. If all lamps do not light successfully, the other Digital Line test results may indicate related problems that will not allow the lamps to light. 2) Investigate by using other Digital Line port tests, examine the station, wiring, and connections. The message to light all of the station lamps was sent to the port successfully.

Station (Digital) Audits Test (#17)

In this series of six tests, which are classified as status update, the SPE sends messages to the on-board microprocessor to perform the following tests:

- **Switchhook Inquiry**—This is an update of the SPE records according to the current state of the terminal. This inquiry is sent all the way to the voice terminal.
- **Bad Scan inquiry**—A message is sent uplink which contains a count that is generated due to certain events relating to the link conditions. This could be an indication of communications problems between the processor and digital port circuit pack.
- **EPF/PTC Inquiry**—For a TN754 Vintage 13 or earlier, the status of the Electronic Power Feed (EPF) is sent uplink. Possible conditions are: EPF on ok, EPF off, and EPF no load. For TN754 Vintage 14 or later and TN784, the status of the Positive Temperature Coefficient is sent uplink. Possible conditions are: PTC on OK, PTC off, and PTC no load.
- **ID Request**—A request is made to the station for its status. The station sends its configuration information and “health” information back. This information is checked and a pass/fail result is provided.
- **Ringer Update**—This updates the digital voice terminal ringer state according to the processor records.
- **Touch-Tone Administration Update**—This is a message to the digital station to refresh the default value which causes the station to send touch-tones only in the primary information channel. This value is set initially when the station is put in-service and every time the station’s state changes from other states to in-service.

Test #17 Station (Digital) Audits		
Error Code	Test Result	Description / Recommendation
1	ABORT	Switchhook audit timed out.
2	ABORT	ID request fails, health bit returned from voice terminal is bad. 1) Make sure voice terminal is connected and repeat test. 2) If test fails, replace voice terminal and repeat test. 3) If the test continues to abort, escalate the problem.

Test #17 Station (Digital) Audits (Contd)		
Error Code	Test Result	Description / Recommendation
3	ABORT	The EPF/PTC has detected an overcurrent condition. 1) For a TN754 Vintage 13 or earlier circuit pack, issue the test CSSpp long command. If Test #11 passes, the EPF/PTC condition has been cleared. Rerun the short test sequence. If Test #11 does not pass, follow the procedures described for Test #11. 2) Look for 769 error type against this DIG-LINE and follow the steps outlined in the footnotes. If any problem is found, rerun the test. 3) If the test continues to abort, escalate the problem.
4	ABORT	Internal System Error 1) Resolve any outstanding circuit pack maintenance problems. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
5	ABORT	Ringer update aborted due to station being in ready-for-service or out-of-service state.
6	ABORT	Touch-Tone Administration Update aborted. 1) Make sure the voice terminal is connected. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available.
2000	ABORT	Response to the test request was not received within the allowable time period.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	1) If complaints still exist, investigate by using other port tests, and by examining the station, wiring, and connections. Station Audits passed. This digital port circuit pack is functioning properly.

DS1-BD (DS1 Trunk Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command' To Run (a)	Full Name Of MO
DS1-BD	MINOR	test board CSS I	DS1 Trunk Circuit Pack
DS1-BD	WARNING	test board CSS s	DS1 Trunk Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); and SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . etc.)

DS1 circuit pack provides System 75 an interface to the DS1 facility. DS1 circuit pack is designed to commit the support of 24 DSO channels based on a 1.544 Mbps DS1 link. These DSO channels can be administered as trunks to other switches.

DS1 Trunk circuit pack maintenance provides a strategy to maintain the DS1 circuit pack. The maintenance strategy covers logging the in-line errors reported by DS1 circuit pack, running tests for error diagnosis and recovery, and raising or clearing maintenance alarms. The maintenance plan applies to the DS1 circuit packs, TN722 and TN722B. TN722 and TN722B support the Tie Trunk signaling.

The signaling over DS1 link has to be synchronized between transmitting and receiving ends to assure an error-free communication. Refer to the TDM-CLK maintenance documentation for details.

DS1 Tie Trunk has its own maintenance strategy. But, it depends on the health of the DS1 circuit pack. Refer the DS1 Tie Trunk maintenance for DS1/Tie Trunk.

Hardware Error Log Entries and Test to Clear Values

DS1 Trunk Circuit Pack Maintenance Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test board CSS s
1(a)	0	Board removed or SAKI Test (#53)	MINOR	ON	
18(b)	0	busyout board CSS	WARNING	OFF	release board CSS
23(c)	0		WARNING	OFF	add dsl CSS
257(d)	0	Control Channel Loop Test (#52)	MINOR	ON	test board CSS I r 20
513(e)	4352 to 4357		MINOR	ON	
769 (f)	4358				
1025(d)	4363	NPE Audit Test (#50)			
1281	Any	Loss of Signal Inquiry Test (#138)	MINOR	OFF	test board CSS s
1538(g)	Any	None	MINOR	ON	
1793	Any	Blue Alarm Inquiry Test (#1 39)	WARNING	OFF	test board CSS s
2049		Red Alarm Inquiry Test (#140)	MINOR	OFF	test board CSS s
2305	8388	Yellow Alarm Inquiry Test (#1 41)	MINOR	OFF	test board CSS s
2561		Major Alarm Inquiry Test (#142)	MINOR	OFF	test board CSS s
2817		Minor Alarm Inquiry Test (#143)	MINOR	OFF	test board CSS s
3073 to 3199	Any	Slip Alarm Inquiry Test (#144)	MINOR	OFF	test board CSS r 6
3329 to 3455		Misframe Alarm Inquiry Test (#145)	MINOR	OFF	test board CSS r 6
3840 (h)	4096 to 4100				

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error indicates that the circuit pack totally stopped functioning or it was physically removed from the system.

Note: The alarm will be logged approximately 11 minutes after the circuit pack has been removed or after SAKI Test (#53) fails.

If the circuit pack is not in the system, re-inserting a circuit pack (in the same slot as the error indicates) will resolve this error. Or, if the circuit pack is in the system, and the red LED is on, then replace the circuit pack.

- (b) DS1 circuit pack has been busied out by a busyout board CSS command.
- (c) The DS1 circuit pack is not administered. Administer the DS1 circuit pack by issuing the add dsl CSS command.
- (d) This Error Log associates with the Common Board Maintenance Test. Refer to the XXX-BD (Common Port Board) maintenance documentation for details.
- (e) DS1 circuit pack detects some hardware faults (for example, external RAM failure, internal RAM failure, internal ROM failure, or instruction set failure). It's a transient hardware error. This Error Log will vanish after no faults are detected for 30 minutes. The value in Aux Data field indicates the type of hardware fault.
- (f) DS1 circuit pack detects a hardware logic error (for example, program logic inconsistency). It's a transient hardware error. This Error Log will vanish after no faults are detected for 100 minutes. The value in Aux Data field indicates the type of hardware fault.
- (g) The DS1 circuit pack is too hyperactive. The circuit pack is isolated from the system and all trunks of this circuit pack are put into the out-of-service state. When no faults are detected for 20 minutes, DS1 circuit pack is restored to normal operation. All trunks of DS1 circuit pack are then put back into the in-service state.
- (h) This Error Log indicates an internal system error. Escalate this error to the next tier. The value in Aux Data field indicates the type of hardware fault.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Audit Connection Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Connection Audit Test (#50)		x	ND
Control Channel Loop Around Test (#52)		x	ND
Loss of Signal Alarm Inquiry Test (#138)	x	x	ND
Blue Alarm Inquiry Test (#139)	x	x	ND
	x	x	ND
Yellow Alarm Inquiry Test (#1 41)	x	x	ND
Major Alarm Inquiry Test (#1 42)	x	x	ND
Minor Alarm Inquiry Test (#143)	x	x	ND
Slip Alarm Inquiry Test (#1 44)	x	x	ND
Misframe Alarm Inquiry Test (#145)	x	x	ND
Translation Update Test (#1 46)	x	x	ND
SAKI Sanity Test (#53)		x	D
DS1 Remote Loop Around Test (#1 60)		x	D

* D = Destructive
ND = Non-destructive

NPE Connection Audit Test (#50)

The system sends a message to the on-board microprocessor to update the network connectivity translation for all the Network Processing Elements (NPEs) on the circuit pack.

Test #50 NPE Audit Connection Test		
Error Code	Test Result	Description / Recommendation
none or 2100 1019	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Test already in progress.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	The circuit pack's NPEs have been updated with their translation.

Control Channel Loop Around Test (#52)

This test queries the circuit pack for its circuit pack code and vintage and verifies its records.

Test # 52 Control Channel Loop Around Test		
Error Code	Test Result	Description / Recommendation
none or 2100	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The circuit pack failed to return the circuit pack code or vintage. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to fail and if the circuit pack is one of the Port circuit packs, replace the circuit pack. Otherwise, if the circuit pack is one of the Processor Complex circuit packs, see the Procedure for Installing/Replacing Processor Complex Circuit Pack section on how to replace the circuit pack. 3) Retry the command at 1 minute intervals a maximum of 5 times. 4) If the test continues to fail, escalate the problem.
	PASS	Communication with this circuit pack is successful.

SAKI Sanity Test (#53)

This test is destructive.

This test resets the circuit pack.

This test is executed as part of the long test sequence only for the Tone/Clock circuit" pack and DS1 circuit packs. All other common circuit packs can be reset via the reset board CSS command. The reset command executes this test.

Test #53 SAKI Sanity Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1005	ABORT	Wrong circuit pack configuration to run this test. This error applies only to DS1 circuit packs. It means the DS1 circuit pack is providing timing for the system and therefore it cannot be reset without major system disruptions. 1) If the circuit pack needs to be reset, then set synchronization to another DS1 circuit pack or the Tone/Clock circuit pack and try again.
1015	ABORT	Port is not out-of-service. 1) Busyout the circuit pack. 2) Execute command again.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1.	FAIL	The circuit pack failed to reset.
2	FAIL	The circuit pack failed to restart. 1) Execute command again. 2) If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1) Run the short test sequence.

Loss of Signal Alarm Inquiry Test (#138)

The Loss of Signal Alarm Inquiry Test verifies the synchronization status of the DS1 link. The Loss of Signal alarm indicates that DS1 circuit pack is unable to derive the synchronization clock from the DS1 facility. When DS1 circuit pack detects a Loss of Signal alarm, DS1 circuit pack stops supplying synchronization clock and transmits a Yellow alarm to the remote DS1 endpoint.

When the Loss of Signal alarm is confirmed, the maintenance software places all trunks of the DS1 circuit pack into out-of-service state. The inquiry test will run every 10 minutes until the loss of signal has been restored.

DS1 circuit pack raises a Loss of Signal alarm after the signal has been lost for about 1 second, and will not retire the alarm until the signal has returned for about 16 seconds.

Test #138 Loss of Signal Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	DS1 circuit pack detects a Loss of Signal alarm. The physical link is broken or the remote DS1 endpoint is down. All trunks of this DS1 circuit pack are out-of-service. If the DS1 circuit pack is designated as the supplier of system synchronization source, then the system synchronization maintenance will adopt a source from others. Refer to the TDM-CLK maintenance documentation for details. 1) Check the physical connection of the DS1 circuit pack and the cable. 2) If DS1 circuit pack connects to a T1 facility, call vendor of the T1 carrier to diagnose the remote DS1 endpoint. If DS1 circuit pack connects directly to a switch, call system technician of the remote switch to diagnose the DS1 endpoint.
	PASS	DS1 signal is present and the physical link is healthy.

Blue Alarm Inquiry Test (#139)

The Blue Alarm is an all-one signal sent by the remote DS1 endpoint when it is out-of-service. The Blue Alarm Inquiry Test checks the blue alarm status of the remote DS1 endpoint.

When the DS1 circuit pack detects a Blue Alarm signal from the remote DS1 endpoint, the circuit pack will transmit a Yellow Alarm back to the remote DS1 endpoint and send a BLUE-ALARM message to the maintenance software. When the Blue Alarm is confirmed, the maintenance software places all trunks of the DS1 circuit pack into out-of-service state. The Inquiry Test will be run every 10 minutes until the Blue Alarm is cleared.

DS1 circuit pack takes 2 seconds to recognize and report a Blue Alarm and 16 seconds to recognize and report the clearance of a Blue Alarm. When the Blue Alarm is cleared, DS1 circuit pack stops transmitting the Yellow Alarm and places the trunks back to the service state before the Blue Alarm occurs.

Test # 139 Blue Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The remote DS1 endpoint is out-of-service. 1) If DS1 circuit pack connects to a T1 facility, call vendor of T1 carrier to diagnose the remote DS1 endpoint. If DS1 circuit pack connects directly to a switch, call system technician of the remote switch to diagnose the DS1 endpoint.
	PASS	Remote DS1 endpoint is in-service. No Blue Alarm is detected in the DS1 circuit pack.

Red Alarm Inquiry Test (#140)

DS1 circuit pack raises a Red Alarm when the framing pattern of the incoming DS1 bit stream has been lost. The Red Alarm Inquiry Test checks the framing status of a DS1 circuit pack. DS1 circuit pack takes 3 seconds to recognize and report a Red Alarm and 12 seconds to recognize and report the clearance of a Red Alarm.

When the DS1 circuit pack detects a Red Alarm, the circuit pack will transmit a Yellow Alarm to the remote DS1 endpoint and send a RED-ALARM message to the maintenance software. After the Red Alarm is confirmed, the maintenance software places all trunks of the circuit pack into out-of-service state. The inquiry test will be run every 10 minutes until the Red Alarm is cleared.

When the Red Alarm is cleared, the DS1 circuit pack will stop transmitting the Yellow Alarm to the remote DS1 endpoint. The maintenance software restores all trunks of DS1 circuit pack to the service state before the Red Alarm occurs.

Loss of Multiframe Alarm

If the DS1 circuit pack is administered using DMI-BOS signaling, DS1 circuit pack raises a Loss of Multiframe Alarm (LMA) when the circuit pack cannot interpret the incoming signaling bits for not being able to synchronize to the multiframe pattern received in the 24th channel. Once DS1 circuit pack detects an LMA, the circuit pack will transmit a Remote Multiframe Alarm (RMA) to the remote DS1 endpoint. Maintenance software handles both Red Alarm and LMA using the same mechanism.

Test #140 Red Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	DS1 circuit pack detects a Red Alarm. An out-of-frame condition occurs on the DS1 circuit pack. DS1 circuit pack will transmit a Yellow Alarm to the remote DS1 endpoint until the Red Alarm is retired. 1) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 2) Check the physical connectivity of DS1 circuit packs and cable. 3) Replace the local DS1 circuit pack and repeat the test. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) If the test still fails, escalate the problem.
1	FAIL	DS1 circuit pack detects a Loss Multiframe Alarm. An out-of-frame condition occurs on the DS1 circuit pack. DS1 circuit pack will transmit a Remote Multiframe Alarm to the remote DS1 endpoint until the LMA is retired. 1) Verify that both endpoints of the DS1 link are administered using the same DMI-BOS signaling mode, framing mode, zero coding. 2) Check the physical connectivity of DS1 circuit packs and cable. 3) Replace the local DS1 circuit pack and repeat the test. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) If the test still fails. escalate the problem.
	PASS	No Red Alarm is detected on DS1 circuit pack.

Yellow Alarm Inquiry Test (#141) ,

Receiving a Yellow Alarm from remote DS1 endpoint indicates that the remote DS1 endpoint has an out-of-frame condition. The Yellow Alarm Inquiry Test is used to determine whether the remote DS1 endpoint is transmitting a Yellow Alarm. The DS1 circuit pack takes 500 msec to recognize and report a Yellow Alarm and 500 msec to recognize and report that a Yellow Alarm condition is cleared.

When the DS1 circuit pack detects a Yellow Alarm from the remote DS1 endpoint, it will send a YELLOW-ALARM up-link message to the maintenance software. After the maintenance software receives the YELLOW-ALARM message, the Yellow Alarm Inquiry Test is run to confirm the Yellow Alarm. Once the Yellow Alarm is confirmed, the maintenance software places all trunks on the circuit pack into out-of-service state. The Inquiry Test will be run every 10 minutes until the Yellow Alarm is cleared.

When the Yellow Alarm is cleared, the maintenance software restores all trunks on the DS1 circuit pack back to their previous service state before the Yellow Alarm is raised.

Remote Multiframe Alarm

Remote Multiframe Alarm (RMA) indicates that the remote DS1 endpoint is in a “Loss of Multiframe Alarm” condition while the DS1 circuit pack is administered using the DMI-BOS common channel signaling. The RMA is handled as a Yellow Alarm.

Test # 141 Yellow Inquiry Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 6 times. 2) If the test continues to abort, escalate the problem.
	FAIL	DS1 circuit pack detects a Yellow Alarm sending by the remote DS1 endpoint. An out-of-frame condition occurs on the remote DS1 endpoint. 1) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 2) Check the physical connectivity of DS1 circuit packs and cable. 3) Replace the local DS1 circuit pack and repeat the test. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) If the test still fails, escalate the problem.
1	FAIL	DS1 circuit pack detects a Remote Multiframe Alarm sending by the remote DS1 endpoint. An out-of-frame condition occurs on the remote DS1 endpoint. 1) Verify that both endpoints of the DS1 link are administered using the same DMI-BOS signaling mode, framing mode, zero coding. 2) Check the physical connectivity of DS1 circuit packs and cable. 3) Replace the local DS1 circuit pack and repeat the test. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) If the test still fails, escalate the problem.
	PASS	No Yellow Alarm nor Remote Multiframe Alarm is received from the remote DS1 endpoint.

Major Alarm Inquiry Test (#142)

The Major Alarm raised by a DS1 circuit pack indicates that the average bit error rate on the DS1 facility is greater than 10E-3. The Major Alarm Inquiry Test is used to determine that the received DS1 bit error rate is greater than 10E-3. When D4 framing mode is selected, the DS1 circuit pack takes 16 seconds to recognize and report a Major Alarm and 16 seconds to recognize and report that a Major Alarm condition is cleared. If ESF framing mode is selected, the DS1 circuit pack takes 10 seconds to recognize and report a Major Alarm and 10 seconds to recognize and report that a Major Alarm condition is cleared.

When the DS1 circuit pack detects a Major Alarm, it will send a MAJOR-ALARM message to the maintenance software. After the maintenance software receives a MAJOR-ALARM message, the Major Alarm Inquiry Test is initiated to confirm the Major Alarm on the DS1 circuit pack. Once the Major Alarm is confirmed, the maintenance software places all trunks on the circuit pack into the out-of-service state. The Inquiry Test will be run every 10 minutes until the Major Alarm is cleared. The maintenance software places all trunks on the circuit in the out-of-service state if the major alarm persists for more than 20 minutes.

When the Major Alarm is cleared, the maintenance software restores all trunks on the circuit pack to their previous service state before Major Alarm occurs.

Test # 142 Major Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 6 times. 2) If the test continues to abort, escalate the problem.
	FAIL	DS1 circuit pack detects a Major Alarm. The DS1 bit error rate is greater than 10E-3, The performance of DS1 link between DS1 circuit pack and remote DS1 endpoint is very poor. 1) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 2) Check the physical connectivity of DS1 circuit packs and cable. 3) Contact T1 Network Service to diagnose the remote DS1 endpoint. 4) Replace the local DS1 circuit pack and repeat the test. 5) If the test still fails, escalate the problem.
	PASS	No Major Alarm is detected in DS1 circuit pack.

Minor Alarm Inquiry Test (#143)

The Minor Alarm raised by a DS1 circuit pack indicates that the average bit error rate on the DS1 facility is greater than 10E-6, but is less than 10E-3. The Minor Alarm Inquiry Test is used to determine the received DS1 bit error rate is greater than 10 E-6 and less than 10E-3. When D4 framing mode is selected, the DS1 circuit pack takes 41 minutes to recognize and report a Minor Alarm and 41 minutes to recognize and report that a Minor Alarm condition is cleared. If ESF framing mode is selected, the DS1 circuit pack takes 10 minutes to recognize and report a Minor Alarm and 10 minutes to recognize and report that a Minor Alarm condition is cleared.

When the DS1 circuit pack detects a Minor Alarm condition, it will send a MINOR-ALARM message to the maintenance software. After the maintenance software receives a MINOR-ALARM message, the Minor Alarm Inquiry Test is initiated to confirm the Minor Alarm. All trunks on the circuit pack stay in the in-service state after the Minor Alarm is confirmed. The Minor Alarm Inquiry Test is run every 10 minutes until the Minor Alarm is cleared.

Test #143 Minor Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	DS1 circuit pack detects a Minor Alarm. The DS1 bit error rate is greater than 10 E-6 and less than 10E-3. 1) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 2) Check the physical connectivity of DS1 circuit packs and cable. 3) Contact T1 Network Service to diagnose the remote DS1 endpoint. 4) Replace the local DS1 circuit pack and repeat the test. 5) If the test still fails, then escalate the problem.
	PASS	No Minor Alarm is detected in DS1 circuit pack.

Slip Alarm Inquiry Test (#144)

Slips occur when transmitter and receiver are not running at precisely the same clock rate. DS1 circuit pack can detect both positive and negative slips on the DS1 facility. The Slip Alarm Inquiry Test is used to acquire the total number of slips that occurred on a DS1 link.

When DS1 circuit pack detects a slip condition, circuit pack will increase on-board slip counter by 1. A SLIP-COUNT message is spontaneously sent to the system software after the counter reaches a threshold (for example, 88). When the maintenance software receives the SLIP-COUNT message, the Slip Alarm Inquiry Test is initiated to inquire the slip counters on DS1 circuit pack and accumulate the slip counts in the maintenance software.

If the count of slips is over the threshold, a MINOR alarm is raised against the DS1 circuit pack. All trunks of the DS1 circuit pack are still in the in-service state. If the DS1 circuit pack is used to provide the system synchronization source, the MINOR alarm will initiate a synchronization source switch. See TDM-CLK (TDM Bus Clock) maintenance documentation for details.

Test # 144 Slip Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1 to 255	FAIL	The DS1 circuit pack and the remote DS1 endpoint are not synchronized to the same clock rate. DS1 circuit pack detects a Slip Alarm. The error code is the count of slips detected by DS1 circuit pack after the last Slip Alarm Inquiry. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 3) Check the physical connectivity of DS1 circuit packs and cable. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) Replace the local DS1 circuit pack and repeat the test. 6) If the test still fails, then escalate the problem.
	PASS	No Slip Alarm is detected on the DS1 circuit pack.

Misframe Alarm Inquiry Test (#145)

Misframe Alarm indicates that framing bits observed on a DS1 circuit pack are in error. Misframe Alarm Inquiry Test inquiries the total number of misframes that have occurred on a DS1 circuit pack since the last inquiry.

When DS1 circuit pack detects a misframe error, it will increase the misframe counter on DS1 circuit pack by 1. If the counter reaches the threshold, a MISFRAME-COUNT message is spontaneously sent to the switch maintenance software. After the maintenance software receives the MISFRAME-COUNT message, the Misframe Alarm Inquiry Test is initiated to collect the misframe counts from the DS1 circuit pack.

When the threshold of misframes is reached, if the DS1 circuit pack is supplying system synchronization source, then a switching synchronization source message is sent to the TDM-BUS maintenance documentation . See TDM-CLK (TDM Bus Clock) maintenance documentation for details. A Minor alarm against the DS1 circuit pack is raised, but all trunks of the DS1 circuit pack are still in the in-service state.

Test #145 Misframe Alarm Inquiry Test		
Error Code	Test Result	Description / Recommendation
2000 2100	ABORT	Internal System Error
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1 to 255	FAIL	The DS1 circuit pack detects errors in the received framing bits pattern. The error code is the count of misframes detected by the DS1 circuit pack after the last Misframe Alarm Inquiry. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 3) Check the physical connectivity of DS1 circuit packs and cable. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) Replace the local DS1 circuit pack and repeat the test. 6) If the test still fails, then escalate the problem.
	PASS	No Misframe Alarm is detected on the DS1 circuit pack.

Translation Update Test (#146)

DS1 circuit pack has to be notified of the appropriate circuit pack level and port level translations administered by System Administration. Translation includes the following data administered for a DS1 circuit pack (see output of display ds1 CSS command): DS1 Link Length between two DS1 endpoints, Synchronization Source Control, All Zero Suppression, Framing Mode, Signaling Mode, Time Slot Number of 697-Hz Tone, Time Slot Number of 700-Hz Tone, and others. The Translation Update Test sends the circuit pack level information specified by System Administration to the DS1 circuit pack.

Test #146 Translation Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal system software error. 1) Enter display ds1 CSS to verify the DS1 circuit pack translation. 2) Remove the DS1 circuit pack out of the carrier and plug it back in again. Enter test board CSS long again to check DS1 circuit pack. 3) If the test continues to fail, escalate the problem.
	PASS	Translation data has been downloaded to the DS1 circuit pack successfully.

Remote Loop Around Test (#160)

This test is destructive.

The Remote Loop Around Test is run when the endpoint [that is, Network Circuit Terminating Equipment (NCTE)] the DS1 circuit pack connects can provide a remote loop around capability. The Remote Loop Around is provided by looping the received DS1 bit stream from the DS1 circuit pack back to the same DS1 circuit pack. The test is highly destructive and can only be initiated by a craft-demanded reset board CSS command. To avoid a misuse of the reset board command, the permission to run Remote Loop Around Test is disabled in the DS1 circuit pack administration by default. To run this test, the field of Remote Loop Around Test in the DS1 circuit pack administration must be "yes".

All trunks on the DS1 circuit pack must be busied out via the craft busyout board command before running Remote Loop Around Test. When the Remote Loop Around Test is initiated, maintenance software sends appropriate messages to the DS1 circuit pack to start the test. DS1 circuit pack will electrically connect two conductors run to the NCTE to signal the NCTE to perform a loop around circuit. The Test uses the Tone Generator and Tone Detector to exercise a bit pattern consistency test for all ports. If the transmitted and received bit patterns on a trunk are different, the Test fails.

When the Test is complete, the maintenance software sends a stop loop around message to the DS1 circuit pack to put the circuit pack back to the normal operation mode. All trunks of DS1 circuit pack are restored back to in-service state after craft enters the release board command.

Test #160 Remote Loop Around Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat the test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #160 Remote Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1 003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	Received an incoming call originated on a port of the DS1 circuit pack during the test. 1) Enter busyout board CSS to put all trunks of DS1 circuit pack to out-of-service state. 2) Retry the command at 1 minute intervals a maximum of 5 times. 3) If the test continues to abort, escalate the problem,
1005	ABORT	Remote Loop Around Test cannot be executed in the current configuration. To run this test, the Remote Loop Around Test field in DS1 circuit pack administration form must be "yes" and at least a port of the DS1 circuit pack has been administered in a trunk group or an OPS station. This port cannot be the port 24 if common channel signaling and ISDN signaling are specified. 1) Enter display ds1 CSS to verify the DS1 circuit pack administration. 2) Check the trunk group administration to verify that at least a non-signaling port has been administered in a trunk group. 3) Retry the command. 4) If the test continues to abort, escalate the problem.
1015	ABORT	Ports on DS1 circuit pack have not been busied out to out-of-service. 1) Enter busyout board CSS to put all trunks of the DS1 circuit pack into "out-of-service" state. 2) Retry the command. 3) If the test continues to abort, escalate the problem.

Test #160 Remote Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	DS1 circuit pack failed in the Remote Loop Around Test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, zero coding. 3) Check the physical connectivity of DS1 circuit packs and cable. 4) Contact T1 Network Service to diagnose the remote DS1 endpoint. 5) Replace the local DS1 circuit pack and repeat the test. 6) If the test still fails, escalate the problem.
	PASS	All administered trunks of DS1 circuit pack pass the Remote Loop Around Test. The bit pattern consistency test is run through successfully over the path that covers a DS1 port, cable, and the external NCTE device.

DTMR-PT (Dual Tone Multi-Frequency Receiver Port)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name of MO
DTMR-PT	MAJOR	test port CSSpp s	Dual Tone Multi-Frequency Receiver Port (TTR)
DTMR-PT	MINOR	test port CSSpp s	Dual Tone Multi-Frequency Receiver Port (TTR)
DTMR-PT	WARNING	release port CSSpp	Dual Tone Multi-Frequency Receiver Port (TTR)

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

The Dual Tone Multi-Frequency Receiver (DTMR) Port (PT), also known as Touch-Tone Receiver (TTR), resides on the Tone Detector circuit pack (for example, TN748, TN748B, TN748C, TN756 combine tone detector and tone clock). There are four Dual Tone Multi-Frequency Receiver ports and two General Purpose Tone Detector ports on a Tone Detector circuit pack. The DTMR port is used to detect touch-tone digits that are placed on the Time Division Multiplex (TDM) bus. Examples of touch-tone digits are digit 0-9, digit '#,' and digit '*'. The ability of the DTMR port to detect touch-tone digits is essential for maintenance of other circuit packs (for example, Tone/Clock circuit pack) and in placing a station-to-station call. Note that calls originating from a hybrid station do not require a DTMR port.

The DTMR-PT maintenance feature defines a set of tests to ensure that the touch-tone digits detection capability of the DTMR port is functioning properly. For all Tone Detector circuit pack level errors (DETR-BD), refer to the XXX-BD (Common Port Board) maintenance documentation.

Hardware Error Log Entries and Test to Clear Values

Dual Tone Multi-Frequency Receiver Port (TTR) Error Log					Entries
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
1 (b)	17664	Tone Detector Audit/Update Test (#43)	MAJOR/MINOR(a)	ON	test port CSSpp r 2
18	0	busyout port CSSPP	WARNING	ON	release port CSSpp
257(c)	17666	Tone Detector Audit/Update Test (#43)	MAJOR/MINOR(a)	ON	test port CSSpp r 3
513		Tone Detection Verification Test (#42)	MAJOR/MINOR(a)	ON	test port CSSpp r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) There are two possible alarm levels for this error, Major alarm and Minor alarm. A Major alarm is raised if the total number of DTMR ports currently in service is less than or equal to 1/2 of the administered threshold number. Otherwise, a Minor alarm is raised. In either case, run the short test sequence against the DTMR port and follow the error code procedures for the individual tests.

The threshold number of DTMR ports for service is administered using the change system-parameters maintenance craft command.

- (b) This error indicates the DTMR port is having problems detecting touch-tone digits. If this error is being constantly logged, then the Tone Detector circuit pack containing the faulty DTMR port should be replaced.
- (c) The DTMR port lost its translation. Testing the DTMR port is sufficient to reload its translation. If testing the DTMR port does not clear the error, then the Tone Detector circuit pack containing the faulty DTMR port should be replaced.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the Tone *Detection Verification Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tone Detection Verification Test (#42)	x	x	ND
Tone Detector Audit/Update Test (#43)	x	x	ND

* D = Destructive
ND = Non-destructive

Tone Detection Verification Test (#42)

This test verifies that the touch-tone digits detection capability of the DTMR port is functioning properly.

Test #42 Tone Detection Verification Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	The system was not able to allocate all the resources needed for this test or there was an Internal System Error.
1	ABORT	The system could not allocate all the resources needed to test the DTMR port.
1001	ABORT	The system was unable to put the DTMR port in the appropriate mode to test it.
1002	ABORT	The system could not allocate time slots for the test connection. This happens when the system is heavily loaded. If the system is not heavily loaded, then test the TDM Bus via the test tdm [1;2] command. Refer to the TDM-BUS maintenance documentation for details. 1) Retry the command at 1 minute intervals for a maximum of 5 times: 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a Tone Generator for the test connection. This could happen when the system is heavily loaded or there is not a Tone/Clock circuit pack in the port network when this test is being executed. 1) Make sure there is a Tone/Clock circuit pack in the same port network. 2) If a Tone/Clock circuit pack is missing, install one in the same port network. 3) Allow approximately 1 minute for the Tone/Clock maintenance to run on the newly inserted Tone/Clock circuit pack. 4) Retry the command at 1 minute intervals for a maximum of 5 times. 5) If the test continues to abort, escalate the problem.

Test #42 Tone Detection Verification Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1-3	FAIL	1) Run the short test sequence: test port CSSpp s r 1. 2) If the problem persists, the system is still operating properly but system capacity will be reduced. In order to restore the system performance to normal, you will have to replace the Tone Detector circuit pack containing the faulty DTMR port.
	PASS	The DTMR port is able to detect all the touch-tone digits.

Tone Detector Audit/Update Test (#43)

The DTMR port is refreshed with all time slot information and sanity audit is performed on the DTMR port.

Test # 43 Tone Detector Audit/Update Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	The system was not able to allocate all the resources needed for this test. 1) Wait 1 minute and try again.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Hardware audit failed. 1) Run the short test sequence: test port CSSpp s r 1. 2) If the problem persists, the system will still operate properly but system capacity will be reduced. In order to restore the system performance to normal, you will have to replace the Tone Detector circuit pack containing the faulty DTMR port.
	PASS	The DTMR port has been successfully refreshed with its translation.

EMG-XFER (Emergency Transfer)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
EMG-XFER	MAJOR	test environment	Emergency Transfer
EMG-XFER	WARNING	test environment	Emergency Transfer

Emergency Transfer provides the ability to cut designated analog voice terminals through to CO (Central Office) trunks if the switch cannot provide even minimal phone service. The Emergency Transfer maintenance object tracks the control of Emergency Transfer. Emergency Transfer can be controlled by the system or can be controlled manually via the Emergency Transfer switch which is located on the TN759 Processor circuit pack (System 75 XE) or the TN731 or TN731B Maintenance circuit pack (System 75). If the Emergency Transfer switch on the Processor circuit pack or Maintenance circuit pack are in a manual position, the system cannot change the state of Emergency Transfer. A manual ON position (to the right) will generate a Major alarm. A manual OFF position (to the left) will generate a Warning alarm. Unless a technician is currently working on the switch, the switch should be left in the AUTO position (center).

Hardware Error Log Entries and Test to Clear Values

Emergency Transfer Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test environment s
1	0	Emergency Transfer Query Test (#1 24)	MAJOR	ON	test environment r 3
257	0	Emergency Transfer Query Test (#1 24)	WARNING	ON	test environment r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery & Battery Charger Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

System 75			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery & Battery Charger Query Test (X5) (a)	x	x	ND
AC Power Query Test (#5) (b)	x	x	ND
OLS Query Test (Carrier E) (#127) (c)	x	x	ND
OLS Query Test (Carrier D) (#127) (c)	x	x	ND
OLS Query Test (Carrier A) (#127) (c)	x	x	ND
OLS Query Test (Carrier B) (#127) (c)	x	x	ND
OLS Query Test (Carrier C) (#127) (c)	x	x	ND
Emergency Transfer Query Test (#1 24)	x	x	ND
Cabinet Sensors Query Test (#1 22) (d)	x	x	ND
External Alarm Lead Query Test (#120) (e)	x	x	ND

* D = Destructive
ND = Non-destructive

- (a) Refer to **POWER** (Battery & Battery Charger) maintenance documentation for a description of this test.
- (b) Refer to **AC-POWER** (AC Power) maintenance documentation for a description of this test.
- (c) Refer to **CARR-POW** (Carrier Port Power Supply) maintenance documentation for a description of this test.
- (d) Refer to **CABINET** (Cabinet Sensors) maintenance documentation for a description of this test.
- (e) Refer to **EXT-DEV** (External Alarm Lead) maintenance documentation for a description of this test.

System 75 XE			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Power Query Test (#5) (a)	x	x	ND
Emergency Transfer Query Test (#1 24)	x	x	ND
External Alarm Lead Query Test (#1 20) (b)	x	x	ND

* D = Destructive
ND = Non-destructive

(a) Refer to POWER (System Power) maintenance documentation for a description of this test,

(b) Refer to EXT-DEV (External Alarm Lead) maintenance documentation for a description of this test.

Emergency Transfer Query Test (#124)

The Emergency Transfer Query Test queries the hardware for the state of the Emergency Transfer switch and reports the result. If the switch is in the AUTO position where the system software can control Emergency Transfer, then the test passes. If the switch is in a position where the system software cannot control Emergency Transfer, then the test fails. The system software does not have control of Emergency Transfer if the switch is in the manual ON or manual OFF position.

Test #124 Emergency Transfer Query Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	System resources required to run this test are not available.
2	ABORT	Internal System Error
3	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	Emergency Transfer is manually turned OFF via the Emergency Transfer switch.
2	FAIL	Emergency Transfer is manually turned ON via the Emergency Transfer switch. 1) Place the switch in the AUTO position.
00	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort with error code 2000, check for system powering problems with the A carrier. Look for and resolve all AC-POWER alarms, then repeat the test. 3) If the test continues to ABORT with error code 2000, check for and resolve MAINT (Maintenance/Tape Processor) errors, then repeat the test. 4) If the test continues to ABORT with error code 2000, escalate the problem.
	PASS	The system software has control of emergency Transfer.

ERR-LOG (Error Log Integrity)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
ERR-LOG	None	None	Error Log

Functional Description

The ERR-LOG (Error Log Integrity) maintenance object is responsible for the sanity of the Alarm Log, the Hardware Error Log, and the Software Error Log. If an inconsistency is detected in any one of these logs, all logs will be re-initialized and a Hardware Error will be logged against ERR-LOG indicating the time of inconsistency. There are no tests and no alarms for the ERR-LOG maintenance object. This maintenance object exists solely for the purpose of allowing errors to be logged against it.

Hardware Error Log Entries and Test to Clear Values

Error Log (ERR-LOG) Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	None
510 (a)	o	None	None	None	None

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) This error indicates that an inconsistency was detected in either the Alarm Log, the Hardware Error Log, or the Software Error Log. To recover from this error, all of the logs were cleared and re-initialized. Any alarms that were active at the time of this error have been cleared. There is no associated test for this error. If the error persists, escalate the problem.

EXT-DEV (External Alarm Lead)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
EXT-DEV	MAJOR	test environment	External Alarm Lead
EXT-DEV	MINOR	test environment	External Alarm Lead

The EXT-DEV (External Alarm Lead) maintenance object represents the state of relays connected to an external device (often an adjunct) in an XE system. These relays are monitored by the Maintenance circuit pack. System 75 R1V3 XE provides two pairs of leads that can be connected to an external device. Closing one pair of leads will cause a Major alarm against External Alarm Lead. Closing the other pair of leads will cause a Minor alarm against External Alarm Lead. The leads may be attached to the same or different devices.

Hardware Error Log Entries and Test to Clear Values

External Alarm Lead Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test environments
1	0	External Alarm Lead Query (#120)	MAJOR	OFF	test environment r 3
257	0	External Alarm Lead Query (#1 20)	MINOR	OFF	test environment r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the XE *Power Query Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
XE Power Query Test (#5) (a)	x	x	ND
Emergency Transfer Query Test (#1 24) (b)	x	x	ND
External Alarm Lead Query Test (#1 20)	x	x	ND

•D = Destructive
ND = Non-destructive

(a) Refer to DC-POWER (XE Power) maintenance documentation for a description of this test.

(b) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a description of this test.

External Alarm Lead Query Test (#120)

The External Alarm Lead Query Test requests the state of the External Alarm Leads from the Maintenance circuit pack and reports the results. The test has no affect on the external device itself.

Test # 120 External Alarm Lead		
Error Code	Test Result	Description / Recommendation
1	ABORT	System resources required to run this test are not available.
2	ABORT	Internal System Error
3	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	The External Alarm Lead Major alarm lead has been activated by the external device.
2	FAIL	The External Alarm Lead Minor alarm lead has been activated by the external device. 1) Clear the problem with the external device and rerun the test. 2) If the test still fails, then disconnect the External Alarm Lead from the Maintenance circuit pack. Rerun the test. 3) If the test still fails, then there is a problem with the Maintenance circuit pack. This circuit pack should be replaced. 4) If the test still fails, escalate the problem.
3	FAIL	The External Alarm Lead Major and Minor alarm leads have been activated by the external device. Clear the problem with the external device by referring to failure code 1 description above.

Test #120 External Alarm Lead (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort with error code 2000, check for system powering problems with the A carrier. Look for and resolve all AC-POWER alarms, then repeat the test. 3) If the test continues to ABORT with error code 2000, check for and resolve MAINT (Maintenance/Tape Processor) errors, then repeat the test. 4) If the test continues to ABORT with error code 2000, escalate the problem.
	PASS	The Maintenance circuit pack is capable of reading the External Alarm Lead, and the lead indicates no trouble. If there are problems with the External Device, then the External Device is not properly reporting these problems or it is not properly connected to the External Alarm Lead.

GPTD-PT [General Purpose Tone Detector Port (CPTR)]

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
GPTD-PT	MAJOR	test port CSSpp s	General Purpose Tone Detector Port (CPTR)
GPTD-PT	MINOR	test port CSSpp s	General Purpose Tone Detector Port (CPTR)
GPTD-PT	WARNING	release port CSSpp	General Purpose Tone Detector Port (CPTR)

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

The General Purpose Tone Detector Port (GPTD), also known as Call Progress Tone Receiver (CPTR), resides on the Tone Detector circuit pack (for example, TN748, TN748B, TN748C, TN756 combine tone detector and tone clock). There are two GPTD ports and four Dual Tone Multi-Frequency Receiver ports on a Tone Detector circuit pack. The GPTD port is used to perform level measurement of test tones and to detect call progress tones. Examples of call progress tones are dial tone, ring back, busy, alert, confirmation, and recall dial. The abilities of the GPTD port to perform level measurement of test tones and to detect call progress tones are essential for maintenance of other circuit packs (for example, Tone/Clock circuit pack).

This section defines a set of tests to ensure that the general purpose tone detection capability of the GPTD port is functioning properly. For all Tone Detector circuit pack level errors (DETR-BD), refer to the XXX-BD (Common Port Board) maintenance documentation.

Hardware Error Log Entries and Test to Clear Values

General Purpose Tone Detector Port (GPTD) Error Log					Entries
Error Type	Aux Data	Associated Test	Alarm Level(a)	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
1 (b)	17664	Tone Detector Audit/Update Test (#43)	MAJOR/MINOR	ON	test port CSSpp r 2
18	0	busyout port CSSpp)	WARNING	ON	release port CSSpp
257(c)	17666	Tone Detector Audit/Update Test (#43)	MAJOR/MINOR	ON	test port CSSpp r 3
513		Tone Detection Verification Test (#42)	MAJOR/MINOR	ON	test port CSSpp r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) There are two possible alarm levels for this error, Major alarm and Minor alarm. A major alarm is raised if the total number of GPTD ports currently in service is less than or equal to 1/2 of the administered threshold number. Otherwise, a Minor alarm is raised. In either case, run the short test sequence against the GPTD port and follow the error code procedures for the individual tests.

The threshold number of GPTD ports for service is administered using the change system-parameters maintenance craft command.

- (b) This error indicates the GPTD port is having problems detecting call progress tones. If this error is being constantly logged, then the Tone Detector circuit pack containing the faulty GPTD port should be replaced.
- (c) The GPTD port lost its translation. Testing the GPTD port is sufficient to reload its translation. If testing the GPTD port does not clear the error, then the Tone Detector circuit pack containing the faulty GPTD port should be replaced.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Tone Detection Verification Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tone Detection Verification Test (#42)	x	x	ND
Tone Detector Audit/Update Test (#43)	x	x	ND

- D = Destructive
ND = Non-destructive

Tone Detection Verification Test (#42)

This test verifies that the call progress tones detection and the tone level measurement capabilities of the GPTD port are functioning properly.

Test #42 Tone Detection Verification Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	The system was not able to allocate all the resources needed for this test or there was an Internal System Error.
1	ABORT	The system could not allocate all the resources needed to test the call progress tones.
1001	ABORT	The system was unable to put the GPTD port in the appropriate mode to test it.
1002	ABORT	The system could not allocate time slots for the test connection. This can happen when the system is heavily loaded. If the system is not heavily loaded, then test the TDM Bus via the test tdm [1;2] craft command. Refer to the TDM-BUS (TDM Bus Clock) maintenance documentation for details. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a Tone/Clock for the test connection. This can happen when the system is heavily loaded or there is not a Tone/Clock circuit pack in the port network when this test is being executed. 1) Make sure there is a Tone/Clock circuit pack in the same port network. 2) If a Tone/Clock circuit pack is missing, install one in the same port network. 3) Allow approximately 1 minute for the Tone/Clock maintenance to run on the newly inserted Tone/Clock circuit pack. 4) Retry the command at 1 minute intervals for a maximum of 5 times. 5) If the test continues to abort, escalate the problem.

Test #42 Tone Detection Verification Test (Contd)		
Error Code	Test Result	Description / Recommendation
1006	ABORT	This abort code indicates that the active Tone/Clock circuit pack may not be functioning properly. If there is more than one Tone Detector circuit pack in the system, then the problem can be either with the Tone/Clock circuit pack or the Tone Detector circuit pack. 1) Test the active Tone/Clock circuit pack in the port network. This test is being executed via the test tone-clock qualifier craft command. Qualifier is the carrier of the active Tone/Clock circuit pack to be tested. Valid qualifiers are: a, b, 1a, 1 b, 2a, and 2b. Refer to the TDM-CLK (TDM Bus Clock) maintenance documentation for details. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) if the test continues to abort, escalate the problem.
101-122	FAIL	1) Run the short test sequence: test port CSSpp s r 1. 2) If the problem persists, the system will still operate properly but system capacity will be reduced. In order to restore the system performance to normal, replace the Tone Detector circuit pack containing the faulty GPTD port.
	PASS	Tone Detection Verification Test is successful. The GPTD port is able to detect all call progress tones and perform level measurement of test tones.

Tone Detector Audit/Update Test (#43)

The GPTD port is refreshed with all time slot information and sanity audit is performed on the GPTD port.

Test #43 Tone Detector Audit/Update Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	The system was not able to allocate all the resources needed for this test. 1) Wait 1 minute and try again.
2000	ABORT	Response to the test. request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Hardware audit failed. 1) Run the short test sequence: test port CSSpp s r 1. 2) If the problem persists, the system will still operate properly but system capacity will be reduced. In order to restore the system performance to normal, replace the Tone Detector circuit pack containing the faulty GPTD port.
	PASS	The GPTD port has been successfully refreshed with its translation.

HYB-LINE (Hybrid Line Station), HYB-BD (Hybrid Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run(a)	Full Name Of MO
HYB-LINE	MINOR	test port CSSpp I	Hybrid Line Station
HYB-LINE	WARNING	test port CSSpp I	Hybrid Line Station
HYB-BD	MINOR(b)	test board CSS s	Hybrid Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to the XXX-BD (Common Port Board) maintenance documentation for more details on the circuit pack problems.

Hybrid Line is the user-friendly name for MFAT, which was previously used to denote the Multi-Function Analog Terminal. The Hybrid set is also known as an SCS (Small Communication System).

The TN762 Hybrid Line Port circuit pack supports eight of these multifunction hybrid terminals, as shown in Figure 6-15. The Hybrid Line requires three pairs of wires: an analog voice pair, a transmit/receive pair, and a power pair.

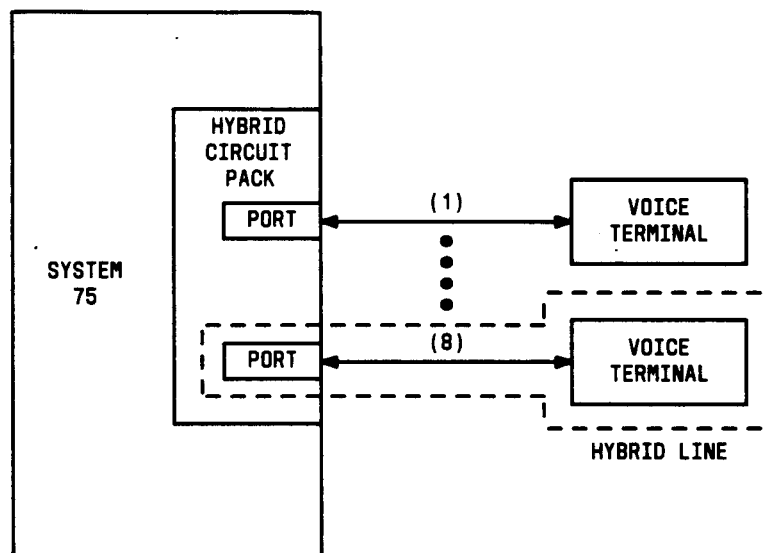


Figure 6-15. Hybrid Station Interactions

This section refers only to the Hybrid line maintenance that is performed. Please note that the Hybrid line maintenance is closely related to, and interacts with, the Hybrid circuit pack maintenance in some instances. Some of the results of maintenance testing of the Hybrid line may be affected by the “health” of the Hybrid circuit pack. This interaction should be kept in mind when investigating the cause of reported Hybrid line problems.

There are instances in this document where service states of a station are mentioned. It is helpful to understand what is meant by the different service states that may exist. An explanation of these service states follows:

- **Out-of-Service**—The port, and thus the station, have been removed from service. A busyout of a port would cause it to be out-of-service.
- **Ready for Service**—Once a port on the circuit pack has been put into service, the voice terminal must communicate that it is present. The time between these two events is the time when the terminal is in the ready-for-service state.
- **In Service**—Once the system has received a message from the voice terminal communicating that it is present, the station is put into the in-service state. The terminal can also be forced into the in-service state if it goes off-hook while it is in the ready-for-service state.

When the status station command has been run, and the status screen appears, the status will be reported as either out-of-service or in-service, which both mean exactly as stated in the above list, or disconnect, which means the station is in the ready-for-service state.

Hardware Error Log Entries and Test to Clear Values

Hybrid Line Station Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
0(a)	0	None			
1(b)	40987	None	WARNING	OFF	
18(c)	0	busyout l)Ort CSpp	WARNING	OFF	release port CSSpp
257(d)	40988	None	MINOR	OFF	
513(e)	40965	Hybrid Line Station Audits Test (#61)	WARNING	OFF	test port CSSpp s r 4
769(f)		Remote Dig Loop Around Test (#59)	WARNING	OFF	test port CSSpp s r 3
1025		Hybrid & Conf Circuits Test (#57)	MINOR	ON	test port CSSpp l r 3
1281 (f)		Local Digital Loop Around Test # 5 8	WARNING	ON	test port CSSpp l r 3
1537(g)	40968	None	WARNING	OFF	
1793		TDM NPE Crosstalk Test (#.6)	MINOR	ON	test port CSSpp l r 3
2049(h)	32770	None			
2049(i)	40967	None			
3840(j)	ANY	Inconsistent Downlink Message			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error type will appear in the Error Log if the Hybrid Line circuit pack has been removed since the Error Log was last cleared. Verify that the circuit pack has been re-inserted.
- (b) Indicates a defective data link. An off-board problem detected by port circuit. Make sure the Hybrid set is connected and that the Electronic Power Feed (EPF) test passes. Check for faulty wiring, a defective voice terminal, or move terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired after a pre-determined period of time.
- (c) This error type is logged when the port in question is busied out by maintenance personnel. Make sure port is released from busyout via the release port CSSPP command.
- (d) This indicates that the EPF has been turned off due to an overcurrent condition at the voice terminal. Check for faulty wiring or a damaged jack, and make sure the voice terminal is a Hybrid set. Once the problem has been resolved, the alarm will be retired after a pre-determined period of time.
- (e) This indicates that the voice terminal has probably been disconnected or that there is a problem in the wiring to the terminal. Verify that the voice terminal is connected or check for defective wiring to the voice terminal.

- (f) Note that error types 769 and 1281 by themselves create Warning alarms only but if both are present, a Minor alarm will be logged.
- (g) This indicates that something is wrong with the data link to the voice terminal. An in-line maintenance error has generated an off-board warning. Ignore if there are no complaints. Otherwise, make sure the voice terminal is connected, check for faulty wiring, check for a defective voice terminal, and move voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem still exists, replace the circuit pack.
- (h) This indicates that the station went off-hook while the station was in the disconnect state. Use the status station command to determine the state of the station. The off-hook should have moved the station to in-service. No craft action is necessary.
- (i) This is the resulting code that is generated when the link between the circuit pack and the voice terminal is successfully reset. Normally no craft action is necessary. If the problem occurs several times, the circuit pack and the voice terminal may have a bad connection. Check wiring and jack. The problem may occur due to other errors. Check the user-reported trouble. If the problem occurs repeatedly, then escalate the problem.
- (j) This problem can be ignored.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Loca/ Digits/ Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Local Digital Loop Around Test (#58)		x	ND
NPE Crosstalk Test (#6)		x	ND
Hybrid Electronic Power Feed Test (#56)		x	ND
Hybrid Circuit and Conference Circuit Test (#57)		x	ND
Remote Digital Loop Around Test (#59)	x	x	ND
Station Lamp Update Test (#60)	x	x	ND
Station Audits Test (#61)	x	x	ND
Ringer Update Test (#62)	x	x	ND

* D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) Maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via administration. This only applies to analog stations. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1) Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and examining station, trunk, or external wiring.

Hybrid Electronic Power Feed Test (#56)

In this test, the software requests that the (Electronic Power Feed (EPF) be turned on for a given port. An attempt is made to turn on the power supply to the station. If no current is being drawn, this probably indicates that the station is not connected. If an overcurrent condition is sensed (that is, too much current is being drawn), this may indicate a short in the loop or a defective voice terminal. Depending on what condition is sensed, a message is returned stating that either the EPF was turned on successfully with no problems or that an overcurrent condition is sensed. This test is repeated once more 5 seconds later. If either test is not successful, the test will abort (see first ABORT entry in the table below).

Test #56 Hybrid Electronic Power Feed		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.

Test #56 Hybrid Electronic Power Feed (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	1) Although this test will never return a FAIL result, after running this test, the Error Log should be checked for any entries with error type 257 to examine the real results of this test. 2) If error type 257 does not appear in the Error Log within 10 seconds after completion of this test, it is safe to assume that the test sensed no problems with the power to the station. To verify that the station is powered up correctly, run a self-test on the station, if available, and check that all the feature buttons are operating. 3) If error type 257 appears in the Error Log, this indicates some problem with the power to the station. The craft should check for a short in the wiring, a damaged jack, a defective voice terminal, or an incorrect type of terminal. The message to turn on the power to the station was successfully sent to the port.

Hybrid Circuit and Conference Circuit Test (#57)

The Hybrid Circuit Test checks the amount of reflection from the Hybrid loop around circuitry and a conference test. Please be aware that if no station is connected to the port being tested, the results of the test will not be valid. The Tone/Clock circuit pack places a 1004-Hz tone on a time slot that the port circuit is listening on. A General Purpose Tone Detector (GPTD) is connected to another time slot that the same port circuit is talking on. The on-board microprocessor places the port in the loop around mode and the GPTD measures the level of the reflected signal.

The Conference Test is performed after the Circuit Test. The Conference Circuit Test will verify that the NPE is able to “listen” to several test tones and correctly conference them together. The test is executed in two parts. The first half of the test checks the operation of the NPE’s first three conference channels. The NPE is put in the loop around mode and instructed to talk on a selected time slot and listen to the 1004-HZ tone using the first three Conference Channels. The signal level and noise level of the conference output are then measured using a GPTD and checked to verify that they are within an acceptable range.

The second half of the Conference Test checks the operation of the NPE’s remaining four conference channels and follows the same procedure as above.

Test #57 Hybrid Circuit and Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display PORT CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #57 Hybrid Circuit and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #57 Hybrid Circuit and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	FAIL	Conference Test failed. User may be able to use conference circuit without difficulty in some cases. In other extreme cases, conference calling will be totally restricted. 1) Check the Tone/Clock and the Tone Detector circuit packs using test board CSS short. 2) Resolve any problems that are detected on the Tone/Clock or Tone Detector circuit pack. 3) If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Hybrid Line circuit pack.
57	FAIL	Hybrid circuit test failed. This could result in noisy or bad connections. 1) Run circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack using test board CSS short. 2) Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3) If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Hybrid Line circuit pack.
	PASS	Hybrid Circuit and Conference Circuit test passed. The hybrid circuitry is transmitting properly. 1) If complaints still exist, investigate by using other port tests, and by examining the station, wiring, and connections.

Hybrid Line Local Digital Loop Around Test (#58)

This test checks the control channel between the SPE (Switch Processing Element) and the port's digital circuitry. The SPE sends transparent data to the on-board microprocessor and compares the data echoed back. This test is repeated three times.

Test #58 Hybrid Line Local Digital Loop Around Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #58 Hybrid Line Local Digital Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1,2,3	FAIL	The control channel between the SPE and the port is not transmitting properly. This port is not operable. 1) Retry the test. 2) If failure still occurs, replace the circuit pack.
	PASS	Hybrid Line Local Digital Loop Around Test passed. The control channel is transmitting properly. 1) If complaints still exist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.

Hybrid Line Remote Digital Loop Around Test (#59)

This test checks the data link from the port circuit to the terminal. The on-board microprocessor sends a message to the terminal and checks for a proper return message. This test is repeated three times, with two out of the three attempts passing sufficient for this test to pass.

Test #59 Hybrid Line Remote Digital Loop Around Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	Internal System Error
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 59 Hybrid Line Remote Digital Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1,2,3	FAIL	Test failed on two out of three tries. The circuit pack is not receiving a proper return message from the voice terminal. The user will not be able to place or receive calls on this port. 1) Check for other errors and follow procedures to clear the errors. 2) Replace terminal and rerun test. 3) If test still fails, replace the circuit pack.
	PASS	Hybrid Line Remote Digital Loop Around Test passed. The hybrid circuit pack is sending and receiving proper messages to and from the voice terminal. 1) If problems still exist, investigate using other circuit pack tests and by examining the station, wiring, and connections.

Hybrid Line Station Lamp Updates Test (#60)

For this test, the software lights the lamps on the terminal based on the status record contained in the processor. The lamp updates will run only if the station is in-service.

Test #60 Hybrid Line Station Lamp Updates Test		
Error Code	Test Result	Description / Recommendation
1,2	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
3	ABORT	Station is in ready-for-service or out-of-service state. 1) Make sure terminal is connected. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	Hybrid Line Station Lamp Updates completed successfully. 1) If complaints still exist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.

Hybrid Line Station Audits Test (#61)

This is a series of three tests that are classified as audits. These audits will abort if attempted on an out-of-service station. The tests are as follows:

- . Switchhook audit—This is an update of the SPE records according to the circuit packs' records.
- . Bad Scan Inquiry—A message is sent uplink which contains a count that is generated due to certain events relating to the data link conditions. This is an indication of data transmission problems between the Hybrid circuit pack and the voice terminal.
- . EPF Inquiry—The status of the Electronic Power Feed (EPF) is sent uplink. Possible conditions are : EPF-on-ok, EPF-off, EPF-no-load, and EPF-on-overcurrent.

Test #61 Hybrid Line Station Audits Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	Internal System Error
	ABORT	Internal System Error
	ABORT	Internal System Error
	ABORT	Internal System Error
		1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #61 Hybrid Line Station Audits Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	Hybrid Line Station Audits passed. 1) Although this test will always return a PASS result, it is possible that it will enter error types 257 or 513 into the Error Log. To determine if there are any problems that don't show up in the test result, look for these error types in the Error Log. 2) If these errors appear in the Error Log, or if user complaints still exist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.

Hybrid Line Ringer Update Test (#62)

In this update, a “ringer on” or a “ringer off” message is sent to the firmware to start and stop the ringer on the set.

Test # 62 Hybride Line Ringer Update Test		
Error Code	Test Result	Description / Recommendation
3	ABORT	Request for Ringer Audit update was unsuccessful. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
I 000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension number of the port. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to section on Status Commands in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	Hybrid Station Ringer Update passed. 1) If complaints still exist, investigate using other circuit pack tests on this circuit pack, and by examining the terminal, wiring, and connections.

INADS (INADS Link)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
INADS	None	test inads-link	INADS Link

The INADS (INADS Link) maintenance object (MO) represents the software and communication link required by the switch to make a call to the Initialization and Administration System (INADS). The purpose of the INADS MO is to check the communication link between the System 75 and INADS and to verify the alarm notification process works correctly. An INADS technician can test the process remotely to verify that alarms will be reported to INADS, or a system technician may want to test the connection while on-site at installation time or during subsequent service calls.

The INADS MO is never alarmed, only errors are logged. The errors are only logged as a “result of the test inads-link command being issued.

Hardware Error Log Entries and Test to Clear Values

The Hardware Error Log entries are described as part of the INADS Link Test description below.

Short and Long Test Sequences.

The test inads-link command is different from other test commands. This command does not have a long or short option, and the test on the inads link does not have an associated test number. When the test inads-link command is issued, the user immediately sees either “Command successfully completed” or “Command failed” message. Refer to INADS Link Test description below for more details.

INADS Link Test (No test number)

The INADS Link Test attempts to place a call to INADS (in the background) to verify the communication link to INADS. When the test inads-link command is entered, the user immediately sees either “Command successfully completed” or “Command failed”. The “Command failed” message appears when a previously run test inads-link command is in progress or System 75 has active alarms that must be reported to INADS. The “Command successfully completed” means the switch will start the attempt to call INADS in 2 minutes (the test will still run even if Alarm Origination is disabled). The 2-minute delay allows a remote INADS technician enough time to hang up the call and thus free up the INADS line so that the switch can call INADS back. As error conditions are encountered, errors are logged against INADS. Error codes 1 through 9 can be logged if the test result was “Command successfully completed” and error codes 10 and 11 can be logged if the test result was “Command failed”. An error is also logged against INADS if the call to INADS finally succeeds. The INADS software (release 3.2 or later) recognizes this special “test inads” type of alarm and will automatically open and then close a trouble ticket, which indicates that the reason for the trouble ticket is a test inads-link command. The trouble ticket alarm will contain a description field of TESTING INADS LINK.

After entering the command, it may take as long as 9 minutes for the switch to place the call . and for INADS to respond. The Error Log should be examined (use the category inads) 10 minutes after successfully entering the command to determine if the call was successful.

Use the following table to interpret the Error Log entries.

INADS Link Error Log Entries Test		
Error TYPE	Aux Data	Description / Recommendation
1	0	The call was successfully placed to INADS. No trouble found.
2	0	Informative error indicating that alarm origination was disabled at the time of the test. The test will still run even if alarm origination is disabled. 1) If Alarm Origination is desired, then enable this feature via the change system-parameters maintenance form.
3	0	The INADS connection is currently in use. 1) Wait 10 minutes and retry this command.
4	0	INADS did not answer the alarm origination call. 1) Verify INADS is up and running. 2) Verify the INADS phone number and switch product id are correct via the change system-parameters maintenance form. 3) Enable alarm origination via the change system-parameters maintenance form and test the Maintenance/Tape Processor (MAINT) by issuing the test processor command. . If MAINT Tests 102 and 103 do not pass, then refer to MAINT documentation. 4) Retry the command.
5	0	No INADS phone number administered. 1) Administer the INADS phone number via the change system-parameters maintenance form. 2) Retry the command.
6	0	INADS did not send the acknowledgment message to the "test inads alarm" message. 1) Verify the INADS phone number and switch product id are correct via the change system-parameters maintenance form. 2) Verify INADS is up and running. 3) Retry the command.

INADS Link Error Log Entries Test (Contd)		
Error Type	Aux Data	Description / Recommendation
7	0	INADS sent a negative acknowledgment to the "test inads alarm" message.
8	0	INADS sent an unknown acknowledgment to the "test inads alarm" message. 1) Verify product id on the switch and in the INADS data base are the same. Use the change system-parameters maintenance form to determine the product id the switch has. 2) Rerun the test.
9	0	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10	0	There is already a test inads-link command in progress. 1) Wait 10 minutes for the present command to finish. 2) Review the results of the present command by viewing the Error Log and selecting the category inads-link.
11	0	The switch is trying to report alarms to INADS. The test cannot be run at this time. 1) Wait 10 minutes and retry the command.

INFC1 (Interface 1 Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
INFC1 (a)	MAJOR		Interface Circuit Pack

Note:

- (a) Interface 1 circuit pack is part of the common hardware to all four Switch Communication Interface Links. Look for the SC-INTF maintenance object and error type 1 in Hardware Error Log. If the error exists, refer to SC-INTF (System Communication Interface) maintenance section for procedures to resolve the error. The alarm will be retired after the error is resolved.

Switch Communication Interface (SCI) in System 75 provides up to four high speed synchronous physical links that connect a System 75 with an adjunct processor [for example, AUDIX, Call Management System (CMS)], or Enhanced DIMENSION® PBX, System 75s, or System 85s in a Distributed Communications System (DCS) environment. SCI is implemented either by a suite of three circuit packs termed Interface 1 (TN716), Interface 2 (TN738), and Interface 3 (TN719), or by a single Processor Interface circuit pack (TN765). The physical configuration of SCI is shown in Figure 6-16. The following paragraphs describe the Interface 1 (TN716) circuit pack maintenance.

Interface 1 circuit pack provides communication between Switch Processing Element (SPE) and Interface 2 circuit pack over System Bus (S-BUS) and supports S-BUS protocol for interrupts, error reporting, and bus control. The Interface 1 circuit pack is part of common hardware to all four SCI Links, and the SC-INTF maintenance monitors the health of Interface 1 circuit pack. All errors detected on the Interface 1 circuit pack are reported to SC-INTF maintenance. The MO name appearing in Hardware Error Log is SC-INTF instead of INFC1. The error type 1 in Error Log is designated for error indication of the Interface 1 circuit pack. Refer to SC-INTF (System Communication Interface) maintenance section for procedures to resolve the errors of the Interface 1 circuit pack.

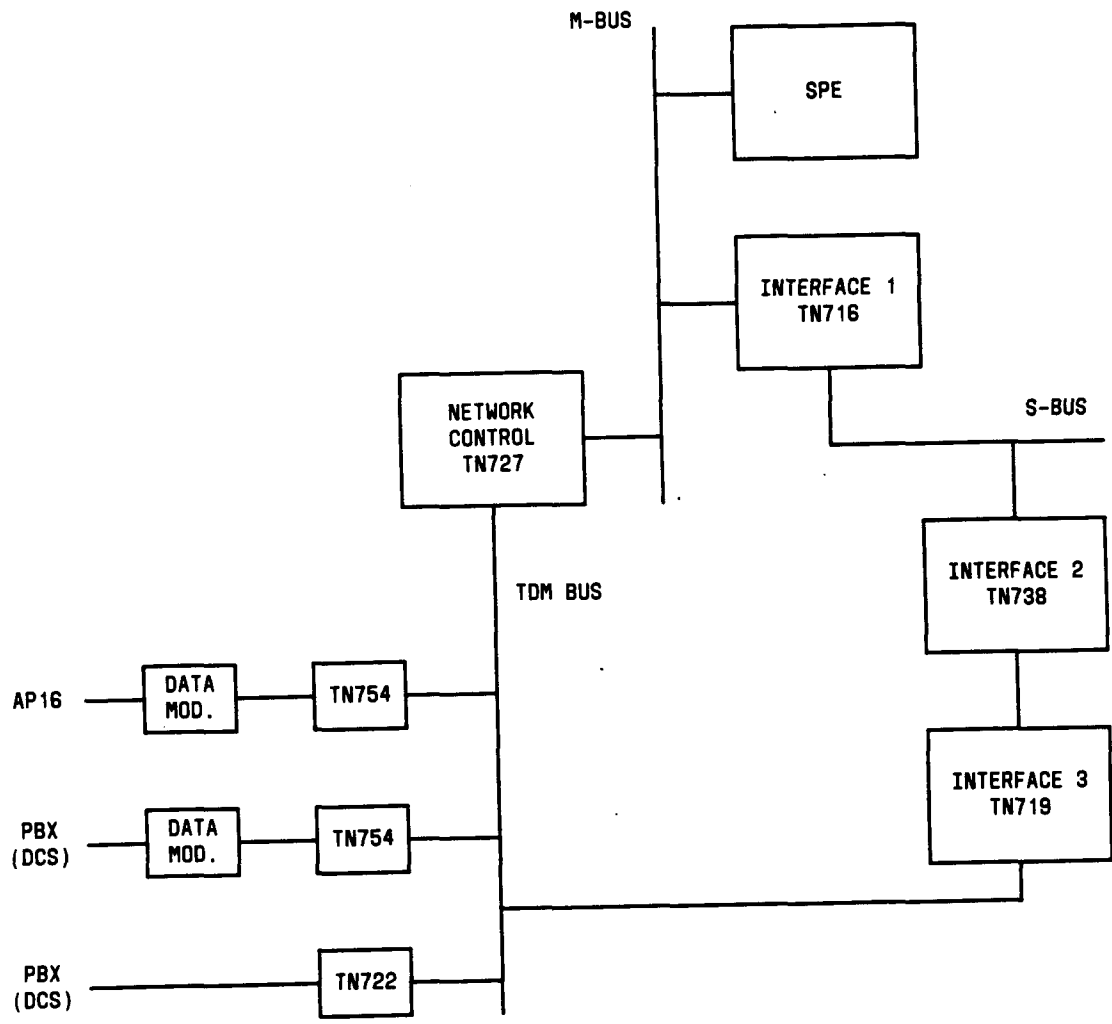


Figure 6-16. SCI Architecture with Inteface 1 Circuit Packs

INFC2 (Interface 2 Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
INFC2 (a)	MAJOR		Interface 2 Circuit Pack

Note:

- (a) Interface 2 circuit pack is part of the common hardware to all four Switch Communication Interface Links. Look for the SC-INTF maintenance object and error types 257, 769, 1025, and 1537 in Hardware Error Log. If the error exists, then refer to SC-INTF (System Communication Interface) maintenance documentation for procedures to resolve the error. The alarm will be retired after the error is resolved.

Switch Communication Interface (SCI) in System 75 provides up to four high speed synchronous physical links that connect a System 75 with an adjunct processor [AUDIX, Call Management System (CMS)], or Enhanced DIMENSION PBX, System 75s, or 85s in a Distributed Communication System (DCS) environment. SCI is implemented either by a suite of three circuit packs termed Interface 1 (TN716), Interface 2 (TN738), and Interface 3 (TN719) or by a single Processor Interface circuit pack (TN765). The SCI architecture with Interface 1, 2, 3 circuit packs is shown in Figure 6-17. The following paragraphs describe the Interface 2 (TN738) maintenance circuit pack.

Interface 2 circuit pack communicates with the SPE via the Interface 1 circuit pack and with the Interface 3 circuit pack to the TDM Bus, forms a channel to the adjunct processor for transmission of data for DCS, CMS, AUDIX, and AP features using the BX.25 Protocol. The Interface 2 circuit pack implements the packet layer and link layer of the BX.25 protocol and some maintenance functions—performing periodic background testing on itself and parts of the Interface 3 circuit pack, as well as controlling loop around testing of each SCI Link.

Interface 2 circuit pack is part of the hardware common to all four SCI Links. All errors detected on the Interface 2 circuit pack are reported to the SC-INTF maintenance. The SC-INTF maintenance monitors the health of the Interface 2 circuit pack. The MO name appearing in the Hardware Error Log is SC-1 NTF instead of INFC2 for errors of the Interface 2 circuit pack. Refer to SC-INTF (System Communication Interface) maintenance documentation for procedures to resolve the errors. The error types 257, 769, 1025, and 1537 of SC-INTF in Hardware Error Log are designated to indicate the errors of Interface 2 circuit pack.

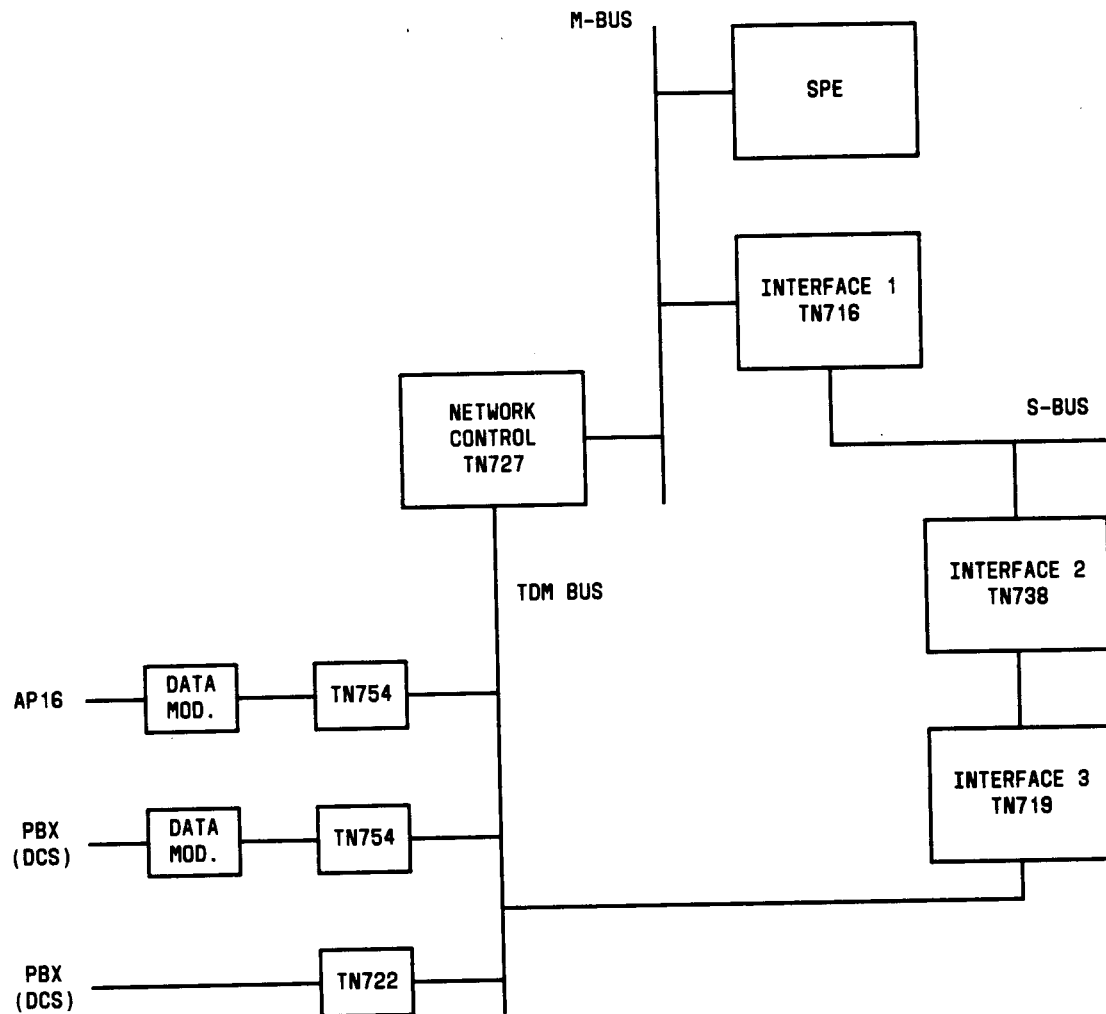


Figure 6-17. SCI Architecture with Interface 2 Circuit Pack

INFC3-BD (Interface 3 Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
IN FC3-BD (a)	MAJOR		S/A Interface 3 Circuit Pack

- (a) interface 3 circuit pack is part of the common hardware to all four Switch Communication Interface Links. Look for the SC-INTF maintenance object and error type 513 in Hardware Error Log. If the error exists, then refer to SC4NTF (System Communication Interface) maintenance documentation for procedures to resolve the error. Once the error is resolved, the alarm will be retired.

Switch Communication Interface (SCI) in System 75 provides up to four high speed synchronous physical links that connect a System 75 with an adjunct processor [AUDIX, Call Management System (CMS)], or Enhanced DIMENSION PBX, System 75s, or 85s in a Distributed Communications System (DCS) environment. SCI is implemented either by a suite of three circuit packs termed Interface 1 (TN716), Interface 2 (TN738), and Interface 3 (TN719), or by a single TN765 Processor Interface circuit pack. The following paragraphs describe the TN719 Interface 3 circuit pack maintenance.

Interface 3 circuit pack terminates Data Communication Protocol (DCP) for data coming from an Adjunct Processor (AP) and passes data from AP to Interface 2 circuit pack. Interface 3 circuit pack contains special hardware for synchronous/asynchronous interface and some of the data module functions. The four ports on the Interface 3 circuit pack can be administered with data extensions and all ports access the TDM Bus directly. The SCI physical configuration is shown in Figure 6-18.

The Interface 3 circuit pack maintenance shares the maintenance strategy of Common Port Board. The MO name appearing in the Hardware Error Log is INFC3-BD. Refer to the XXX-BD (Common Port Board) maintenance section for procedures to resolve the error.

Interface 3 circuit pack is part of the hardware common to all four SCI Links. The SC-INTF maintenance monitors the health of the Interface 3 circuit pack. Look for the SC-INTF MO and error type 513 in the Hardware Error Log. If the error exists, then refer to SC-INTF (System Communication Interface) maintenance documentation for procedures of resolving the error.

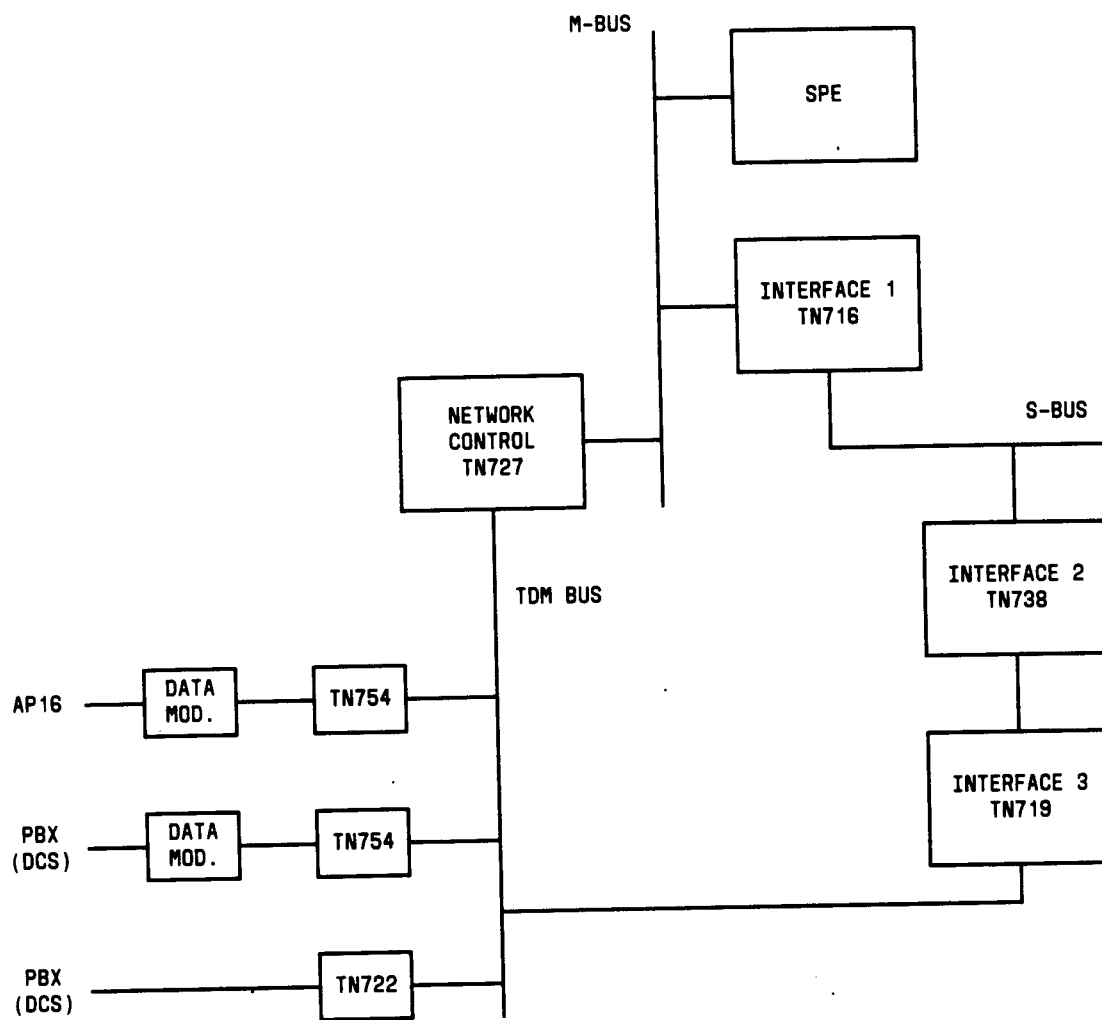


Figure 6-18. SCI Architecture with Interface 3 Circuit Packs

INT-PT (Interface Port)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
INT-PT (a)	MAJOR		Interface Port

Note:

- (a) The INT-PT alarm indicates that the physical Port on the TN719 Interface 3 circuit pack or on the TN765 Processor Interface circuit pack is defective. The Port field of the Alarm Log contains the port id of the defective port. The Interface Port maintenance is implemented as part of the Processor Interface Link maintenance. Look for the SC-LINK maintenance object and error type 769 in the Hardware Error Log. If the error exists, then refer to SC-LINK (Processor Interface Link) maintenance documentation for procedures to resolve the error. The alarm will be retired after the error is resolved.

Switch Communication Interface (SCI) in System 75 provides up to four high speed synchronous physical links that connect a System 75 with an Adjunct Processor [AUDIX, Call Management System (CMS)], or Enhanced DIMENSION PBX, System 75s, or 85s in a Distributed Communications System (DCS) environment. SCI is implemented either by a suite of three circuit packs termed Interface 1 (TN716), Interface 2 (TN738), and Interface 3 (TN719), or by a single Processor Interface circuit pack (TN765). The Interface Port maintenance maintains the four physical ports on the Interface 3 circuit pack or on the Processor Interface circuit pack.

The interface Port maintenance is implemented as part of the Processor Interface Link maintenance. The Processor Interface Link maintenance monitors the health of Interface Port. All errors detected on the Interface Port are reported to the Processor Interface Link maintenance. The MO name appearing in the Alarm Log is INT-PT and the Port field contains the port ID of the physical port on the Interface 3 or on the Processor Interface circuit pack.

The SC-LINK MO and error type 769 indicates an Interface Port hardware error. Refer to SC-LINK (Processor Interface Link) maintenance documentation for procedures to resolve the error. The INT-PT alarm will be retired after the error is resolved.

JRNL-LNK (Journal Printer Link)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
JRNL-LNK (a)	MINOR	test journal pms-log;wakeup-log ;	Journal Printer Link
JRNL-LNK	WARNING	test journal pms-log;wakeup-log	Journal Printer Link

Note:

- (a) Port column on Alarm Log Screen identifies the Journal Printer Link, that is, 0 for wakeup-log Journal Printer Link and 1 for pros-log Journal Printer Link.

in System 75 R1V3, there are up to two journal printers. They are identified as the wakeup-log printer that is shared between the Automatic Wakeup feature and the Emergency Access to Attendant feature to print scheduled reports and log of events, and the pros-log printer that is used as a backup of the Property Management System (PMS) output device to print the audit trail data of all PMS transactions executed by System 75 and the PMS Housekeeping Status Change events while the PMS link is not available. The journal printer link is administered to a data extension which provides a standard RS-232C interface to the printer. The printer can be connected through a data module (PDM, MPDM, DTDM) and a port on the TN754 Digital Line circuit pack, or through an Asynchronous Data Unit (ADU) and a port on the TN726 Digital Line circuit pack.

Journal Printer Link maintenance provides a strategy in System 75 for maintaining the link between System 75 and an external Journal Printer device. The strategy includes a set of tests for periodic diagnosis, detection of errors during normal operation, actions for troubleshooting, and raising alarms for serious problems. Journal Printer Link maintenance uses a try-and-wait mechanism for maintaining the Journal Printer Link. If a Journal Printer Link is torn down due to an error, Journal Printer Link maintenance intends to bring the link up immediately. If the trial of Link Setup fails, Journal Printer Link maintenance will wait for 5 minutes before the next retry. If the number of retries reaches the value of a threshold (15 in R1V3), a Minor alarm is raised.

Journal Printer Link maintenance does not cover the maintenance of the elements composing the journal printer physical link, for instance, the external printer device, Data Module (PDM/MPDM/DTDM), Digital Line Port of TN754 Digital Line circuit pack, ADU, Data Line Port of TN726 Data Link circuit pack, and Data Channels on TN727 Netcon circuit pack. If Journal Printer Link maintenance cannot restore the Journal Printer Link, then the maintenance tests of these individual components of the Journal Printer Link must be executed to diagnose faults.

Procedures for Restoring the Journal Printer Link

1. Get the status of the Journal Printer Link.

Enter status journal-printer wakeup-log;pms-log command and make sure that the Journal Printer Link is not busied out for maintenance. If the link is down, then continue to next step.

2. Where does the Journal Printer Link connect?

Enter display system hospitality to determine the destinations of the Journal Printer Link.

3. Get the status of the data extension.

Enter status data <extension> command and verify whether the data extension is in in-service/idle state. If the data extension is NOT available, then look for the extension number in Alt Name field of Hardware Error Log. Refer to XXX-BD (Common Port Board) maintenance documentation for resolutions.

4. Is a data channel on Netcon circuit pack in in-service/idle state?

Enter list data command and find out the extension numbers of data channels on Netcon circuit pack. Enter status data <extension> command and make sure that at least one data channel is in in-service/idle state. If no data channel is available, then look for DATA-CHL/DATA-CON/DATA-BD errors in the Hardware Error Log. If present, refer to DATA-CHL (Network Control Data Channel) maintenance documentation; if none are present, escalate the error.

5. Is the external printer device available?

Make sure that the printer device is ON-LINE and ready for service. Check the physical connectivity between Data Module and the printer device.

It is recommended to busy out the Journal Printer Link before executing maintenance tests. If the Journal Printer Link is busied out, then all Journal Printer Link maintenance actions are deactivated.

Hardware Error Log Entries and Test to Clear Values

Journal Printer Link Maintenance Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test journal pms-log!wakeup-log s
0*	o		MINOR	OFF	test journal wakeup-log!pms-log
18(a)	o		WARNING	OFF	release journal wakeup-log!pms40g
257(b) 257(c)	2 20	Link Retry Test (#215)	MINOR	OFF	test journal wakeup-log!pms-log l
51 3(d)	3 to 6				test journal wakeup-log!pms-log
769(e)	o				
1 025(f)	5	None			release journal wakeup-log! pros-log

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- The Journal Link and the PMS link are administered with the same extension but the printer is not connected. Refer to the Procedures for Restoring the Journal Link section for resolution.

Notes:

- Craft busied out the journal printer link via the busyout journal wakeup-log!pms-log command. The link is torn down. Enter release command to restore the link.
- Link Retry Test (#21 5) fails because the Journal Link could not be set up. Refer to the Procedures for Restoring the Journal Printer Link section for resolution.
- Link Retry Test (#21 5) fails due to an internal system error. Retry the test journal wakeup-log!pms-log command.
- The Journal Printer physical link is down due to the following causes: cable to the printer device is disconnected, the printer device is powered off, or the data extension where the printer device connects to has been busied out. The Aux Data field contains the Channel ID of Data Channels on Netcon circuit pack (that is, 3 for Channel 01, 4 for Channel 02, 5 for Channel 03, 6 for Channel 04). Check the connectivity of wire and cable among wall jacket, data module, and the printer device. Enter status data <extension> and verify that the data extension of the printer device is in in-service/idle state. If the data extension is not available, then refer to the Procedures for Restoring the Journal Printer Link section for resolution.
- This error indicates that the printer device is in an off-line state. For example, paper jam or paper out for a printer device. Check the printer device and act promptly to put it back to on-line state. Enter test journal wakeup-log!pms-log command to set up the printer link.
- The Journal Link has been busied out for maintenance at the request of the PBX. The Journal Link is torn down. The Journal Link maintenance will stop attempting to re-establish the Journal Link. To restore the Journal Link, enter release journal wakeup-log!pms-log command.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the Link Tear *Down Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Link Tear Down Test (#21 3)		x	D
Link Retry Test (#21 5)	x	x	ND

* D = Destructive
ND = Non-destructive

Note: In the long test sequence, only the results of Test #214 are displayed. Test #21 4 is the Link Reset Test, that is, the combination of Test #213 and Test #215.

Link Tear Down Test (#213)

This test is destructive.

Link Tear Down Test disconnects the existing link between System 75 and the external printer device. If the link has been disconnected already, then this test just returns PASS. . All resources allocated for a Journal Printer Link are released after this test.

Test #213 Link Tear Down Test		
Error Code	Test Result	Description / Recommendation
2008 2000	ABORT	Internal System Error
	ABORT	Internal System Error
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1010	ABORT	The Journal Printer link has been busied out. 1) Enter release journal wakeup-log;pms-log command to release the journal printer link from busy out state. 2) Retry test journal wakeup-log;pms-log long command to execute the test.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	The Journal Printer Link is torn down.

Link Retry Test (#215)

Link Retry Test sends a message to the journal printer management software process to make a data call to the extension where the printer device connects. If the Journal Printer Link is already up, then this test passes without making any data call.

Test #215 Link Retry Test		
Error Code	Test Result	Description / Recommendation
2008 2000	ABORT	Internal System Error
	ABORT	Internal System Error
	ABORT	Internal System Error Response to the request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1010	ABORT	The Journal Printer Link has been busied out. 1) Enter release journal wakeup-log;pms-log command to release the journal printer link from busy out state. 2) Retry test journal wakeup-log;pms-log long command to execute the test.
257	ABORT	Internal System Error. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	The Journal Printer Link cannot be established. 1) Refer to the Procedures for Restoring the Journal Printer Link section for procedures to restore the Journal Printer Link.
	PASS	The Journal Printer Link is up.

MAINT (Maintenance/Tape Processor or Maintenance Circuit Pack)

MO blame As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
MAINT	MINOR	test maintenance s	Maintenance/Tape Processor or Maintenance Circuit Pack

For System 75 R1V3 XE, the 8086 Processor and Maintenance/Tape Processor (MTP) each comprise roughly half of the TN759 Processor circuit pack. The 8086 Processor portion is responsible for the execution of the System 75 software package. This includes all of the call processing, maintenance, and administration functions. The 8086 Processor is the most critical component to correct operation of the system.

The Maintenance/Tape Processor portion of the TN759 takes the place of the Maintenance (TN731, TN731B) and Tape Controller (TN729) circuit packs found in non-XE systems. In non-XE systems, the Maintenance circuit pack (TN731, TN731B) is responsible for monitoring environmental conditions and the sanity of the 8086 Processor. Additionally, it provides the serial interfaces for the System Access Terminal (SAT) and SMDR port, and the communication interface to INADS for alarm reporting and remote maintenance capability. (On the system backplane, the SAT port is labeled TERM and the SMDR port is labeled DCE.)

In XE systems, the Maintenance/Tape Processor provides all the functions of the Maintenance circuit pack, as well as containing the hardware required for controlling the tape drive.

Warning: Whenever the Processor circuit pack or any Processor complex circuit pack needs to be replaced, the system must be powered down before doing replacement.

Hardware Error Log Entries and Test to Clear Values

Maintenance/Tape Processor and Maintenance Circuit Pack (MAINT) Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test maintenance-bd s
1(a)	Any	Reset Test (#1 01)	MINOR	ON	reset maintenance l
257	Any	Sanity Handshake Test (#1 06)			test maintenance s r 3
513	Any	Analog Loop Around Test (#1 03)	MINOR	ON	test maintenance s r 3
769	Any	Dual Port Ram Test (#1 04)	MINOR	ON	test maintenance l r 3
1025	Any	Outpulse Relay Test (#102)	MINOR	OFF	test maintenance s r 6
1537(b)	0	SAT Loop Around Test (#228)	MINOR	ON	test maintenance s r 4
1793(b)	0	Aux Loop Around Test (#229)	MINOR	ON	test maintenance s r 4

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) For the Maintenance circuit pack, alternatively issue the test maintenance long command to perform a reset.
- (b) These errors only pertain to the Maintenance/Tape Processor and NOT to the Maintenance circuit pack.

Craft-Demanded Tests: Descriptions and Error Codes

The short and long test sequences are executed using the test maintenance-bd short and test maintenance-bd long commands. The reset test sequence is executed using the reset maintenance-bd command.

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the Reset *Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Reset Test (#1 01)	X	X	D
Sanity Handshake Test (#1 06)	x	x	ND
Dual Port Ram Test (#1 04)		x	D
SAT Loop Around Test (#228) (a)	x	X	D
Analog Loop Around Test (#1 03)	X	X	ND
Output Relay Test (#102)	x	x	ND
Aux Loop Around Test (#229) (a)	X	X	ND

* D = Destructive

ND = Non-destructive

(a) System 75 XE only.

Reset Test (#101)

This test is destructive.

This test will reset the Maintenance/Tape Processor or Maintenance circuit pack. The destructive nature of this test will cause a local SAT session or INADS session to logoff, the SMDR port to terminate data transmission, any current tape access to terminate, and will tear down any remote access INADS connection. If this test is not run from a remote SAT, log in to system after running test and examine the Error Log for errors against MAINT error type 1. If present, Test 101 FAILED.

Test #101 Reset Test		
Error Code	Test Result	Description / Recommendation
10101	ABORT	Test has been disabled via software patch.
10102	ABORT	System resources required to run this test are not available.
10103	ABORT	Either system resources required to run this test were not available or the system was not able to put the Maintenance circuit pack/MTP into the proper state.
10104	FAIL	Internal System Error. This is NOT a failure of the Maintenance circuit pack/MTP. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10105	FAIL	The Maintenance circuit pack/MTP did not respond to being reset. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to fail, replace the Processor circuit pack if in an XE or the Maintenance circuit pack if in a non-XE system.

Test #101 Reset Test (Contd)		
Error Code	Test Result	Description / Recommendation
10106	FAIL	The MTP was reset, but responded with a status NOT PASS indicating it did not pass initialization correctly. The MTP is not functioning correctly. The system should continue to operate but will not have the ability to save translation to tape or read tape if system needs to be rebooted. Environmental monitoring is also lost. 1) Repeat test. 2) If the test continues to fail, replace the Processor circuit pack if in an XE system or the Maintenance circuit pack if in a non-XE system.
	PASS	The Maintenance/Tape Processor was reset, it did pass initialization correctly. The other MTP tests should be examined to verify that the MTP is functioning normally. 1) Execute test maintenance-bd short and verify that the Maintenance circuit pack/MTP is operating correctly.

Outpulse Relay Test (#102)

This test validates correct operation of the remote access CO trunk used by INADS. The Maintenance circuit pack/MTP will go off-hook and then on-hook on this trunk. If loop current is detected, then the test passes. This test is not allowed if the remote access line is in use.

Note: The INADS trunk must be Loop Start type.

Test #102 Outpulse Relay Test		
Error Code	Test Result	Description / Recommendation
1018	ABORT	The test has been disabled via administration. 1) To enable test, set the Test Remote Access Port field to "y" on the System-Parameters Maintenance screen form.
10201	ABORT	System resources required to run this test are not available.
10202	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10203	ABORT	Maintenance circuit pack/MTP did not respond to test request. 1) Repeat test at 1 minute intervals for a maximum of 5 times. 2) If only the Outpulse Relay Test is aborting, escalate the problem to next tier. 3) If all tests are aborting, execute reset maintenance in order to reset Maintenance circuit pack/MTP and examine results of Reset Test (#1 01).
10205	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10206	ABORT	System could not determine if testing of INADS port is administered. 1) Check System-Parameters Maintenance screen form for legal entry in Test Remote Access Port field. 2) Repeat test. 3) If data is correct on System-Parameters Maintenance screen form, escalate to next tier level.

Test # 102 Outpulse Relay Test (Contd)		
Error Code	Test Result	Description / Recommendation
10207	ABORT	The test has been disabled via a software patch.
10208	ABORT	The remote access port is busy. INADS is probably dialed into the switch. 1) If INADS is dialed in, INADS trunk is working. No need to run test.
10204	FAIL	Maintenance circuit pack/MTP reported test failure. No loop current detected. 1) Repeat test. 2) If test continues to fail, examine INADS trunk for connectivity; manually check for loop current. 3) If INADS trunk checks out fine, but test still fails, check backplane connector wiring. 4) If backplane wiring checks out fine, replace Processor circuit pack at earliest convenience if system is an XE; if non-XE, replace the Maintenance circuit pack.
	PASS	Maintenance circuit pack/MTP detected loop current on remote access port. 1) If system cannot call INADS or INADS cannot contact system, check with local Central Office for problems with INADS trunk. 2) Verify that INADS trunk is loop start. 3) Execute the test inads command and examine results of that test.

Analog Loop Around Test (#103)

This test does an on-board loop around using the Maintenance circuit pack/MTP INADS channel. Test data is sent through the on-board modem out toward the INADS trunk. The data is looped around before the actual trunk and comes back into the on-board modem. The data is then verified for integrity.

Note: This test does not send any data onto the INADS trunk, but the test does require the trunk to be present to pass.

Test #103 Analog Loop Around Test		
Error Code	Test Result	Description / Recommendation
1018	ABORT	The test has been disabled via administration. 1) To enable test, set the Test Remote Access Port field to “y” on the System-Parameters Maintenance screen form.
10301	ABORT	System resources required to run this test are not available.
10302	ABORT	Internal System Error 1) Retry the command at 1“ minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10303	ABORT	Maintenance circuit pack/MTP did not respond to test request. 1) Repeat test at 1 minute intervals for a maximum of 5 times. 2) If only the Analog Loop Around Test (#103) is aborting, escalate the problem to next tier. 3) If all tests are aborting, execute reset maintenance-bd in order to reset Maintenance circuit pack/MTP and examine results of Reset Test (#1 01).
10305	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to. abort, escalate the problem.
10306	ABORT	System cannot determine if testing of INADS port is administered. 1) Check System-Parameters Maintenance screen form for legal entry in Test Remote Access Port field. 2) Repeat test. 3) If data is correct on System-Parameters Maintenance screen form, escalate to next tier level.

Test #103 Analog Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
10307	ABORT	The test has been disabled via a software patch.
10308	ABORT	The remote access port is busy. INADS is probably dialed into the switch. 1) Wait until INADS session is terminated, repeat test.
10304	FAIL	Maintenance circuit pack/MTP reported test failure. The system will not be able to reliably contact INADS with alarm data. The system will otherwise continue to provide service. 1) If MTP Output Relay Test (#102) is also failing, check for presence of INADS trunk and resolve INADS trunk problems. 2) If Test #102 passes, the fault is on the Processor circuit pack if system is an XE; if non-XE system, the fault is on the Maintenance circuit pack. The pack should be replaced at customer's convenience.
	PASS	Maintenance circuit pack/MTP detected correct data through loop back connection. 1) If system cannot call INADS or INADS cannot contact system, check with local Central Office for problems with INADS trunk.

Dual Port Ram Test (#104)

This test is destructive.

This test will terminate any local SAT or INADS session, disrupt SMDR output, and terminate any active tape operation. This is a coordinated test of the Maintenance circuit pack/MTP dual port ram (DPR). The DPR is a section of memory that is shared by the Maintenance circuit pack/MTP and the 8086 Processor. Control messages and data are passed through the DPR. The test forces both sides to read and write the DPR simultaneously in alternate locations.

The DPR test causes the local SAT to logoff prior to the test result being displayed. To determine the test result, if the test is run from the local SAT, craft should log back in and examine the Error Log for an error against MAINT, with error type 769, no aux data. This error entry indicates that the DPR test did fail and that the Processor circuit pack should be replaced.

If the test is being run from somewhere other than the local SAT (for example, remote access, etc.) the test results will be displayed on the screen.

Test #104 Dual Port Ram Test		
Error Code	Test Result	Description / Recommendation
10401	ABORT	System resources required to run this test are not available.
10403	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10405	ABORT	The test has been disabled via a software patch.
10402	FAIL	Internal System Error. This is NOT a failure of the Maintenance circuit pack/MTP. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #104 Dual Port Ram Test (Contd)		
Error Code	Test Result	Description / Recommendation
10404	FAIL	The dual port RAM is not functioning correctly. Communication between the Processor and Maintenance circuit pack/MTP is lost. The system will not be able to report environmental alarms, or reboot from tape if the need arises. 1) Repeat the test. If it continues to fail, replace the Processor circuit pack if in an XE system; if non-XE system, replace the Maintenance circuit pack.
	PASS	Dual port RAM is functioning. Communication does exist between the 8086 Processor and the Maintenance circuit pack/MTP.

Sanity Handshake Test (#106)

The Sanity Handshake Test is just a query from the 8086 Processor to the Maintenance circuit pack/MTP. The Maintenance circuit pack/MTP must reply for the test to pass.

Test #106 Sanity Handshake Test “		
Error Code	Test Result	Description / Recommendation
10601	ABORT	System resources required to run this test are not available.
10602	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
10604	ABORT	The test has been disabled via a software patch.
10603	FAIL	The Maintenance circuit pack/MTP did not respond to the sanity handshake query. 1) Reset the Maintenance circuit pack/MTP using reset maintenance-bd. Then run short test sequence on Maintenance circuit pack/MTP using test maintenance-bd short. 2) If test continues to fail, replace the Processor circuit pack if system is an XE; if non-XE system, replace the Maintenance circuit pack at the earliest convenience.
	PASS	The Maintenance circuit pack/MTP did respond to the sanity handshake query. 1) Examine other Maintenance circuit pack/MTP tests for errors.

MTP SAT Loop Around Test (#228)

This test is destructive.

This test only applies to the Maintenance/Tape Processor and NOT to the Maintenance circuit pack (that is, only for XE systems with a TN759).

This test places the SAT port of the MTP into a loop around mode and verifies the data integrity of the port. Any data being displayed on the SAT while this test is running will be lost.

Test # 228 MTP Loop Around Test		
Error Code	Test Result	Description / Recommendation
22801	ABORT	The test has been disabled via a software patch.
22802	ABORT	System resources required to run this test are not available.
22803	ABORT	Internal System Error
22804	ABORT	Response to the test request was not received within the allowable time period.
22806	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
22805	FAIL	The SAT port failed the Loop Back Test. The SAT will probably be unusable for administration or maintenance. Remote access can still be used. 1) Repeat short test. 2) If test continues to fail, the Processor circuit pack should be replaced at the earliest convenience.
	PASS	The SAT channel passed the Loop Back Test. 1) If the local SAT is not usable, check the SAT itself and the cabling.

MTP Auxiliary Loop Around Test (#229)

This test only applies to the Maintenance/Tape Processor (MTP) and NOT to the Maintenance circuit pack (that is, only for XE systems with a TN759).

This test places the Auxiliary channel (SMDR port) of the MTP into a loop around mode and verifies the data integrity of the port. The auxiliary channel is used as the SMDR output port.

Test #229 MTP Auxiliary Loop Around Test		
Error Code	Test Result	Description / Recommendation
1018	ABORT	The test has been disabled via administration. This test is not activated until the SMDR port has been administered. This is done via the System-Parameters features screen. 1) Administer SMDR port, then repeat test maintenance-bd.
22901	ABORT	The test has been disabled via a software patch.
22902 22903 22904	ABORT	System resources required to run this test are not available.
22905	ABORT	Internal System Error
22906	ABORT	Response to the test request was not received within the allowable time period.
22908	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
22907	FAIL	The Auxiliary channel failed the Loop Back Test. The SMDR port is probably not sending any SMDR data to the SMDR collection device. 1) Repeat short test. 2) If test continues to fail, the Processor circuit pack should be replaced at the earliest convenience.
	PASS	The Auxiliary channel passed the Loop Back Test. The SMDR port is functioning correctly. 1) If no SMDR data is being recorded, check the SMDR collection device and verify it has been set up and connected correctly.

MEM-BD (Memory)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
MEM-BD (a)	MAJOR	test memory s	Memory

(a) This refers to all memory maintenance objects (MEMORY, MEM1-BD, and MEM2-BD).

The Memory circuit pack is where the System 75 software resides and where it is executed from after it is loaded from tape. The Processor circuit pack and the Memory together form the most critical component for all system operation.

For all system activity, the Processor must be able to access the Memory. If it cannot, then the system will go into SPE-down mode. In SPE-down mode, it is possible that fatal Memory errors show up as Processor circuit pack errors. In other words, the Processor and the Memory are closely tied together.

Different releases of System 75 have different Memory circuit packs. The TN734 can only be used in R1V1 through R1V3 medium cabinets. The TN761 can only be used in R1V2 XE and R1V3 XE.

Hardware Error Log Entries and Test to Clear Values

Memory Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test memory s
1-30	0	Read All Memory Test (#85)	MAJOR	ON	test memory l r 5
257-287	0	Read All Memory Test (#85)	MAJOR	ON	test memory l r 1
513	0	Memory Error Detection Correction Exception Test (#87)	MAJOR	ON	test memory r 3
769(a)	0	RAM Checksum Test (#86)	MAJOR	OFF	test memory l r 2
1025(a)(b)	0	RAM Checksum Test (#86)	MAJOR	ON	None
1281(c)	0	Memory Functional Test	MAJOR	ON	None

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) The RAM Checksum Test is reported as ON-BOARD for all releases. This is incorrect, it should be treated as OFF-BOARD.
- (b) This test is performed only on reboot. Therefore, try to reboot the system if possible. The command line to reboot the system is reset system 4 or reset system 5. If alarm is still present, replace the Memory circuit pack.
- (c) This alarm is cleared during a reset system 4 or reset system 5. Therefore, try these commands if possible. If alarm is still present, replace the Memory circuit pack. Refer to the Memory Functional Test description for more details.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Read All Memory Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
	X	X	ND
Read All Memory Test (#85)		X	ND
RAM Checksum Test (#86)		X	ND

* D = Destructive
ND = Non-destructive

Read All Memory Test (#85)

This test reads every location in memory and writes it back. A failure of this test indicates a failure in the Memory circuit pack.

Test #85 Read All Memory Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The system may or may not continue to operate correctly. The Memory circuit pack can work with substantial errors in it. If the system can still provide service, then it indicates that the Memory circuit pack has something wrong on it, but it can handle it. 1) If test continues to fail, the Memory circuit pack should be replaced at a time convenient to the customer.
	PASS	The Memory circuit pack is okay. To be absolutely sure that the memory is fine, this test should-pass three times in a row.

RAM Checksum Test (#86)

This test computes the checksum of the System 75 software text module. A failure of this test indicates corruption of the RAM. It does NOT indicate a hardware problem; if this is the only test that is failing, there should be no reason to replace the Memory circuit pack.

Do NOT REPLACE the Memory circuit pack when this is the only error. In all R1V1 through R1V3 releases, this test is incorrectly depicted as ON-BOARD.

A system restart by a reset system 4 should be performed at the earliest convenience;

Test #86 RAM Checksum Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The system may or may not continue to operate correctly. The system may fail at some future date when some action requires access to the corrupted area of the RAM. 1) The system should be restarted with a reset system 4.
	PASS	The checksum is correct.

Memory Error Detection/Correction/Exception Test (#87)

This test checks to see if the error correction circuitry on the memory is working by seeing if errors can be detected. This test is run on a few reserved locations in memory.

Test #87 Memory Error Detection/Correction/Exception Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The memory correction circuitry is not working correctly. The system may or may not continue to operate correctly. 1) Repeat the test. 2) If test continues to fail, the Memory circuit pack should be replaced at a time convenient to the customer.
	PASS	The memory correction circuitry is working. To be absolutely sure that the memory is fine, this test should pass three times in

Memory Functional Test

This test is destructive.

This test will ensure that the Memory circuit pack (or packs) is working correctly. It will ensure that every memory location can be changed, independent of all other locations. Running this test will wipe out any data in memory.

This test is performed during a reset system 4 or reset system 5.

This test can fail during the restart in two ways: a partial failure will raise an alarm and the system will run. A major failure will cause the SPE to go into SPE-Down mode.

If there are two Memory circuit packs, this test cannot identify the faulty one. The red LED on both packs will be lit. It is almost certain that only one of the two packs is bad.

Replacing a Memory (or processor) circuit pack requires that the system be brought down and then a reset system 4 be performed.

At the convenience of the customer, the system should be powered down and the first (or only) Memory circuit pack be replaced. Then power the system up and the diagnostics on the SAT will indicate if the Memory Functional Test passes. If the system does complete the restart, verify that there are no memory alarms. “

If there are two Memory circuit packs and replacing the first one does not solve the problem, then the original Memory circuit pack should be put back and the second Memory circuit pack should be replaced with the new Memory circuit pack. This should solve the problem.

If replacing the Memory circuit pack does not solve the problem, then escalate.

MET-LINE (MET Line)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
MET-LINE	MINOR	test port CSSpp I	MET Line
MET-LINE	WARNING	test port CSSpp s	MET Line
MET-BD	MINOR (b)	test board CSS s	MET Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to the XXX-BD (Common Port Board) maintenance documentation.

Electronic Station is the user-friendly term to denote the MET Station which stands for Multibutton Electronic Voice Terminal Set. The MET sets were originally introduced for use in the HORIZON@ Communications System and DIMENSION PBX system but can now be used in System 75 switches.

The TN735 MET port circuit pack will support four of these Multifunctional Electronic Sets. Each MET set uses three pairs of wires: an analog voice pair, a transmit pair, and a receive pair. Power is sent over the transmit and receive pairs. The MET circuit pack supports all 10, 20, and 30 button sets.

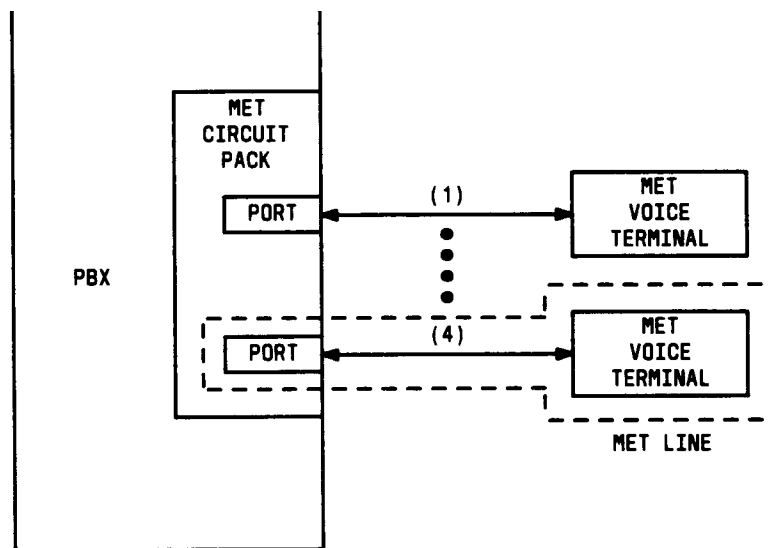


Figure 6-19. MET Line Interactions

A change in the use of the Recall button on the MET set needs to be noted. Instead of being used as it was in the DIMENSION PBX system, the Recall button is used in System 75 as a self-test button and, when pushed, will light all of the lamps on the MET set and run the ringer update.

There are instances where service states of a station are mentioned. It is helpful to understand what is meant by the different service states that may exist. An explanation of these service states follows:

- **Out of Service**—The port, and thus the station, have been removed from service. A busy out of a port would cause it to be out-of-service.
- **Ready for Service**—Once a port on the circuit pack has been put into service, the voice terminal must communicate that it is present. The time between these two events is the time when the terminal is in the ready-for-service state.
- **In Service**—Once the system has received a message from the voice terminal communicating that it is present, the station is put into the in-service state. The terminal can also be forced into the in-service state if it goes off-hook while it is in the ready-for-service state.

When the status station command has been run, and the status screen appears, the status will be reported as either out-of-service or in-service, which both mean exactly as stated in the above list, or disconnect, which means the station is in the ready-for-service state.

Hardware Error Log Entries and Test to Clear Values

MET Line Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test port CSSpp s
0(a)	o	None			
1 (b)	40987	None			
18(c)	o	busyout port CSSpp	WARNING	OFF	release port CSSpp
257(d)	40988	None	MINOR	OFF	
513(e)		Hybrid Line Station Audits (#61)	WARNING	OFF	test port CSSpp s r 4
769		Port Diagnostic Test (#35)	MINOR	ON	test port CSSDD l r 3
1025		Hybrid & Conf Circuits Test (#57)	MINOR	ON	test port CSSpp l r 3
1537(f)	40968	None	MINOR	OFF	
1793		TDM NPE Crosstalk Test (#6)	MINOR	ON	test port CSSpp l r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error code will appear in the Error Log if the MET Line port circuit pack has been removed since the last time the Error Log was cleared. Make sure the port circuit pack has been re-inserted.
- (b) Indicates a bad data link. An off-board problem detected by port circuit. Make sure the MET set is connected, and that the Electronic Power Feed (EPF) test passes. If data transmission problems are experienced, check for faulty wiring or a defective voice terminal, and move voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired due to the passing of time.
- (c) This error is logged when the port in question is busied out by maintenance personnel. Make sure port is released from busy out.
- (d) This indicates that the EPF has been turned Off due to the overcurrent condition at the voice terminal. Check for faulty wiring or a damaged jack, and make sure the voice terminal is a MET set. Once the problem has been resolved, the alarm will be retired due to the passing of time.
- (e) The particular station audit that causes this error type to be produced is the EPF inquiry audit. If the EPF inquiry receives an epf-no-load message a certain number of times, this error will occur, and if the EPF inquiry receives an epf-on-ok or an epf-off-ok message, it will contribute to the resolution of this alarm.

- (f) This indicates that there is something wrong with the link to the voice terminal. An in-line maintenance error has generated an off-board minor alarm. Ignore if there are no complaints. Otherwise, make sure the voice terminal is connected, check for faulty wiring, check for a defective voice terminal, and move voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem still exists, replace the circuit pack.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Crosstalk Test (#6)		x	ND
Port Diagnostic Test (#35)		x	ND
MFAT Electronic Power Feed Test (#56)		x	ND
Hybrid Circuit and Conference Circuit Test (#57)		x	ND
Station Lamp Update Test (#60)	x	x	ND
Station Audits Test (#61)	x	x	ND
Ringer Update Test (#62)	x	x	ND

* D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the "station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via administration. This only applies to analog stations. 1) To enable test, set the Test field on the Station Administration screen for the particular analog station being tested to "y". Use the change station <extension> command.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1) Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and examining station, trunk, or external wiring.

Port Diagnostic Test (#35)

This test checks a port's battery feed circuitry. The battery feed circuitry is tested for battery by testing the switchhook state. The MET set must be on-hook for the test to run.

Test # 35 Port Diagnostic Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #35 Port Diagnostic Test (Contd)		
Error Code	Test Result	Description / Recommendation
1018	ABORT	Test disabled via software patch 1) Escalate to next tier level.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Battery Feed Test failed. This port is out-of-service. 1) Other ports on this circuit pack are not affected. Place user on a different port, if available, until a replacement circuit pack can be obtained. 2) Replace circuit pack when available.
	PASS	Battery Feed Test passed. Current flow is properly. detected for this port. 1) If users are reporting problems, examine connections to the port. 2) Escalate the problem.

MET Electronic Power Feed Test (#56)

In this test, the software requests that the Electronic Power Feed (EPF) be turned on for a given port. An attempt is made to turn on the power supply to the station. If no current is being drawn, this probably indicates that the station is not connected. If an overcurrent condition is sensed (that is, too much current is being drawn), this may indicate a short in the loop or a defective voice terminal. Depending on what condition is sensed, a message is returned stating that either the EPF was turned on successfully with no problems or that an overcurrent condition is sensed. This test is repeated once more 5 seconds later. If either test is not successful, the test will abort.

Test #56 MET Electronic Power Feed Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook), if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #56 MET Electronic Power Feed Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	Electronic Power Feed test passed. The message to turn on the power to the station was successfully sent to the port. 1) Although this test will never return a FAIL result, after running the test the Error Log should be checked for any entries with error type 257 to examine the real results of this test. 2) If error type 257 does not appear in the Error Log within 10 seconds after completion of this test, it is safe to assume that the test sensed no problems with the power to the station. To verify that the station is powered up correctly, run a self-test on the station, if available, and check that all the feature buttons are operating. 3) If error type 257 appears in the Error Log, this indicates some problem with the power to the station. The craft should check for a short in the wiring, a damaged jack, a defective voice terminal, or an incorrect type of terminal.

MET Circuit and Conference Circuit Test (#57)

The MET Circuit Test checks the amount of reflection from the MET loop around circuitry and a Conference Test. The Tone/Clock circuit pack places a 1004-Hz tone on a time slot that the port circuit is listening on. A General Purpose Tone Detector (GPTD) is connected to another time slot that the same port circuit is talking on. The on-board microprocessor places the port in the loop around mode and the GPTD measures the level of the reflected signal.

The Conference Test is performed after the Circuit Test. The Conference Circuit Test will verify that the NPE is able to listen to several test tones and correctly conference them together. It is executed in two parts. The first half of the test checks the operation of the NPE's first three conference channels. The NPE is put in the loop around mode and instructed to talk on a selected time slot and listen to the 1004-Hz tone using the first three Conference Channels. The signal level and noise level of the conference output are then measured using a GPTD and checked to verify that they are within an acceptable range.

The second half of the Conference Test checks the operation of the NPE's remaining four conference channels and follows the same procedure as above.

		Test #57 MET Circuit and Conference Circuit Test
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #57 MET Circuit and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TON E-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test #57 MET Circuit and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	FAIL	Conference Test failed. User may be able to use conference circuit without difficulty in some cases. In other extreme cases, conference calling will be totally restricted.
57	FAIL	Hybrid Circuit Test failed. This could result in noisy or bad connections. 1) Run circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack using test board CSS short. 2) Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3) If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the MET Line circuit pack.
	PASS	Hybrid Circuit and Conference Circuit Test passed. The hybrid circuitry is transmitting properly. 1) If complaints still exist, investigate by using other port tests, and by examining the station, wiring, and connections.

MET Line Station Lamp Updates Test (#60)

For this test, the software lights the lamps on the terminal based on the status record contained in the processor. The lamp updates will run only if the station is in in-service.

Test #60 MET Line Station Lamp Updates Test		
Error Code	Test Result	Description / Recommendation
1,2	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
3	ABORT	Station is in ready-for-service or out-of-service state. 1) Make sure terminal is connected. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	MET Line Station Lamp Updates Test completed successfully. 1) If complaints still exist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.

MET Line Station Audits Test (#61)

This is a series of three tests that are classified as audits. These audits will abort if attempted on an out-of-service station. The tests are as follows:

- **Switchhook audit**—This is an update of the SPE records according to the circuit packs' records.
- **Bad Scan inquiry**—A message is sent uplink which contains a count that is generated due to certain events relating to the link conditions. This is an indication of data transmission problems between the MET circuit pack and the voice terminal.
- **EPF Inquiry** status of the Electronic Power Feed (EPF) is sent uplink. Possible conditions are: EPF-on-ok, EPF-off, EPF-no-load, and EPF-on-overcurrent.

Test #61 MET Line Station Audits Test		
Error Code	Test Result	Description / Recommendation
1 2 3	ABORT	Internal System Error
	ABORT	Internal System Error
		1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) [f the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #61 MET Line Station Audits Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) Retry the command at 1' minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	Hybrid Line Station Audits passed. 1) Although this test will always return a PASS result, it is possible that it will enter error types 257 or 513 into the Error Log. To determine if there are any problems that don't show up in the test result, look for these error types in the Error Log. 2) If these errors appear in the Error Log, or if user complaints still exist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.

MET Line Ringer Update Test (#62)

In this update, a “ringer on” or a “ringer off” message is sent to the firmware to start and stop the ringer on the set.

Test #62 MET Line Ringer Update Test		
Error Code	Test Result	Description / Recommendation
3	ABORT	Request for Ringer Audit update was unsuccessful. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSPP command to determine the station extension, attendant number, or trunk group/member number of the port. Use the status station, status attendant, or status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	Hybrid Station Ringer Update passed. 1) If complaints still exist, investigate by using other circuit pack tests, and by examining the terminal, wiring, and connections.

MIS (Management Information System)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
MIS	WRN	release mis	Management Information System

The Management Information System (MIS) maintenance object is used only for administering MIS translations, such as trunks and stations. There are no hardware failures associated with this maintenance object.

Note: To diagnose MIS link hardware errors and alarms, see SC-LINK and SC-INTF maintenance documentation.

The MIS/CMS is an adjunct processor that collects Automatic Call Distribution (ACD) data sent from the switch. In order to change MIS translations, a switch administrator must first enter a busyout mis command at the SAT. When the MIS is busied out, the switch will stop sending ACD data to the MIS and a Warning alarm will be raised.

When the switch administrator is finished, a release mis command should be entered at the SAT. This will clear the Warning alarm and allow the switch to send ACD data to the MIS.

Hardware Error Log Entries and Test to Clear Values

Management Information System Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	release mis
18 (a)	o	None	WARNING	ON	release mis

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) When busyout MIS is issued, no data is sent to the MIS/CMS regardless of the link state. To allow data to be sent to MIS/CMS, a release mis command must be issued from the SAT.

MODEM-PT (Modem Pool Port), MODEM-BD (Modem Pool Circuit Pack)

MO Name As it Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
MODEM-PT	MINOR	test port s	Modem Pool Port
MODEM-BD	MINOR	test board CSS s	Modem Pool Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); and SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.).

The Modem Pool Port provides an interface for digital and analog data communication devices or ports connected to the PBX. It may be thought of as a PBX data communications “conversion resource” because it converts analog modem signals typically used in the voice terminal network into digital signals that are compatible with the” internal PBX network and vice versa.

There may be a number of these conversion resources available in the PBX, each assigned to one of five available Modem Pool Groups. Only one conversion resource is used per data connection. The PBX software usually adds the conversion resource into a data connection if it determines that it is necessary for the call. Typical connections that include Modem Pool conversion resources include data calls from Analog Line or Central Office Trunk ports to any digital port or Digital Line or Trunk ports to any analog port. An example of a Data Module to Central Office Trunk connection using a Modem Pool conversion resource is shown in Figure 6-20. When a local data call originates from an analog port normally used for voice service only and terminates on a digital port, a Data Origination access code must be dialed before the extension number for the Modem Pool conversion resource to be included in the connection.

Each Modem Pool conversion resource contains two ports. One of these, an analog port, is connected (via the PBX network) to the analog line or trunk port that is the source of the modem signal. The second port is referred to as the digital port and is connected (again through the PBX network) to the digital line or trunk port associated with the Data Module in the connection. The analog modem signals enter the analog port of the conversion resource in standard Pulse Code Modulation (PCM) format, but they are converted into Data Communications Protocol (DCP) format before going to the digital line or trunk in the connection.

There are two primary types of Modem Pool conversion resources available: an Integrated Pooled Modem and a Combined Modem Pool. The integrated TN758 Pooled Modem circuit pack contains two independent 300 or 1200 baud conversion resources. Each conversion resource contains two interfaces to the PBX digital network: an analog port and a digital port. The analog port is connected through the PBX network to the analog line or trunk port containing the analog modem signals. The digital port connects through the PBX network to the digital line or trunk port in the call. Figure 6-20 shows a typical end-to-end connection using a conversion resource on the integrated Pooled Modem circuit pack.

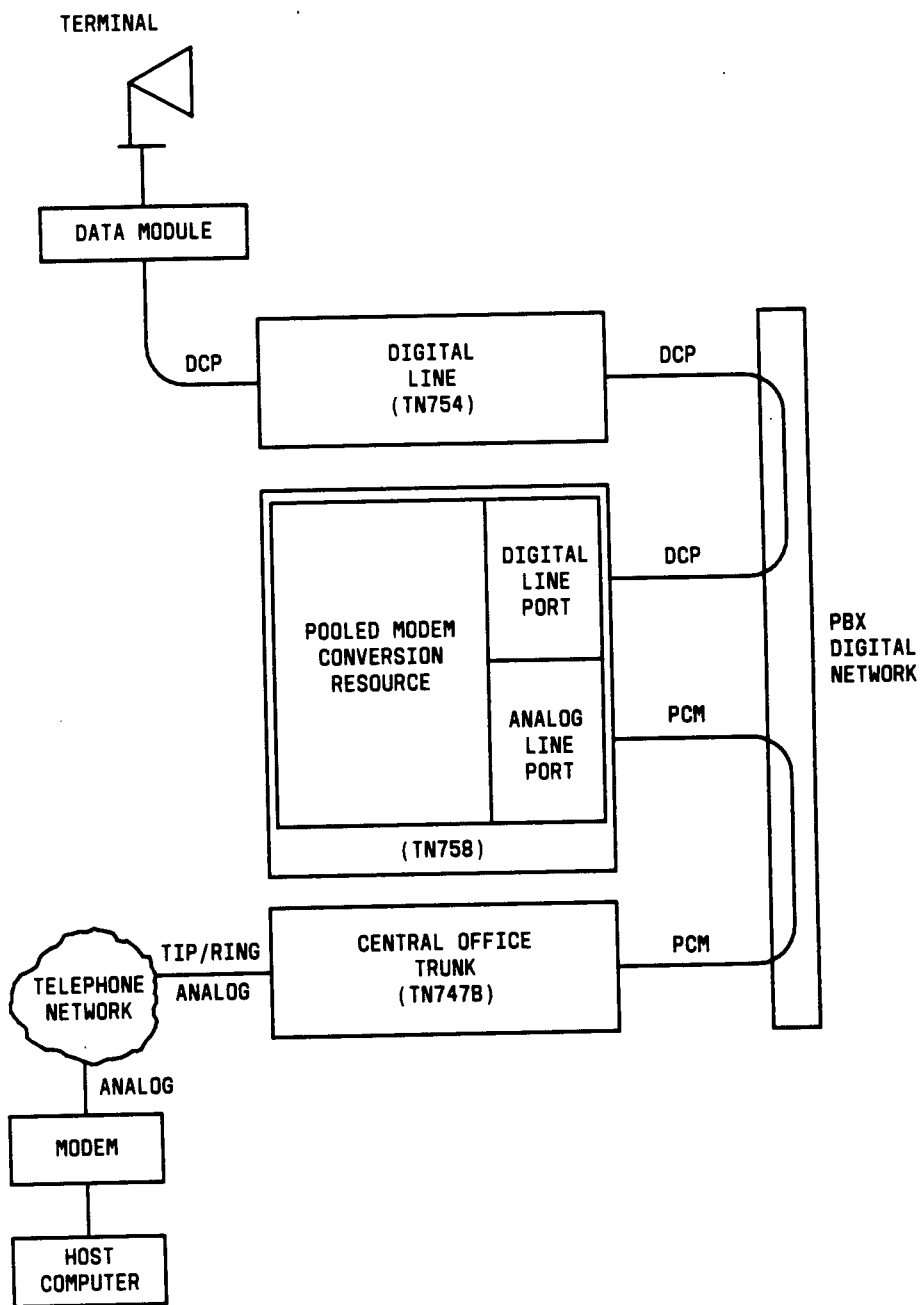


Figure 6-20. Typical Modem Pool Switched Connection with integrated Pooled Modem

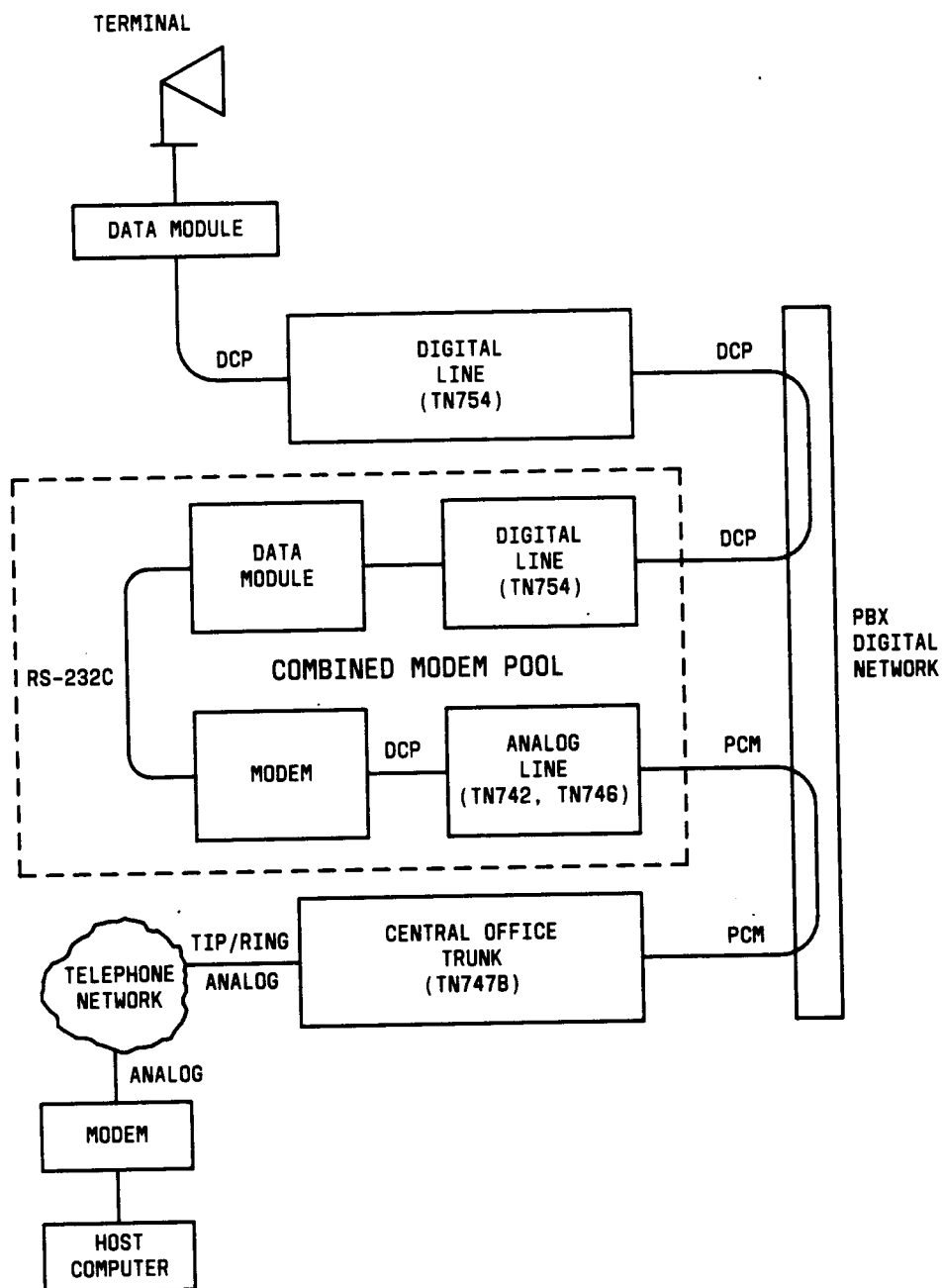
The Combined Modem Pool conversion resource (Figure 6-21) is the second type available. The function served by the Combined Modem Pool is similar to that of the integrated Pooled Modem circuit pack, but the physical implementation is much different. It has the advantage of supporting any speed that the external modem can support. The Integrated Pooled Modem circuit pack can only support 300 or 1200 baud transmission rates. The Combined Modem Pool conversion resource consists of a port on a TN742 or TN746 Analog Line circuit pack, an external modem, a Data Module, and a port on a TN754 Digital Line circuit pack. The tip and ring interface of the Analog Line is connected to the modem, the RS-232C interface of the modem connects to the Data Module, and the DCP interface on the Data Module is connected to the Digital Line port.

The analog modem signals pass through the Analog Line port to the modem. The modem converts these to RS-232C signals that are passed on to the Data Module. The Data Module further converts the signals to the DCP protocol for the Digital Line port which passes the signals on to the PBX network.

Certain customer-reported troubles may provide important information for troubleshooting Modem Pool problems. For example, if the customer tries to make a data call requiring a Modem Pool conversion resource, and the Modem Pool and Data Module speeds or other options don't match, they will receive a CHECK OPTIONS error message on their terminal. If this happens, the Modem Pool administration and customer Data Module option settings should be checked. In addition, if the Modem Pool is a Combined type, option settings should be checked on the external Modem and Data Module making up the Combined Modem Pool. The cabling and connections between the Digital Line port, Data Module, Analog Line port, and Modem should be checked between the Combined Modem Pool components.

There are three types of commands that can be used to test Modem Pool circuits: test port, test modem-pool #, and test board. The test port is generally the first test to run after the Error Log is evaluated and an entry is found for a Modem Pool port. The test modem-pool # command runs the same tests as the test port short command performed on a Modem Pool port. However, the test modem-pool # command can automatically test all ports in the Modem Pool group number specified in #. The test board command performs the same tests as test port and test modem-pool #, plus additional tests for circuits common to the entire circuit pack. Refer to the XXX-BD (Common Port Board) maintenance documentation testing for information on additional tests performed with test board (#50, #52, and #53).

If the Modem Pool port or group being tested with test modem-pool # contains Combined Modem Pools, the ports on the associated TN742 or TN746 Analog Line circuit pack and the TN754 Digital Line circuit pack are tested as a group. Note, however, that Combined Modem Pools are not tested with the tests described in this section. And the repair information in error code description tables and related to Tests 96, 97, 98, and 99 is not applicable. Use the repair procedures for Analog and Digital Line circuit packs when interpreting the results of test modem-pool performed on Combined Modem Pools.



Modem Pool Switched Connection with Combined Modem Pool

Hardware Error Log Entries and Test to Clear Values

Modem Pool Port Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Command
0†	0	Any	Any	Any	test port CSSpp s
18(a)	0	busyout board CSS	WARNING	OFF	release board CSS
257		Conversion Resource Loop (#98)	MINOR	ON	test port CSSpp s r 3
513		Modem Conference (#97)	MINOR	ON	test port CSSpp l r 3
769		Modem NPE Crosstalk (#96)	MINOR	ON	test port CSSpp l r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

(a) Modem Pool circuit pack has been busied out by a busyout board CSS command.

Craft-Demanded Tests: Descriptions and Error Codes

The tests in this section do not apply to Combined Modem Pool conversion resources. The standard Digital Line and/or Analog Line port tests will be run on the ports associated with the Combined Modem Pool. The test descriptions for those maintenance objects should be consulted when repairing Combined Modem Pool arrangements.

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Modem Pool NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Modem Pool NPE Crosstalk Test (#96)		x	D
Modem Pool Conference Test (#97)		x	D
Modem Pool Conversion Resource Loop Around Test (#98)	x	x	ND
Modem Pool Audits Test (#99)	x	x	ND

* D = Destructive
ND = Non-destructive

Modem Pool NPE Crosstalk Test (#96)

This test is destructive.

The NPE crosstalk test verifies that the NPE is connected only to the desired time slot and crosstalk is not present on other time slots. This test operates exactly like Test #6 for other types of port circuits but is performed twice in order to test both NPEs in the Modem Pool Port.

Test # 98 Modem Pool NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
6000	ABORT	System resources needed to complete the test could not be allocated for the digital section of the Modem Pool conversion resource. Ordinarily, this means the conversion resource or other hardware used during the test was in use. 1) Wait 1 minute and attempt the test again. 2) If the same error occurs, use the status port command to determine whether the Modem Pool conversion resource is in use. 3) If the conversion resource is in use, and it is absolutely necessary to test it, the call will have to be dropped by issuing a busyout port CSS command against the conversion resource. Run the test again. 4) If the same error occurs while the conversion resource is idle, busy out both Modem Pool conversion resources on the TN758 Pooled Modem circuit pack containing the conversion resource under test. 5) Rerun the test. If the test continues to abort, replace the Pooled Modem circuit pack and retest. 6) If the test continues to abort with this error code after circuit pack replacement, escalate the problem.
6001	ABORT	System resources needed to complete the test could not be allocated for the analog section of the Modem Pool conversion resource. Follow the test procedures for the previous error code.

Test #96 Modem Pool NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
NONE	FAIL	The test failed. This error is internal to the Pooled Modem circuit pack and does not involve external equipment or interfaces. 1) Busy out both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2) Rerun the test. If the test continues to fail, then replace the Pooled Modem circuit pack and retest. 3) If the circuit pack still fails after replacement, escalate the problem.

Modem Pool Conference Test (#97)

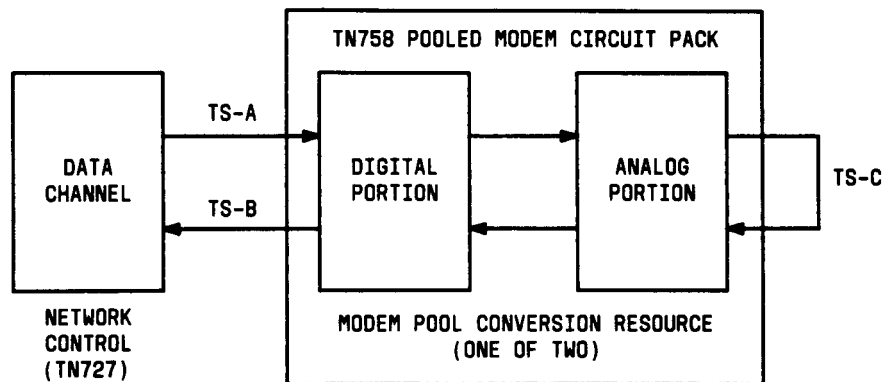
This test is destructive.

The Modem Pool Conference Test checks most of the switching and gain control functions provided by the NPE circuit in the analog section of the conversion resource. This test conferences a 1004-Hz tone through the NPE, looping it back so that it can be verified with a Tone Detector circuit.

Test #97 Modem Pool Conference Test		
Error Code	Test Result	Description / Recommendation
4000	ABORT	System resources needed to complete the test could not be allocated. Ordinarily, this means the conversion resource or other hardware used during the test was in use. 1) Wait 1 minute and attempt the test again. 2) If the same error occurs, use the status port command to determine whether the Modem Pool conversion resource is in use. 3) If the conversion resource is in use, and it is absolutely necessary to test it, the call will have to be dropped by issuing a busyout port CSS command against the conversion resource. Run the test again. 4) If the same error occurs while the conversion resource is idle, busy out both Modem Pool conversion resources on the TN758 Pooled Modem circuit pack containing the conversion resource under test. 5) Rerun the test. If the test continues to abort, then replace the Pooled Modem circuit pack and retest. 6) If the test continues to abort with this error code after circuit pack replacement, escalate the problem.
NONE	FAIL	The test failed. This error is internal to the Pooled Modem circuit pack and does not involve external equipment or interfaces. 1) Busy out both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2) Rerun the test. If the test continues to fail, then replace the Pooled Modem circuit pack and retest. 3) If the circuit pack still fails after replacement, escalate the problem.

Modem Pool Conversion Resource Loop Around Test (#98)

The Modem Pool Conversion Resource Loop Around Test is set up as follows:



Test data patterns are transmitted from the Network Control Data Channels 1 or 3 over network time slot A through the digital port and looped around through the analog port via time slot C back to the Network Control Data Channel circuit via time slot B, where the patterns are checked for accuracy. Finally, the test forces a disconnect by breaking the connection between the Data Channel and Modem Pool Port (time slot A) and verifying that the Data Channel and Modem Pool Port go on-hook within the proper time.

This test attempts to allocate a Network Control Data Channel, Modem Pool Port, and other internal resources. If any of these allocation attempts fail, the test cannot be completed and a specific abort error is reported.

Test # 98 Modem Pool Conversion Resource Loop Around Test		
Error Code	Test Result	Description / Recommendation
NONE	ABORT	An internal system error occurred. 1) Wait 1 minute and try the test again. 2) If the error occurs again, escalate the problem.
5000	ABORT	System resources needed to complete the test could not be allocated for the digital section of the Modem Pool conversion resource. Ordinarily, this means the conversion resource or other hardware used during the test was in use. 1) Wait 1 minute and attempt the test again. 2) If the same error occurs, use the status port command to determine whether the Modem Pool conversion resource is in use. 3) If the conversion resource is in use, and it is absolutely necessary to test it, the call will have to be dropped by issuing a busyout port CSS command against the conversion resource. Run the test again. 4) If the same error occurs while the conversion resource is idle, busy out both Modem Pool conversion resources on the TN758 Pooled Modem circuit pack containing the conversion resource under test. 5) Rerun the test. If the test continues to abort, then replace the Pooled Modem circuit pack and retest. 6) If the test continues to abort with this error code after circuit pack replacement, escalate the problem.
5001	ABORT	A DATA-CHL (Network Control Data Channel) could not be allocated for this test. This error is more closely related to the Data Channels (1 or 3 only) on the Network Control circuit pack used for this test than the TN758 Pooled Modem circuit pack itself. Therefore, any hardware testing or replacement activities will focus on the Network Control circuit pack. However, the Data Channels on the Network Control circuit pack normally should not be busied out, tested with the test data-module command, or reseated in the carrier to clear this error, since this may drop other data calls that may be active at the time. The administration of Network Control Channels 1 and 3 should be checked if this error occurs. 1) Wait 1 minute and attempt the test again. 2) If the same error persists after 5 attempts at 1 minute intervals, escalate the problem.

Test # 98 Modem Pool Conversion Resource Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
5002	ABORT	The DATA-CHL allocated for this test could not be set to maintenance-busy status. Follow the repair procedures for error code 5001.
5003	ABORT	The test was not able to establish a connection for the digital portion of the Modem Pool Port. Follow the repair procedures for error code 5000.
5004	ABORT	The test was not able to allocate the analog portion of the Modem Pool Port. Follow the repair procedures for error code 5000.
5005	ABORT	The test was not able to establish a connection for the analog portion of the Modem Pool Port. Follow the repair procedures for error code 5000.
5006	FAIL	The Modem Pool Port did not respond to the "maintenance activate" message. This error is internal to the Modem Pool circuit pack and does not involve external equipment or interfaces. The test failed. This error is internal to the Pooled Modem circuit pack and does not involve external equipment or interfaces. 1) Busy out both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2) Rerun the test. If the test continues to fail, then replace the Pooled Modem circuit pack and retest. 4) If the circuit pack still fails after replacement, escalate the problem.
5007	ABORT	The DATA-CHL allocated for this test did not respond to the incoming call indication. Follow the repair procedures for error code 5001.
5009	ABORT	The DATA-CHL allocated for this test did not handshake correctly. 1) Attempt the test again. 2) If the same error occurs, test the Network Control circuit pack using the test data-module command [refer to the DATA-CHL (Network Control Data Channel) test and repair procedures for this]. 3) If the Network Control circuit pack tests pass, escalate the problem.

Test # 98 Modem Pool Conversion Resource Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
5010	FAIL	The Data Loop Around Test failed, indicating a likely problem with the TN758 Pooled Modem circuit pack. Follow the repair procedure for error code 5006.
5011	ABORT	The DATA-CHL allocated for this test did not disconnect properly. Follow the repair procedures for error code 5001.
5012	ABORT	The digital portion of the tested Modem Pool Port did not disconnect properly. Follow the repair procedures for error code 5000.
5013	FAIL	The Modem Pool Port did not respond with an on-hook message when the connection to the Data Channel was broken, indicating a likely problem with the TN758 Pooled Modem circuit pack. Follow the repair procedure for error code 5006.
5014	ABORT	The DATA-CHL allocated for this test did not respond correctly to the setup message sent to it after the connection was established. 1) Attempt the test again. . 2) If the same error occurs, test the Network Control circuit pack using the test data-module command [refer to the DATA-CH L (Network Control Data Channel) test and repair procedures for this]. 3) If the Network Control circuit pack tests pass, escalate the problem.
5015	ABORT	Data Channels 1 and/or 3 have not been administered. Administer the Data Channels and retest.

Modem Pool Audit Test (#99)

This audit updates the Modem Pool conversion resource status contained in the TN758 Pooled Modem circuit pack's microprocessor. It does not actually test the Pooled Modem circuit pack; therefore, there are no FAIL codes. The audit can only be performed on idle conversion resources. If the conversion resource is in use, the audit will abort.

Test #99 Modem Pool Audit		
Error Code	Test Result	Description / Recommendation
NONE	ABORT	The system was not able to allocate all the necessary resources to execute this test. An ABORT simply indicates that the conversion resource was in use when the audit was performed. No repair action is necessary unless it was known that the conversion resource was actually idle during the test (yellow in-use LED was off) or was busied out before the test was run. If this is the case, a TN758 failure condition may exist and the following procedure should be used: 1) Busy out both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2) Rerun the test. If the test continues to fail, then replace the Pooled Modem circuit pack and retest. 3) If the circuit pack still fails after replacement, escalate the problem.

P-INT-BD (Processor Interface Circuit Pack), P-INT-PT (Processor Interface Port)

MO Name As H Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
P-INT-BD	MAJOR	test interface I/s	Processor Interface Circuit Pack
P-INT-PT	MAJOR		Processor Interface Port

Processor Interface Circuit Pack (P-INT-BD)

The TN765 Processor Interface (Pi) circuit pack provides a front-end processor to the TN759 Processor circuit pack. Figure 6-22 shows communication interface architecture that can be used in R1V3 XE small cabinet or R1V3 medium cabinet. The PI circuit pack implements the packet layer and link layer of the X.25 protocol (DCS, AUDIX, MIS, and API 6 links). The TN765 is a downloadable circuit pack. This means that at reboot or system power up, PI firmware is downloaded from tape to the circuit pack. For other restarts, a Checksum Test is performed on the firmware. If the Checksum Test fails, then the firmware is redownloaded. The firmware can be automatically downloaded any time via the reset interface craft command.

On the Switch Processing Element (SPE) complex, PI maintenance is mainly used for alarming the circuit pack. If SC-INTF (System Communications Interface) finds an error or alarm condition that can be associated with an on-board problem with the PI circuit pack, then it alarms both the SC-INTF and P-INT-BD. P-INT-BD maintenance is also used to test the common circuit pack functions on the circuit pack. If these tests fail, then a circuit pack level alarm is raised on the P-INT-BD.

The PI circuit pack maintenance shares the Common Port Board maintenance strategy. The maintenance object name appearing in the Hardware Error Log is P-INT-BD. Refer to the XXX-BD (Common Port Board) maintenance documentation for procedures of resolving the error.

The test sequence for testing the PI circuit pack is described in the System Communication Interface (SC-INTF) maintenance documentation.

Processor Interface Port (P-INT-PT)

P-INT-PT is the physical port on the TN765 Processor Interface circuit pack. The Processor Interface Port is monitored by the SC-LINK (Processor Interface Link). No test runs directly on the Processor Interface Port. The SC-LINK maintenance object is responsible for the testing of TN765 ports along with DCS link, AUDIX link, MIS link, etc. If SC-LINK maintenance finds an error or alarm condition that can be associated with the Processor Interface Port, then P-INT-PT will be alarmed. Refer to the SC-LINK maintenance documentation for details.

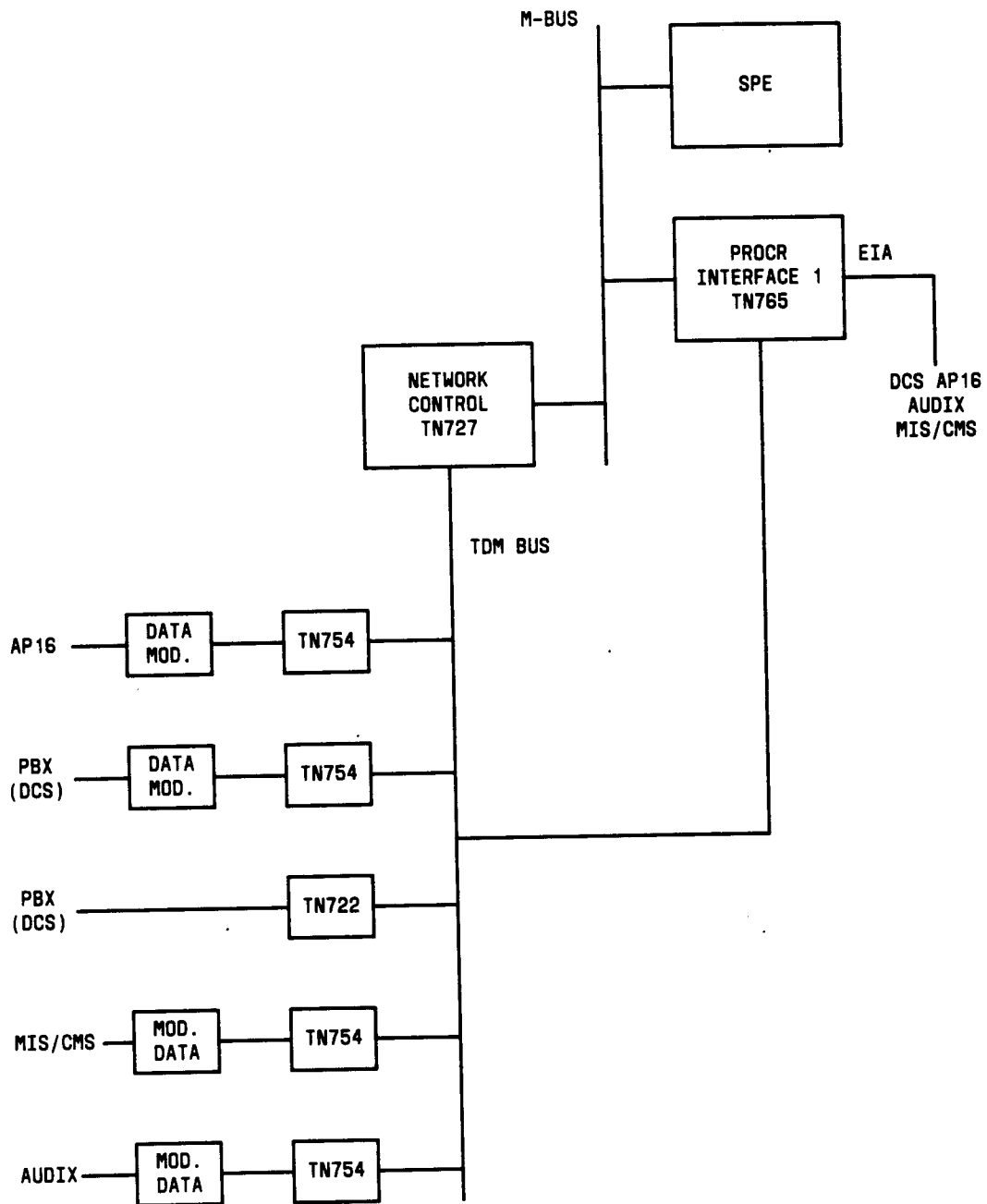


Figure 6-22. R1V3 Communication Interfaces Architecture With One PI Board

PDMODULE (Processor Data Module), TDMODULE (Trunk Data Module)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
PDMODULE	MINOR (b)	test port CSSpp I	Processor Data Module
PDMODULE	WARNING	test port CSSpp s	Processor Data Module
TDMODULE	MINOR (b)	test port CSSpp I	Trunk Data Module
TDMODULE	WARNING	test port CSSpp s	Trunk Data Module

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . etc.); and pp is the 2-digit port number (for example, 01).

(b) Some of the alarms that are logged due to PDMODULE and TDMODULE test failures may be related to circuit pack problems that are reported during the common circuit pack testing phase. Refer to the XXX-BD (Common Port Board) maintenance documentation for information about testing the Digital Line circuit packs.

Note The Digital Terminal Data Module (DTDM) is considered to be part of the DIG-LINE maintenance object. Refer to the DIG-LINE (Digital Station) maintenance documentation for DTDM failures.

Data Module

As illustrated in Figure 6-23, data modules provide an interface between the System 75 TN754 Digital Line circuit pack and data equipment such as terminals, host computers, and modems. Data modules are used for both dial-up and permanent circuit-switched data calls.

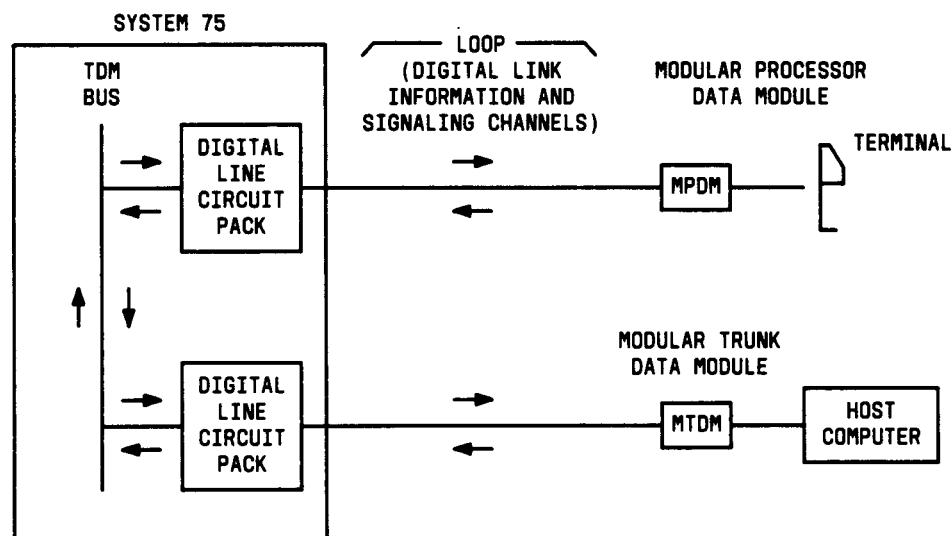


Figure 6-23. Typical Data Module Application

The (Modular) Processor Data Module (MPDM) provides an interface for Data Terminal . Equipment (terminals) and the (Modular) Trunk Data Module (MTDM)* provides an interface for Data Communications Equipment (transmission equipment such as a modem).

The PBX loop or digital link between a data module and the Digital Line port supports two logical information channels and one signaling channel. MPDMs and MTDMs use the primary information channel for data communication and the signaling channel for dialing and call supervision. The secondary information channel is not used.

Data modules are not only used for data calls between terminals, computers, and data communication equipment, but are also used as interfaces to equipment associated with System 75 features such as System Administration, Station Message Detailed Recording (SMDR), Message Center Service, Automatic Call Distribution (ACD), Distributed Communications System (DCS), and Audio Information Exchange (AUDIX). Maintenance tests for data modules associated with those services are covered by tests other than those described here. See the SC-LINK (Processor Interface Link), JRNL-LNK (Journal Printer), and PMS-LINK (PMS-Link).

MPDMs and MTDMs maintenance is closely related to, and interacts with, the Digital Line circuit pack maintenance in some instances and some of the results of testing of MPDMs and MTDMs may be affected by the “health” of the Digital Line circuit pack. This interaction should be kept in mind when investigating the cause of reported data module problems.

Data modules provide a variety of option switches to allow the customer to select data rates, parity, keyboard dialing, local and remote loop back, etc. An incorrect setting of those switches will not affect error and alarm information or test results described in this section, but it may result in an inoperable condition. Refer to the Installation Manual provided with the data module for more information about those options.

There are instances in this document where the service-state of a data module is mentioned. It is helpful to understand what is meant by the different service states that may exist. An explanation of these service states follows:

- **Out-of-Service**—The port, and thus the data module, have been removed from service. A busy out of a port or removal of the associated Digital Line circuit pack will cause the data module to be placed in the out-of-service state. Failure of the NPE Crosstalk Test (Test #9) will also take a port out-of-service.
- **Disconnected**—The port is administered but the associated digital link does not respond. An administered port is put in a disconnected state after system booting or circuit pack insertion, until a “link reset pass” message is received from firmware on the associated circuit pack.

* Early versions of these data modules were referred to as PDMs and TDMs, respectively. Later models are designed to provide various customer interfaces through the use of interchangeable interface modules and, therefore, are called modular data modules. Both versions are supported by the tests described in this section.

- **In Service**—Once the PBX software has received a “link reset pass” message from the Digital Line port, the port is placed in the in-service state. If the “link reset message pass” is missed, and an off-hook message is received while the port is in the disconnected state, maintenance software will run an ID request test and the port will be put back in service if a correct response is received.

If the link is disconnected, the port will return to the disconnect state. Note that it will take a few minutes (less than 5) for the state of a data module port to change from in-service to disconnected after the data module is disconnected from the local PBX loop.

Hardware Error Log Entries and Test to Clear Values

PDMODULE and TDMODULE Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test port CSSpp s
0(a)	0	None			
1 (b)	40987	None	WARNING	OFF	
1 (c)	1220	None	WARNING	OFF	
15(d)	Any	None			
18(e)	0	busyout port CsSpp	WARNING	OFF	release port CSSpp
257(f)	40971	N o n e		OFF	
513	0	Data Module Audits (#1 7)		OFF	test port CSSpp s r 6
769(g)	40988	None	WARNING	OFF	
1281		Data Module Audits (#1 7)	WARNING	OFF	test port CSSpp s r 4
1537(h)	40968	None	WARNING	OFF	
1793		Info & Ctrl Ch Local Loop (#13)	MINOR	ON	test port CSSpp l r 3
2049		NPE Crosstalk (#9)	MINOR	ON	test port CSSpp l r 3
2305(i)	132770	None		OFF	
2305(j)	40967	None		OFF	
2561		Data Module Internal Loop Around (#175)	WARNING	OFF	test port CSSpp l r 5

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error code appears in the Error Log only if the Digital Line circuit pack which has ports administered has been removed since the Error Log was last cleared. Make sure that the circuit pack has been re-inserted. Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommendation procedures.

- (b) Could experience a noisy port or link. This is an off-board problem detected by the port circuit. Check for faulty wiring, a defective data module, or reduce the cabling distance between the data module and the PBX (5000 feet for 24-gauge wire and 4000 feet for 26-gauge wire*). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired automatically within 60 minutes.
- (c) This error type and auxiliary data will occur when at least 15 off-board problems have been detected with the link to the data module. When an error with the link is detected, an on-board counter is incremented. The aux data will contain the value of this counter divided by 15. The user may experience a noisy port or link. This is an off-board problem detected by the port circuit. Check for faulty wiring, check for a faulty data module, or reduce the cabling distance between the data module and the PBX (5000 feet for 24-gauge wire and 4000 feet for 26-gauge wire*). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired automatically within 60 minutes.
- (d) This is an internal type error that occurs when an audit request fails. The aux data (i) is the internal identifier of the maintenance object that failed.
- (e) This error type is logged when the port in question is busied out by maintenance personnel. Make sure that the port is released from busy out.
- (f) There are problems with transmitting to the data module. This is usually an on-board problem and can be ignored if no user complaints are received. Otherwise, check for faulty wiring.
- (g) This error type indicates that the Electronic Power Feed (EPF) circuit has been turned off due an overcurrent condition at the local loop. Check for a short in the line, or a damaged jack. Once the problem has been resolved, the alarm will be retired after a pre-determined amount of time.
- (h) An in-line maintenance error has generated an off-board warning due to some problem with the link to the data module. This can be ignored if no user complaints are received. Otherwise, make sure the data module i's connected, check for faulty wiring, check for a faulty data module, or reduce the cabling distance between the data module and the PBX (5000 feet for 24-gauge wire and 4000 feet for 26-gauge wire*). If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired automatically within 60 minutes.
- (i) This indicates that the data equipment went off-hook while the associated link was being initialized (in a disconnected state). Use the status data module command to determine the state of the data module. The off-hook should have changed the service state to in-service. No craft action is necessary.
- (j) This is the resulting code that is generated when the link between the circuit pack and the data module is successfully reset. The link is normally reset when the circuit pack associated with an administered port is first plugged in (assuming that the data module is already in place and connected to the associated port), when a port is first administered, (assuming the associated circuit pack is plugged in and that the data module is connected to the associated port), or when a data module is first connected to an administered port.

* Refer to AT&T *System 75—Wiring*, 555-200-111.

No craft action is necessary.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Data Module Internal Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Data Module Internal Loop Around Test (#1 75)		x	ND
Digital Port Circuit Pack Network Processing Element Crosstalk Test (#9)		x	ND
Port Circuit Information Channel and Control . Channel Loop Around Test (#1 3)		x	ND
Data Module Audits Test (#1 7)	x	x	ND

.D = Destructive

ND = Non-destructive .

NPE Crosstalk Test (#9)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete. If this test fails, the data module is taken out-of-service.

Test #9 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be busy with "a valid call. Use the display port CSSpp command to determine the extension of the data module port. Use the status data-module to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 9 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1001	ABORT	System resources to run this test are not available. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look forTTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port may be busy with a valid call. Use the display port CSSpp command to determine the extension of the data module port. Use the status data-module to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test # 9 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1020	ABORT	Test disabled via background testing. Use status data-module to determine when the data module is available for testing.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2120	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1) Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
1,2	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1,2	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. Failure code 1 indicates that the Crosstalk Test failed on the primary channel. Failure code 2 indicates that the Crosstalk Test failed on the secondary channel. 1) Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. 1) To be sure that this is not an intermittent problem, repeat this test up to a maximum of 10 times and verify that it continues to pass. 2) If complaints still exist, examine the data module, connections, and wiring.

Information and Control Channel Local Loop Test (#1 3)

This is a set of four tests that check the operation of the information and control channels used between the SPE and the Digital Line port circuit*.

The SPE first sends a message to the on-board microprocessor to loop around both the information and control channels for the port. Then, the Primary Information Channel Loop Back Test is run. The test is performed by sending a digital count from the Tone/Clock circuit pack on the primary channel time slot and receiving the same digital count with a general purpose tone detector. The digital count looks like transparent data to the on-board microprocessor.

Next, with the port still in loop around mode, the S Channel Loop Around Test is performed. This test consists of sending four different transparent patterns to the on-board microprocessor, receiving them back, and comparing them.

The third test is a Loop Around Test for the secondary (alternate) channel. It is not performed for data modules since this channel is not used by MPDMs and MTDMs.

A Conference Test is done next for the primary channel. This test is the same as the Analog Line Terminal/Port Conference Test #6.

Only one value (Pass, Fail, or Abort) is generated as a result of four tests run. If any test fails or aborts, the sequence is stopped.

* This is an internal loop around test only and does not check building wiring. Use Test #175 for external loop around tests to the data module.

Test #13 Information and Control Channel Local Loop Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the display port CSSpp command to determine the data module extension. Then use status data module with the extension number to determine the service state of the data module. If the service state indicates that the data module is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	System resources required to run this test are not available. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If the system has no TDM Bus errors and is not handling heavy traffic, repeat the test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.

Test #13 Information and Control Channel Local Loop Test (Contd)		
Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the data module extension. Then use status data module with the extension number to determine the service state of the data module. If the service state indicates that the data module is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	FAIL	Conference Test failed on the primary information channel. In some cases, user may not notice disruption in service. In extreme cases, conferencing feature may not work at all.
14	FAIL	The primary information channel is not transmitting properly. User impact may range from noticing nothing to not being able to use this port.
15	FAIL	The control channel between the Processor and Digital circuit pack is not transmitting properly. User impact may range from noticing nothing to not being able to use the port. Could also be disruptive to other users. 1) Run circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack using test board CSS short. 2) Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3) If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Digital Line circuit pack.
	PASS	Information and Control Channel Local Loop Test passed. All channels are transmitting properly. 1) To be sure that this is not an intermittent problem, repeat this test up to a maximum of 10 times to make sure it continues to pass. 2) If complaints still exist (bad data transmission), examine the data module, connections, and wiring.

Data Module Audits Test (#17)

This is a series of six tests which are classified as hardware audits. The processor sends messages to the on-board microprocessor to perform the following tests:

- **Switchhook Inquiry**—This is an update of the processor's software records based on the on-hook/off-hook status of the data module.
- **Bad Scan Inquiry**—A message is sent uplink which contains a count that is generated due to certain events relating to the digital loop's (link) conditions. This could be an indication of communication problems between the processor and digital port circuit pack.
- **EPF inquiry**—The status of the Electronic Power Feed (EPF) is sent uplink. EPF is not used for data modules.
- **ID Request**—A request is made to the data module for its status. The data module sends its configuration information and "health" information back. This information is checked and a pass/fail result is provided.
- Ž **Ringer Update**—This updates the data module's ringer state according to processor records.
- Ž **Translation Update**—This is a message normally used with digital stations to refresh the default value which causes the station to send touch-tones only in the primary information channel. This test is not used with data modules.

Test #17 Data Module (Digital Line) Audits Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	Switchhook audit timed out. 1) Make sure the data module is connected to the PBX and repeat the test. 2) If the test aborts, replace the data module and repeat the test. 3) If the test continues to abort, replace the circuit pack and repeat the test. 4) If the test continues to abort, escalate the problem.
2	ABORT	ID request fails, health bit is bad, or no response from on-board microprocessor. 1) Verify that the correct data module type (PDM versus TDM) is administered. 2) If the test aborts, replace the data module and repeat the test. 3) If the test aborts, replace the circuit pack and repeat the test. 4) If the test continues to abort, escalate the problem.

Test #17 Data Module (Digital Line) Audits Test (Contd)		
Error Code	Test Result	Description / Recommendation
3	ABORT	No response from EPF audit
4	ABORT	Internal System Error 1) Resolve any outstanding circuit pack maintenance problems. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
5	ABORT	Ringer update aborted (data module not in the in-service state) 1) Verify that the data module is powered (Power LED on). 2) Make sure data module is connected to the building wiring, check for faulty wiring, check for faulty data module. 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) Replace the Data Module and repeat the test. 5) If the test continues to abort, replace the Digital Line circuit pack and repeat the test. 6) If the test continues to abort, escalate the problem.
6	ABORT	Data module translation update aborted. 1) Make sure the data module is connected to the PBX. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available.
2000	ABORT	Response to the test request was not received within the allowable time period.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	Data Module Audits passed. This digital port circuit pack is functioning properly. 1) If complaints still exist, investigate by using other port tests, and by examining the data module options, wiring, and connections.

Data Module Internal Loop Around Tests (#175)

This test verifies that a data message can be sent from the PBX, through the building wiring, through an internal loop around path in the data module under test, and back to the PBX. Figure 6-24 illustrates the hardware configuration used for this test.

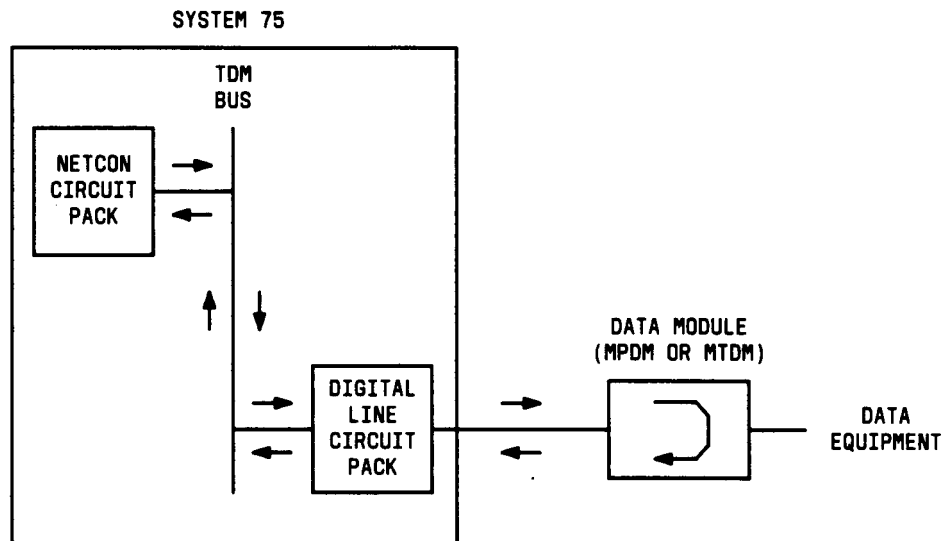


Figure 6-24. Internal Loop Around Test

A signaling message is sent through the digital port circuit pack to the data module under test to request it to enter loop around mode. A test pattern is then sent from the Switch Processing Element (SPE) through Network Control circuit pack (Netcon), over the TDM Bus, through the digital "port circuit pack, to the data module where the message is looped around and sent back through the digital port circuit pack, the TDM Bus, the Network Control circuit pack, to the SPE where it is checked for consistency.

This test will abort if no terminal or communications equipment is connected to the data module. It will also abort if a number of local PBX resources are not available. These resources include a network control channel from the Network Control circuit pack (there are a maximum of four channels administered as Netcon type data modules), two TDM time slots (one for each direction of the loop around message), and an idle digital port circuit associated with the data module under test. Failure to allocate any of these resources will cause the test to abort with a specific error code for that resource.

A yes/no parameter on each data module (MPDM or MTDM only) administration form is required to specify if the Data Module remote loop around test is supported by the data module endpoint. If the parameter is No (n), the test will not run.

Test # 175 Data Module Internal Loop Around Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	Could not get translation information for port. 1) Verify that port circuit is administered. 2) Wait 1 minute and attempt the test again. 3) If the test continues to abort and the port is not in use, escalate the problem.
1005	ABORT	Loop around not specified on data module administration form. 1) Administer data module with loop around test allowed.
1020	ABORT	Internal software error “ 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1030	ABORT	Internal software group identifier for data module not valid 1) Verify that port circuit is administered correctly. 2) If administration data correct, escalate the problem.
1031	ABORT	Extension number not valid
1032	ABORT	Extension number not correct length 1) Verify that the data module extension is administered correctly. 2) If the administration data is correct, escalate the problem.
1071	ABORT	No auxiliary port on Netcon circuit pack available to test with. 1) Check that the Netcon data channels are administered (list data-modules should show four netcon type data modules). 2) Test the Network Control (Netcon) circuit pack using the test data-module command for the Netcon circuit pack. 3) If administration data is correct, escalate the problem.

Test #175 Data Module Internal Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
3000	ABORT	Data module disconnected. 1) Verify that the data module is powered (Power LED on). 2) Make sure data module is connected to the building wiring, check for faulty wiring, check for faulty data module. 3) Retry the command at 1 minute intervals for a maximum of 5 times. 4) Replace the Data Module and repeat the test. 5) If the test continues to abort, replace the Digital Line circuit pack and repeat the test. 6) If the test continues to abort, escalate the problem.
3004	ABORT	This error could be caused by Network Control Data Channel. Look for DATA-CHL errors in the Error Log.
1040	FAIL	Data received from remote loop back does not match data sent. 1) Check for faulty wiring. 2) Replace the data module and repeat the test. 3) If the test fails, replace the Digital Line circuit pack associated with the data module and repeat the test. 4) If the test continues to fail, escalate the problem.
1070	FAIL	Internal software response. 1) Wait 1 minute and attempt the test again. 2) If the same error persists after 5 attempts in 1 minute intervals, escalate the problem.
1072	FAIL	Bad response from auxiliary channel. 1) Test the Network Control (Netcon) circuit pack using the test data-module command. 2) If the test fails, replace the Digital Line circuit pack. 3) If the test continues to fail, escalate the problem.
1073	FAIL	Internal System Error 1) Wait 1 minute and attempt the test again. 2) If the same error persists after 5 attempts in 1 minute intervals, escalate the problem.

Test #175 Data Module Internal Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
1074	FAIL	Internal System Error 1) Make sure that the data equipment connected to the data module is powered. 2) For an (M)PDM, verify that the Data Terminal Ready LED is ON, or for an (M)TDM, verify that the Data Set Ready LED is ON. If not, check the cable from the data equipment to the data module. 3) If the test continues to fail, escalate the problem.
1075	FAIL	Unknown message received during test. 1) Attempt the test again. 2) If the same error occurs, test 'the Network Control Data Channel using the test data-module command and a known working data module. 3) Replace the Digital Line circuit pack and repeat the test. 4) If the test continues to fail, escalate the problem.
2000	FAIL	Internal System Error " 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
2040 2095	FAIL	Internal System Error 1) Repeat the test. 2) If the test continues to fail, escalate the problem.
	PASS	Data Module Loop Around Test passed. This digital port circuit pack is functioning properly. 1) If complaints still exist, investigate by using other port tests, and by examining the data module options, wiring, and connections.

PMS-LINK (PMS Link)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
PMS-LINK	MINOR	test pms I	PMS Link
PMS-LINK	WARNING	test pms	PMS Link

Property Management System (PMS) is a standalone computer system which a hotel/motel-type and a hospital-type environment uses for services such as reservation, registration, messaging, housekeeping, night audit, billing, and inventory. The PMS Link provides a communication channel between System 75 and a customer-owned PMS so that the PMS can interrogate the System 75 about the information related to the following features:

- message waiting notification
- controlled restriction
- housekeeping status
- check-in/check-out
- room change/room swap.

Refer to *AT&T DEFINITY and System 75 Feature Description, 555-200-201*, “for details of PMS feature. The PMS link is administered to a data extension which provides a standard RS-232C interface to the PMS. A PMS can be connected through a data module (PDM, MPDM, DTDm) and a port on the TN754 Digital Line circuit pack, or through an Asynchronous Data Unit (ADU) and a port on the TN726 Digital Line circuit pack.

PMS-LINK maintenance provides a strategy in System 75 R1V3 for maintaining the link between System 75 and a PMS device. The strategy includes a set of tests for periodic diagnosis, detection of errors during normal operation, actions for troubleshooting, and raising alarms for serious problems. PMS-LINK Maintenance uses a try-and-wait mechanism for maintaining the PMS link. If a PMS link is torn down due to an error, PMS-LINK maintenance intends to bring the link up immediately. If the trial of Link Setup fails, PMS-LINK maintenance will wait for 5 minutes before the next retry. If the number of retries reaches the threshold value of 12, a Minor alarm is raised for service attention.

PMS-LINK maintenance does not cover the maintenance of the elements composing the PMS physical link [the external PMS device, Data Module (PDM/MPDM/DTDM) and Digital Line Port of TN754 Digital Line circuit pack, Asynchronous Data Unit (ADU) and Data Line Port of TN726 Data Link circuit pack, and Data Channels on TN727 Netcon circuit pack]. If PMS-LINK maintenance cannot restore the PMS link, then the maintenance tests of these individual components of the PMS link must be executed to diagnose faults.

If craft demanded test pms fails, no alarm will be generated.

Procedures for Restoring the PMS Link

1. Get the status of the PMS link.

Enter status pms command and make sure that the PMS Link is not busied out for maintenance. If the link is down, then continue to the next step.

2. Where does the PMS Link connect to?

Enter display system hospitality and find out the destinations of the PMS Link.

3. Get the status of the data extension.

Enter status data <extension> command and verify whether the data extension is in in-service/idle state. If the data extension is NOT available, then look for the extension number in Alt Name field of Hardware Error Log. Refer to the XXX-BD (Common Port Board) maintenance documentation for resolutions.

4. Is a data channel on Netcon circuit pack in in-service/idle state?

Enter list data command and find out the extension numbers of data channels on Netcon circuit pack. Enter status data <extension> command and make sure that at least one data channel is in in-service/idle state. If no data channel is available, then look for DATA-CHL/DATA-CON/DATA-BD errors in the Hardware Error Log. If present, refer to the DATA-CHL (Network Control Data Channel) maintenance documentation; if not present, escalate the error.

5. Is the external PMS device available?

Make sure that the PMS device is ON-LINE and ready-for-service. Check the physical connectivity between Data Module and the PMS device.

It is recommended that you busyout the PMS Link before executing maintenance tests over objects composed by the PMS Link. If the PMS Link is busied out, then all PMS Link maintenance actions are deactivated. The interference to tests of other maintenance objects is off.

Hardware Error Log Entries and Test to Clear Values

PMS Link Maintenance Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test pros-link s
18(a)	0	busyout pros-link	WARNING	OFF	release pros-link
257(b)	3 to 6 255	Link Retry Test (#21 5)	MINOR	OFF	test pros-link l
513(C)	3 to 6				test pros-link
769(d)	5				
1025(e)					
1281(f)					
1537(g)					
1793(h)	None			test pros-link	
2049(i)	None				
2305(j)	None			release pros-link	
2561(k)	None				
2817(l)	None				
3841(m)					

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) Craft busied out the PMS Link. The link is torn down. Enter release pros-link command to restore the link.
- (b) Link Retry Test (#21 5) fails. The Aux Data field contains either the Channel ID of Data Channels on Netcon circuit pack (that is, 3 for Channel 01, 4 for Channel 02, 5 for Channel 03, 6 for Channel 04) or an error code 255 for the internal system error. Refer to the Procedures for Restoring the PMS Link section for resolution.
- (c) The PMS physical link is down due to the following causes: cable to the PMS device is disconnected; the PMS device is powered off; or the data extension where the PMS device connects to has been busied out. The Aux Data field contains the Channel ID of Data Channels on Netcon circuit pack (that is, 3 for Channel 01, 4 for Channel 02, 5 for Channel 03, 6 for Channel 04). Check the connectivity of wire and cable among wall jacket, data module, and the PMS device. Enter status data <extension> and verify that the data extension of the PMS device is in in-service/idle state. If the data extension is not available, then refer to the Procedures for Restoring the PMS Link section for resolution.
- (d) No communication between System 75 and PMS for a period of time (the time is specified in system hospitality administration). The PMS Link is torn down. To clear this error, refer to the Procedures for Restoring the PMS Link section.

- (e) System 75 CANNOT receive any message from PMS. If the PMS Link is down and the error rate of this error type in Hardware Error Log is greater than 12, then notify customer to call the vendor of the PMS to diagnose the PMS device. Once the PMS Link is established successfully, this error vanishes out of the Hardware Error Log.
- (f) System 75 CANNOT send any message to the PMS. If the PMS Link is down and the error rate of this error type in Hardware Error Log is greater than 12, then notify customer to call the vendor of the PMS to diagnose the PMS device. Once the PMS Link is established successfully, this error vanishes out of the Hardware Error Log.
- (g) The PMS has been busied out for maintenance. If the PMS Link is down and the error rate of this error type in Hardware Error Log is greater than 12, then notify customer to call the vendor of the PMS to diagnose the PMS device. Once the PMS Link is established successfully, this error vanishes out of the Hardware Error Log.
- (h) PBX buffer overflows due to either heavy call traffic or PMS protocol message rate being faster than PMS/PBX protocol specifications allow. The PMS Link is torn down. PMS-LINK maintenance software will wait for 5 minutes before attempting to set up the link again. If the error rate of this error type in the Hardware Error Log is greater than 12, then notify the customer to call the vendor of the PMS to diagnose the PMS device. The PMS should be checked for adherence to message rate defined in the PMS/PBX protocol specifications. No alarm is raised against this error.
- (i) The attempt to swap the data base between PBX and PMS failed three times consecutively due to excessive PMS/PBX protocol violations, buffer overflows, or PMS Link outages. The PMS Link is NOT torn down. If the error rate of this error type in the Hardware Error Log is greater than 12, then notify customer to call the vendor of the PMS to diagnose the PMS device. No alarm is raised against this error.
- (j) The PMS Link has been busied out for maintenance at the request of the PBX. The PMS Link is torn down. PMS-LINK maintenance will stop attempting to re-establish the PMS Link. To restore the PMS Link, enter release pros-link command.
- (k) The PMS Link is physically established, but the protocol has not been started by the PMS before the protocol timer expires. The PMS Link is not torn down. If the error rate of this error type in the Hardware Error Log is greater than 12, then notify the customer to call the vendor of the PMS to diagnose the PMS device. The PMS should be checked to make sure that it will attempt to start the protocol according to the PMS/PBX protocol specifications. No alarm is raised against this error.
- (1) PMS violated the protocol. This error indicates that the PMS and PBX are not synchronized to each other in the PMS/PBX protocol. For example, PMS sends the "room image" message of the data base swapping when the PBX is NOT in the data base swap state. The PMS Link is NOT torn down. If the error rate of this error type in the Hardware Error Log is greater than 12, then notify the customer to call the vendor of the PMS to diagnose the PMS device. The PMS should be assessed for adherence to the PMS/PBX protocol specifications. No alarm is raised against this error.
- (m) System 75 CANNOT interpret the messages from PMS due to invalid message format or checksum error. The PMS Link is torn down. PMS-LINK maintenance software will wait for 5 minutes to set up the link again. Look for the error rate of this error type in Hardware Error Log. If the error rate is greater than 12, then notify customer to call the vendor of the PMS to diagnose the PMS device. Once the PMS Link is established successfully, this error vanishes out of the Hardware Error Log.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Link Tear Down Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Link Tear Down Test (#21 3)		x	D
Link Retry Test (#215)	x	x	ND

•D = Destructive

ND = Non-destructive

Note: Only the result of Test #215 is displayed.

Link Tear Down Test (#213)

This test is destructive.

Link Tear Down Test disconnects the existing link between System 75 and the external PMS device. If the link has been disconnected already, then this test just returns PASS. All resources allocated for a PMS Link are released after this test.

Test #213 Link Tear Down Test		
Error Code	Test Result	Description / Recommendation
40	ABORT	Internal System Error
50	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1010	ABORT	The PMS link has been busied out to out-of-service. 1) Enter release pros-link command to release the PMS Link from busyout state. 2) Retry test pros-link long command to execute the test.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	The PMS Link is torn down.

Link Retry Test (#215)

Link Retry Test sends a message to the PMS software process to make a data call to the extension where the PMS device connects to. If the PMS Link is already up, then this test passes without making any data call.

Test #215 Link Retry Test		
Error Code	Test Result	Description / Recommendation
10	ABORT	Internal System Error
20	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
30	ABORT	Internal System Error 1) Refer to the “Procedures for Restoring the PMS Link” section for procedures.
1010	ABORT	The PMS Link has been busied out to out-of-service. 1) Enter release pros-link command to release the PMS Link from busyout state. 2) Retry test pros-link command to execute the test.
	FAIL	The PMS link CANNOT be established. 1) Refer to the “Procedures for Restoring the PMS Link” section for restoring the PMS Link.
	PASS	The PMS Link is up.

POWER (Battery & Battery Charger)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
POWER	MINOR	test environment	Battery & Battery Charger

The System 75 medium cabinet system is equipped with rechargeable batteries that can span short AC power outages. The entire cabinet can be powered for 10 seconds from the batteries. After this time, all port carrier power is shed and the control carrier is powered for another 10 minutes.

The POWER (Battery & Battery Charger) maintenance object represents the battery charger and the battery which are located in the lower left corner of the cabinet (see Figure 6-25). Should anything go wrong with the battery or charger, they must be replaced. The system will detect one of the following three problems with the batteries or charger:

- Reserve Fault—The charger has detected a problem within itself or the batteries and has notified the system.
- High Charge Rate—The batteries are charging at a high charge rate. This indicates that there is a short in the batteries or the charger.
- Prepare to Disconnect (Low Battery)--The batteries are in danger of being drained to a point where the batteries will be damaged. This warning will often occur after multiple power failures.

The batteries take 30 hours to fully charge after being drained. A fully charged battery pack should bridge two power failures without causing a low battery warning to occur.

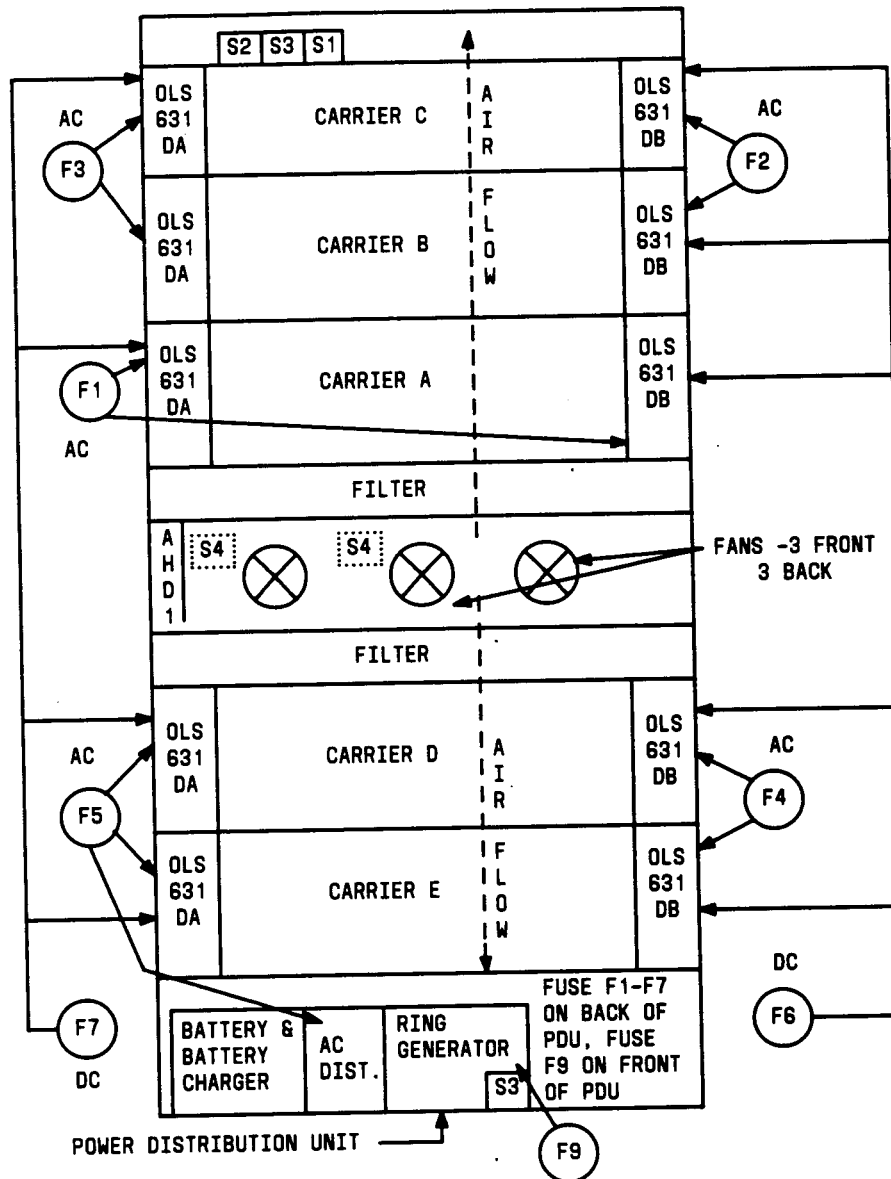


Figure 6-25. Medium Cabinet Environment Components

Replacing the Battery & Battery Charger

1. At the battery charger, set the power switch to OFF.

Warning: Always turn off the battery charger before replacing the battery. Failure to do this will result in damage to the 397B battery charger.

2. Disconnect the cord from the outlet on the front of the battery charger.
3. Remove the screw at the top left of the cover and open the cover to access the charger.
4. Check the battery voltages at the test points. They should be 48 volts or higher.

Note: An ordinary voltmeter can be used to check battery voltages at the test points, but it may not produce valid results. If the battery voltage readings are below 48 volts, the battery is probably defective. However, a normal voltage reading does not necessarily mean the battery is good; under load, a defective battery with a normal reading on the voltmeter may discharge rapidly.

5. Check battery dates and replace batteries if they are more than 2-1/2 years old.

Note: If any defective batteries are found, replace them all.. Batteries are ordered in sets of three and should be replaced as such.

6. If no defective batteries are found, replace the entire charger.
7. Close the cover and secure it with the screw.
8. Reconnect the cord and set the power switch on the battery charger to ON.

Hardware Error Log Entries and Test to Clear Values

Battery & Battery Charger Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test environments
1	0 or 1	Battery & Battery Charger Query (#5) (failure error code 8)	MINOR	ON	test environment s r 3
257	Any	Battery & Battery Charger Query (#5) (failure error code 4)	MINOR	ON	test environment s r 3
513(a)	0 or 1	AC Power Query (#5)	MAJOR	OFF	test environment s r 1
769	0	Battery & Battery Charger Query (#5) (failure error code 2)	MINOR	ON	test environments r 3

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) For VI and V2 Only, see AC-POWER maintenance documentation for more details.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Battery & Battery Charger Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery & Battery Charger Query Test (#5)	x	x	ND
AC Power Query Test (#5) (a)	x	x	ND
OLS Recycle Test (carrier E, D, A,B,C) (#127) (b)	x	x	ND
OLS Recycle Test (carrier E, D, A,B,C) (#126)		x	ND
Emergency Transfer Query Test (#1 24) (c)	X	X	ND
Cabinet Sensors Query Test (#1 22) (d)	X	X	ND
Adjunct Processor Query Test (AP 1,2,3) (#1 20) (e)	X	X	ND

* D = Destructive

ND = Non-destructive

(a) Refer to AC-POWER (AC Power) maintenance documentation for a description of this test.

(b) Refer to CARR-POW (Carrier Port Power Supply) maintenance documentation for a description of this test.

(c) Refer to EMG-XFER (Emergency Transfer) maintenance documentation for a description of this test.

(d) Refer to CABINET (Cabinet Sensors) maintenance documentation for a description of this test.

(e) Refer to AUX-CAB (Adjunct Processor) maintenance documentation for a description of this test.

Battery & Battery Charger Query Test (#5)

This test queries the Maintenance circuit pack for the status of the battery pack and battery charger, and reports the result.

Test #5 Battery & Battery Charger Query Test		
Error Code	Test Result	Description / Recommendation
	ABORT	System resources required to run this test are not available or response to the test request was not received within the allowable time period or Internal System Error. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2	FAIL	The system is in nominal power holdover, and the battery is currently so low that the system will disconnect power very shortly. 1) If power returns, then the port carriers in the PPN should power up again. All the circuit packs should be reinserted, and the system should continue to operate normally. There will probably be a Minor alarm against Battery & Battery Charger due to the fact that the batteries are recharging. 2) If power does not return, the system will shut down to prevent damage to the batteries. Restore power, and the system will reboot.
4	FAIL	The battery is currently being charged. 1) After 30 hours, the battery should be fully charged, and this error should disappear. 2) If, after 30 hours, the battery is still in the high charge rate, an alarm will be raised. Display the Error Log with the display errors command and select the category '(environ" to display only environment-related errors. Look for POWER errors of type 257. The FIRST OCCUR of this error indicates the time when the battery started charging. Use this time as the starting point to determine if the battery has been charging for 30 hours. If it has, then replace the battery and battery charger. See the Replacing the Battery & Battery Charger section. 3) Rerun the test. If the test still fails, then the MAINT (Maintenance Circuit Pack) could be reporting this condition incorrectly. Resolve all alarms on these maintenance objects, and rerun the test. If the test still fails, then escalate the problem.

Test #5 Battery & Battery Charger Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
6	FAIL	This indicates that error codes 2 and 4 have occurred. Refer to error code 2 and 4 descriptions. Also, refer to the description for error code 14 for this test.
8	FAIL	There is a reserve power fault. A problem exists with the battery charger (more probable) or the battery (less probable). 1) Replace the battery charger and the battery. See Replacing the Battery & Battery Charger section. The fault should disappear. 2) Rerun the test. If the test still fails, then the MAINT (Maintenance Circuit Pack) could be reporting this condition incorrectly. Resolve all alarms on these maintenance objects and rerun the test. If the test still fails, then follow normal escalation procedures.
10	FAIL	This indicates that error codes 2 and 4 have occurred. Refer to error code 2 and 4 descriptions. Also, refer to the description for error code 14 for this test.
12	FAIL	This indicates that error codes 4 and 8 have occurred. Refer to error code 4 and 8 descriptions. Also, refer to the description for error code 14 for this test.
14	FAIL	This indicates that error codes 2, 4, and 8 have occurred. Refer to error code 2, 4, and 8 descriptions. Note: This could also indicate that the detection logic on the Maintenance/Tape Processor (MTP) or Maintenance circuit pack (MAINT) is defective. Such an error is not detected by the respective maintenance. If many environment tests are failing, replace the suspect circuit pack (depending on system configuration).

Test # 5 Battery & Charger Query Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort with error code 2000, check for system powering problems with the A carrier. Look for and resolve all AC-POWER alarms, then repeat the test. 3) If the test continues to ABORT with error code 2000, check for and resolve MAINT (Maintenance/Tape Processor) errors, then repeat the test. 4) If the test continues to ABORT with error code 2000, escalate the problem.
	PASS	The Maintenance circuit pack has reported that the status of Battery & Battery Charger is good.

PROC-SAN (Processor Sanity Audits)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
PROC-SAN	None	None	Processor Sanity Audits

The PROC-SAN (Processor Sanity Audits) maintenance object monitors the sanity of software processes in System 75. If the PROC-SAN maintenance object detects that a process has gone insane (does not respond to a sanity message within an allotted time period), the process will be restarted. If the PROC-SAN maintenance object detects that multiple processes (or a single key process) do not respond to sanity messages within an allotted time period, a system recovery action will be initiated.

The PROC-SAN maintenance object has no alarms and no tests. Certain errors are logged to the Hardware Error Log for informational purposes only.

Hardware Error Log Entries and Test to Clear Values

Processor Sanity Audits Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	None
10 (a)	o	None	None	None	None
204 (a)	Any	None	None	None	None

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) These errors indicate that a system recovery action has been taken because one or more software “processes failed to respond to a sanity audit in a timely fashion. As a result of the recovery action, the system may have temporarily suspended service for a period of time surrounding the error. If these errors persist, escalate the problem immediately.

PROCR (Processor Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
PROCR	MAJOR	test processor s	Processor Circuit Pack

For System 75, the Processor circuit pack used is the TN711 or TN711B. For R1V3 XE, the Processor circuit pack used is the TN759. The 8086 Processor and Maintenance/Tape Processor (MTP) each comprise roughly half of the TN759 Processor circuit pack in System 75 R1V3 XE.

The TN711 B or the 8086 Processor portion of the TN759 is responsible for the execution of the System 75 software. This includes all of the call processing, maintenance, and administration functions. This central processor is the most critical component to correct operation of the system.

On R1V3 XE only, the MTP portion of the TN759 takes the place of the maintenance (TN731, TN731B) and tape controller (TN729) circuit packs found in medium or small cabinet systems. As such, the MTP is responsible for monitoring the sanity of the 8086 Central Processor on the TN759, as well as environmental conditions. The MTP provides the serial interfaces for the System Access Terminal (SAT) and SMDR ports and contains the hardware required for controlling the tape drive. The MTP also provides the communication interface to INADS for alarm reporting and remote maintenance capability.

Hardware Error Log Entries and Test to Clear Values

Processor Circuit Pack Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test processor s
1	0	Software Initiated Interrupt Test (#77)	MAJOR	ON	test processor r 4
257	0	Memory Management On/Off Test (#78)	MAJOR	ON	test processor r 6
513	0	Overflow Stack Test (#79)	MAJOR	ON	test processor r 6
769	0	ROM Checksum Test (#80)	MAJOR	ON	test processor r 6
1025	0	Processor Non-maskable Interrupt Test (#82)	MAJOR	ON	test processor r 3
1281	0	Processor Sanity Timer Test (#83)	MAJOR	ON	test processor l r 1

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Processor Non-maskable Interrupt Test*, for example, you may also clear errors generated from other tests in the testing sequence.

For R1V3 XE systems, test processor will run tests on the 8086 Processor and the MTP. For non-XE systems, only tests of the 8086 Processor will be run.

System 75			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Processor Software Initiated Interrupt Test (#77)	x	x	ND
Processor Memory Management On/Off Test (#78)	x	x	ND
Processor Overflow Stack Test (#79)	x	x	ND
Processor ROM Checksum Test (#80)	x	x	ND
Processor Non-maskable interrupt Test (#82)	x	x	ND
Processor Sanity Timer Test (#83)		x	D

- D = Destructive
- ND = Non-destructive

System 75 XE			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
MTP Outpulse Relay Test (#102) (a)	x	x	ND
MTP Analog Loop Around Test (#103) (a)	x	x	ND
MTP Sanity Handshake Test (#106) (a)	x	x	ND
MTP SAT Loop Around Test (#228) (a)	x	x	ND
MTP Aux Loop Around Test (#229) (a)	x	x	ND
Processor Software Initiated Interrupt Test (#77)	x	x	ND
Processor Memory Management On/Off Test (#78)	x	x	ND
Processor Overflow Stack Test (#79)	x	x	ND
Processor ROM Checksum Test (#80)	x	x	ND
Processor Non-maskable Interrupt Test (#82)	x	x	ND
Processor Sanity Timer Test (#83)		x	D

- D = Destructive
- ND = Non-destructive

(a) Refer to MAINT (Maintenance/Tape Processor) documentation for a description of these tests.

Processor Software Initiated Interrupt Test (#77)

This test verifies if the 8086 Processor can exercise the three types of software initiated interrupts. They are:

1. Divide by zero
2. Single step
3. One byte interrupt instruction.

Test #77 Processor Software Initiated Interrupt Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The processor did not detect the software interrupt condition and execute the correct interrupt vector. The system may or may not continue to operate correctly. 1) Repeat the test. 2) If the test continues to fail, the Processor circuit pack should be replaced.
	PASS	The processor did detect the software interrupt condition and did execute the correct interrupt vector. The system will continue to operate correctly.

Processor Memory Management On/Off Test (#78)

This test verifies if the Memory Management Unit on the TN711 or TN759 can correctly translate virtual memory addresses to physical memory addresses.

Test #78 Processor Memory Management On/Off Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The processors memory management unit has been found to be defective. It is very improbable that the system is functioning well enough to even run this test. 1) The Processor circuit pack should be replaced.
	PASS	The Memory management unit is functioning properly. Examine other test results to diagnose system problems.

Processor Overflow Stack Test (#79)

The 8086 Processor Overflow Stack Test tests a portion of memory on the Processor circuit pack that is only used if system software has temporarily exhausted all available memory on the Memory circuit packs.

Test #79 Processor Overflow Stack Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The Overflow stack memory was found to not be functioning correctly. It may be possible that the system will continue to operate normally. 1) The Processor circuit pack should be replaced:
	PASS	The overflow stack memory is functioning properly. Examine other test results to diagnose system problems.

Processor ROM Checksum Test (#80)

This test computes the checksum of the 8086 Processor's bootstrap ROM and compares it to a predetermined value stored within the ROM. A failure of this test indicates corruption of the ROM.

Test #80 Processor ROM Checksum Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The computed checksum did not match the ROM checksum. The system may or may not continue to operate correctly. The system may fail at some future date when some action requires access to the corrupted area of the bootstrap ROM. 1) The Processor circuit pack should be replaced.
	PASS	The computed checksum did match the ROM checksum. System will continue to operate normally.

Processor Non-maskable Interrupt Test (#82)

This test is used to verify that the 8086 Processor can detect and respond to non-maskable interrupts. One example is a BUS TIMEOUT EXCEPTION (BTE). The processor intentionally causes a BTE and verifies if it vectors to the correct interrupt routine.

This is basically a test of internal operation of the 8086 Central Processing Unit (CPU) chip.

Test #82 Processor Non-maskable Interrupt Test		
Error Code	Test Result	Description / Recommendation
	FAIL	The interrupt was not detected or acted upon. 1) Repeat the test. 2) If the test continues to fail, the Processor circuit pack should be replaced. 3) If replacement of the Processor circuit pack still results in test failure, examine the control carrier for bent pins. 4) If no bent pins are found, the following circuit packs should be replaced one at a time and the test repeated after the system has rebooted: TN734, TN743, and TN761 Memory circuit packs, TN765 Processor Interface, TN727 Network Control, TN716 Interface 1, TN738 Interface 2, TN729 Tape Control, TN727 Network Control. 5) If the test still fails after replacing all the above circuit packs, the problem must be in the control carrier and it should be replaced.
	PASS	The interrupt was correctly detected. The 8086 CPU chip is functioning correctly.

Processor Sanity Timer Test (#83)

This test is destructive.

This test will cause service to be disrupted for approximately 7 seconds. During this time, the system will not respond to any user action.

This test checks to see if the 8086 Processor sanity timer is functioning correctly. The processor will intentionally allow the sanity timer to time out. If the processor detects itself being reset, the test passes and the processor executes a warm start to continue execution. If the processor does not detect a reset, the test has failed. If this test should continue to fail, the Processor circuit pack should be replaced at the earliest possible convenience. The sanity timer is not critical to system operation, but it is needed for processor recovery should the processor stop functioning.

Test #83 Processor Sanity Timer Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The sanity timer did not time out as expected. The system will continue to function normally. If the processor should get into an infinite loop, it WILL NOT be detected and the system WILL NOT reboot itself to clear the problem. 1) Repeat test. 2) If test continues to fail, the Processor circuit pack should be replaced at a time convenient to the customer.
	PASS	The sanity timer did go off as expected. The system will continue to function normally after it executes a warm start. If the processor should get into an infinite loop, it WILL be detected and the system WILL reboot itself to clear the problem.

SC-INTF (System Communication Interface)

MO Name As It Appears In Alarm Loci	Alarm Level	Initial Craft Command To Run	System Communication Interface Of MO
SC-INTF	MAJOR	Test interface I	System Communication Interface

The SC-INTF (System Communication Interface) maintenance object in System 75 R1V2 and R1V3 consists of tests that maintain the Interface circuit packs that support BX.25 connections. There are two basic interface configurations. The first configuration uses the TN716, TN738, and TN719 Interface circuit packs. The second configuration replaces the TN716, TN738, and TN719 circuit packs with the TN765 Interface circuit pack.

The SC-INTF maintenance object in System 75 R1V2 is used to put the TN716 Interface 1 circuit pack, TN738 Interface 2 circuit pack, and TN719 Interface 3 circuit pack in a state such that BX.25 (DCS and AP16) links can be established (see Figure 6-26).

INFC1 will be used from this point on to refer to the TN716 Interface 1 circuit pack. The main purpose of INFC1 is to interface the M-BUS with the S-BUS.

INFC2 will be used from this point on to refer to the TN738 Interface 2 circuit pack. The main purpose of INFC2 is to support BX.25 link level (level 2 or LAPB) and Packet level (level 3).

IN FC3-BD will be used from this point on to refer to the TN719 Interface 3 circuit pack. The main purpose of the INFC3-BD is to interface the INFC2 to the TDM Bus.

Failures while communicating with the INFC1, INFC2, and INFC3-BD circuit packs are logged against SC-INTF maintenance object. If errors against the System Communication Interface can be related to the three Interface circuit packs, then the circuit pack maintenance object (INFC1, INFC2, and/or INFC3-BD) is/are alarmed. See also SC-LINK (Processor Interface Link) and INFC1, INFC2, and INFC3-BD maintenance documentation.

In the R1V3 XE, the TN765 Processor Interface (Pi) circuit pack replaces the functionality of the INFC1, INFC2, and INFC3-BD. However, the R1V3 medium cabinet can use either the PI circuit pack or the set of three Interface circuit packs noted above (see Figures 6-27 and 6-28).

The PI circuit pack has downloadable firmware. It is the responsibility of SC-INTF to download the firmware to the TN765 circuit pack during initialization. Failures while communicating with the TN765 circuit pack are logged against this maintenance object (SC-INTF). If errors against the SC-INTF can be related to the PI circuit pack, then the circuit pack maintenance object is alarmed (P-INT-BD). See also SC-LINK (Processor Interface Link) and P-INT-BD (Processor Interface Circuit Pack) maintenance documentation.

When investigating X.25 (DCS, Audix, etc.) link problems, resolve SC-INTF errors initially, since they might clear up the SC-INTF problems.

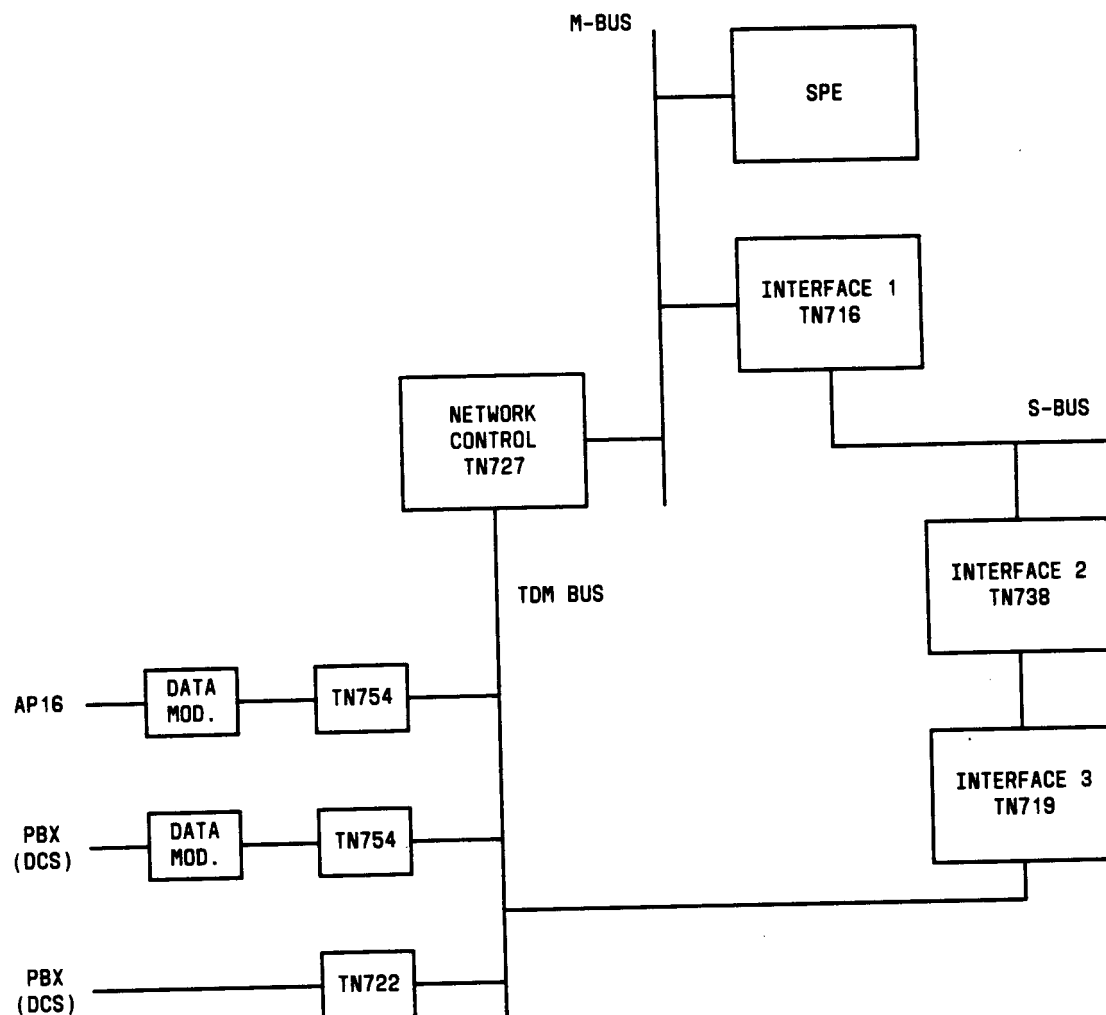


Figure 6-26. R1V2 Communication Interfaces Architecture (SC-INTF)

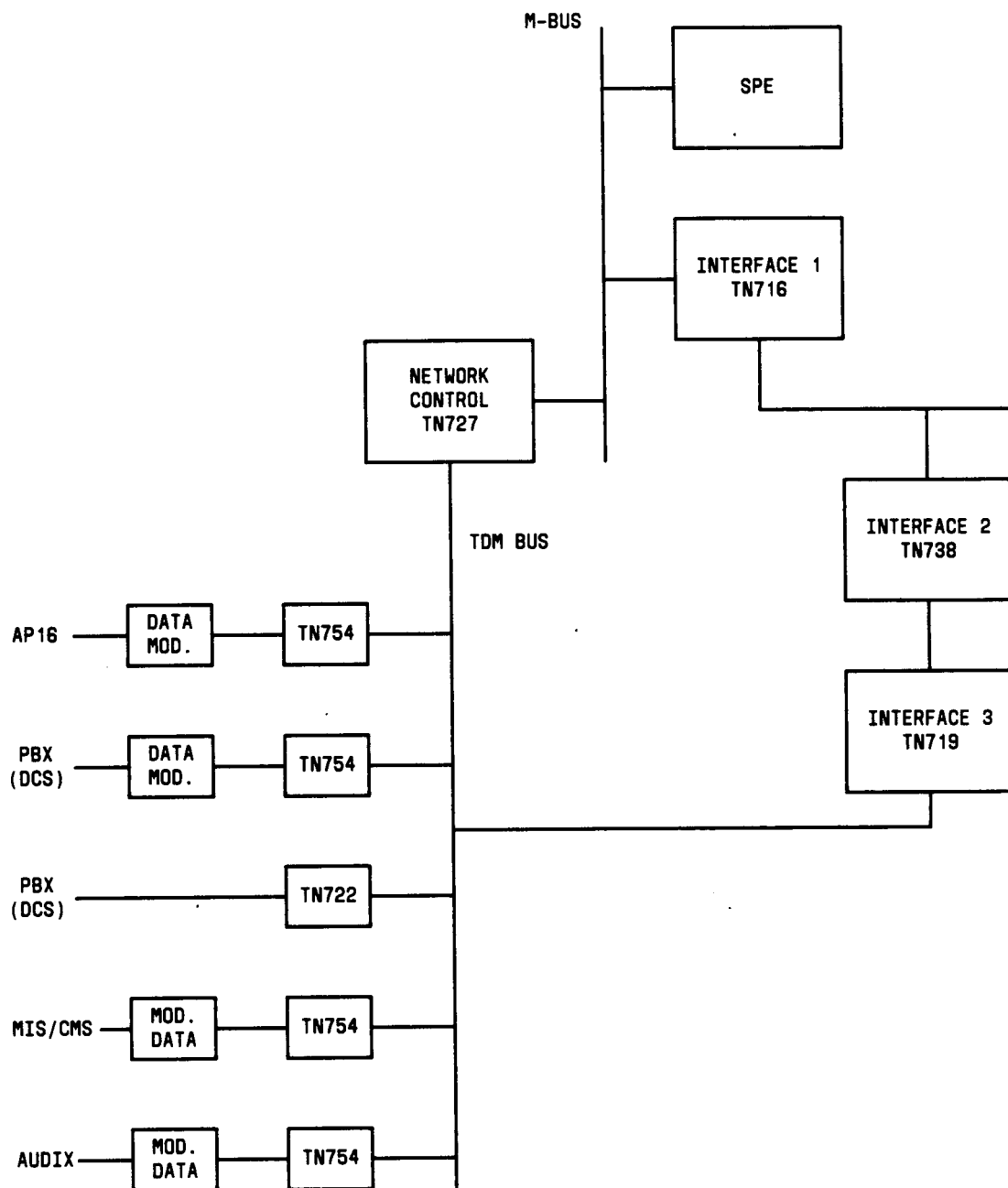


Figure 6-27. R1V3 Communication Interfaces Architecture With Three Interface Boards (SC-INTF)

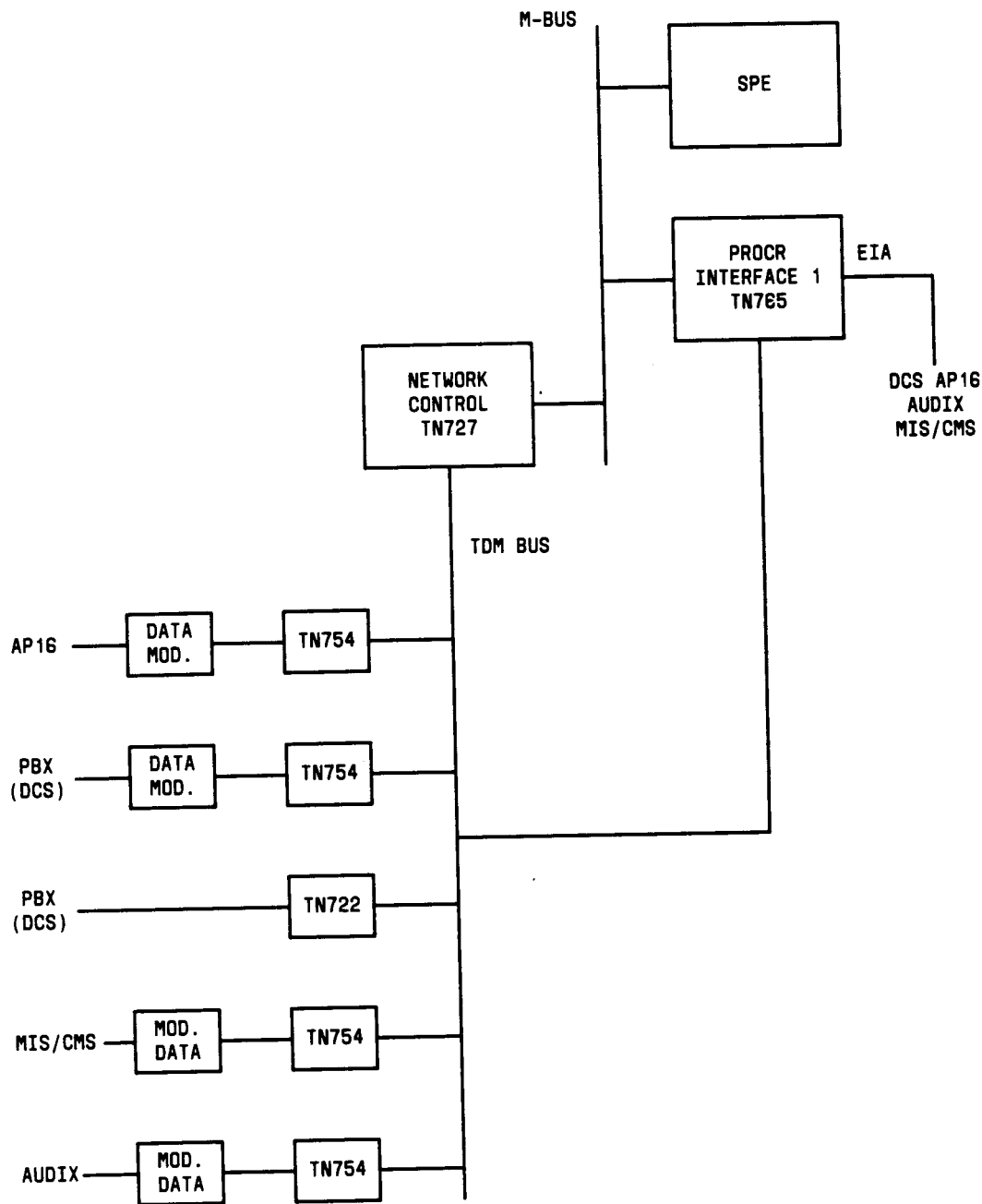


Figure 6-28 R1V3 Communication Interfaces Architecture With One PI Board (SC-INTF)

Hardware Error Log Entries and Test to Clear Values

System Communication Interface Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test interface s
1(a)	Any	None	MAJOR	OFF	
257(b)	Any	None	MAJOR	OFF	
513(c)	Any	None	MAJOR	OFF	
769(d)	Any	None	MAJOR	OFF	
1025(e)	Any	None	MAJOR	OFF	
1281	Any	Sci Start Test (#176)	MAJOR	OFF	test interface l r 2
1537(f)	Any	SBUS Test (#177)	MAJOR	OFF	test interface s
1793(g)	Any	None	MAJOR	OFF	test interface l
2049(h)	Any	Sci Start Test (#176)	MAJOR	OFF	test interface l r 3
2305(i)		Sci Selftest Test (#231)	MAJOR	OFF	test interface s r 2
2561(i)	Any	None	MAJOR	OFF	

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Warning: The “test interface long” command starts a destructive test that interrupts all interface links.

Notes:

- (a) This error can only occur when using the three Interface circuit pack configurations. The error indicates an SBUS failure on either the INFC1 and/or INFC2 circuit packs. If the error persists, and the System Communication Interface is unstable (resets often), type in test interface long command. If this does not fix the problem, then replace the INFC1 circuit pack. If the problem still exists, then replace the INFC2 circuit pack. If the problem still exists, then check the SBUS terminators to make sure they are not loose. Further problems should be escalated. This error will also raise alarms against the INFC1 circuit pack. Error type 1 will also raise an on-board alarm on the INFC1 circuit pack, see INFC1 maintenance documentation.
- (b) This error indicates a hardware failure” on the INFC2 circuit pack or the PI circuit pack. If the error persists, and the System Communication Interface is unstable (resets often), type in test interface long command. When equipped with the INFC2 and the problem still exists, then type reset interface at the SAT. If this does not fix the problem, then replace the INFC2 circuit pack. When equipped with the PI circuit pack, the firmware will be redownloaded if the checksum fails. If the problem still exists, automatically redownload the PI firmware by typing reset interface. If this doesn't work, then replace the PI circuit pack. Further problems should be escalated. Error type 257 will also raise an on-board alarm on the INFC2 or PI circuit Packs. See INFC2 or PI-INT-BD maintenance documentation.
- (c) This error indicates a hardware failure on the INFC3-BD circuit pack. If the error persists, and the System Communication Interface is unstable (resets often), type in test interface long command. If the problem still exists, then type reset interface at the SAT. If this does not fix the problem, then replace the INFC3-BD circuit pack. Error type 513 will also raise

an on-board alarm on the IN FC3-BD circuit pack. See INFC3-BD maintenance documentation.

- (d) The INFC2 or PI circuit pack lost communication with the SPE process. Error while communicating with INFC2 or PI circuit pack. For the INFC2, if the error persists, and the System Communication Interface is unstable (resets often), type in test interface long command. If the problem still exists, then type reset interface at the SAT. If this does not fix the problem, then replace the INFC2 circuit pack. For the PI circuit pack see Note (b).
- (e) SPE informs maintenance that the System Communication Interface should be reset. This could be because a task with the SPE is blocked, the SPE and INFC2 or PI circuit pack are out of synch, or data corruption within the SPE. Error while communicating with INFC2 or PI circuit pack. See Note (b) for recovery. Error 1025 can also be caused by trouble within the line.
- (f) The SBUS driver detected errors while communicating with the INFC2 circuit pack. The MBUS driver detected errors while communicating with the PI circuit pack. Error while communicating with INFC2 or PI circuit pack. See Note (b) for recovery.
- (g) These errors will also raise alarms against the PI circuit pack [see SCI Start Test (#176)].
- (h) These errors will also raise alarms against the PI circuit pack [see SCI Selftest Test (#231)].
- (i) An audit of the firmware failed. If BX.25 links are still up, no action is needed. If PI circuit pack is reset continuously, recover as in Note (b).

The following errors are generated as a result of SPE initiated tasks, such as testing and downloading PI firmware.

SPE Failure Codes	
Aux Data	Description
1	No INFC2 or PI Circuit Pack in the system.
5	INFC1 Interface Failure
6	INFC2 or PI Circuit Pack Failure
7	INFC3-BD or PI Circuit Pack Failure
8	SBUS Test Failure (INFC2 configuration only)
155	Checksum Test failed on downloaded PI software (PI configuration only—possible tape problem).
199	PI Software download failure (PI configuration only).
519	NMI reported on PI Driver (PI configuration only).
579	NMI reported on SBUS Driver (INFC1, INFC2, and INFC3-BD configuration only).
90XX	TAPE errors—See Tape maintenance (PI configuration only).
Xxxx	Any other aux values are useless

Description of Aux Values

(Aux Data 1) - This aux value means that there is either no INFC2 or PI circuit pack in the system OR the IN FC3-BD or PI circuit pack are bad. See SCI Start Test (#176).

(Aux Data 5) - This aux value means that the INFC1 circuit pack is bad. See SCI Start Test (#176).

(Aux Data 6) - This aux value means that the INFC2 circuit pack is bad. See SCI Start Test (#176).

(Aux Data 7) - This aux value means that the INFC3-BD circuit pack is bad. See SCI Start Test (#176).

(Aux Data 8) - This aux value means that there is a problem with either the INFC2 or INFC1 circuit packs or the SBUS. See SCI Start Test (#176) and SBUS Test (#177).

(Aux Data 155) - This aux value means that the checksum test run by the PI circuit pack failed. See SCI Start Test (#176).

(Aux Data 199) - This aux value means that the software download to the PI circuit pack failed. See SCI Start Test (#176).

(Aux Data 519) - This aux value means that the SPE had a problem addressing the PI circuit pack. See SCI Start Test (#176).

(Aux Data 579) - This aux value means that the SPE had a problem addressing the INFC2 or INFC1 circuit packs or the SBUS. See SCI Start Test (#176) and SBUS Test (#177).

(Aux Data 90XX) - The 90XX series of aux values means that the PI software download failed because of TAPE errors. Refer to TAPE (Tape Unit) maintenance documentation.

Craft-Demanded Tests: Descriptions and Error Codes

The following are the short and long test sequences for System Communication Interface. The craft command test interface tests both the System Communication Interface (SC-INTF) and the XXX-BD (Common Port Board) circuitry (INFC3-BD or P-INT-BD).

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *SCI Start Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
SCI Start Test (#176)		x	D
SCI Self Test (#231)	x	x	ND
SBUS Test (#177)	x		ND
Control Channel Loop Test (#52) (a)	x	x	ND
NPE Audit Test (#50) (a)		x	ND

•D = Destructive
ND = Non-destructive

- (a) For information about these tests refer to the XXX-BD (Common Port Board) maintenance documentation. These tests are run on the Synchronous-Asynchronous Interface Board (displayed on SAT as INFC3-BD) maintenance object and the Processor Interface Board maintenance object (displayed on SAT as P-INT-BD).

SCI Start Test (#176)

This test is destructive.

Warning: This test will bring down all BX.25 links. Before running the test, check the status of all administered processor channels (see SC-LINK maintenance documentation). If all the administered processor channels have a status of 6 (data transfer) then do not run this test.

This test restarts the System Communication Interface. This implies all BX.25 (DCS, AUDIX, MIS, etc.) links are restarted. For the PI circuit pack, the checksum of the downloadable firmware is tested. If the checksum fails, the firmware is redownloaded from tape. If it passes, SCI Start completes and the associated BX.25 links are started up.

This test is also performed in response to the reset interface command, in which case the PI firmware will be downloaded regardless of the checksum. The download of the PI firmware may take up to 10 minutes, if the firmware on the tape has an incorrect checksum. Access to the tape will be blocked during this time. To shorten this waiting period, disable all enable links using change communication command after waiting for 5 minutes. Remember to. re-enable the links once when a tape with good firmware is available.

Test #176 SCI Start Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	Could not reset the INFC3-BD or PI circuit pack 1) Check to make sure the INFC3-BD or the PI circuit pack is inserted. 2) Retry the command at 1 minute intervals for a maximum of 5 times. 3) If this continues to abort, replace the circuit pack. 4) If the test continues to abort, escalate the problem.
9 10	ABORT	Internal System Error
3 4 102	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
16 80 94 103 160	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If this continues to fail, replace either the INFC2 circuit pack or the PI circuit pack. 3) If the test continues to fail, escalate the problem.

Test #176 SCI Start Test (Contd)		
Error Code	Test Result	Description / Recommendation
5	FAIL	INFC1 circuit pack is bad. 1) Retry the command for a maximum of 5 times. 2) Replace INFC1 circuit pack. 3) If the test continues to fail, escalate the problem.
6	FAIL	INFC2 circuit pack is bad. 1) Retry the command for a maximum of 5 times. 2) Replace INFC2 circuit pack. 3) If the test continues to fail, escalate the problem.
7	FAIL	INFC3-BD circuit pack is bad. 1) Retry the command for a maximum of 5 times. 2) Replace INFC3-BD circuit pack. 3) If the test continues to fail, escalate the problem.
8	FAIL	Hardware Error Pattern from the INFC2 did not match pattern expected. 1) Retry the command for a maximum of 5 times. 2) If the test continues to fail, then replace the INFC2 circuit pack. 3) If the test continues to fail, escalate the problem.
199	FAIL	Download of PI firmware failed. 1) Could be tape access problem. Check that a tape exists in the tape drive. 2) If problem persists and TAPE is idle when command is entered, then a problem could exist in either the TAPE or the PI circuit pack. 3) Cross-reference the TAPE maintenance documentation for possible TAPE errors. If there are no TAPE errors, replace the PI circuit pack.
	PASS	The INFC1, INFC2, and INFC3-BD circuit packs or the PI circuit pack initialized correctly. BX.25 links should recover now. See SC-LINK maintenance documentation for more information if links do not recover.

SBUS Test (#177)

This test does not apply to System Communication Interface which uses a PI circuit pack.

The SPE initiates the SBUS Test by requesting the INFC2 circuit pack to return a fixed bit pattern based on a parameter provided by the SPE. This test's primary purpose is to test the basic sanity of the INFC2 circuit pack.

Test # 177 SBUS Test		
Error Code	Test Result	Description / Recommendation
11	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1005	ABORT	Hardware not appropriate Hardware environment not appropriate—this test will not run on a Pi circuit pack configuration. Must have a INFC1, INFC2, and INFC3-BD circuit pack configuration.
8	FAIL	Hardware Error Pattern from the INFC2 circuit pack did not match pattern expected. 1) Retry the command for a maximum of 5 times. 2) If the test continues to fail, then replace the INFC2 circuit pack. 3) If the test continues to fail after the circuit pack has been replaced, escalate the problem.
3 4 102	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
103 160	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, then replace INFC1 circuit pack. Retry the command at 1 minute intervals for a maximum of 5 times. If the test continues to fail, then replace INFC2 circuit pack. 3) If the test continues to fail, escalate the problem.
	PASS	The INFC1 and INFC2 circuit pack passed SBUS Test. On-board hardware is functioning correctly.

SCI Self Test (#231)

This test applies only to the PI circuit pack configuration.

This is an on-board test that checks the basic functionality of the PI circuit pack. This test runs in the background periodically, or can be invoked via the test interface command. If this test continuously fails, then replace the PI circuit pack.

Test # 231 SCI Self Test		
Error Code	Test Result	Description / Recommendation
11	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1005	ABORT	Hardware not appropriate. Hardware environment not appropriate—this test will not run on a INFC1, INFC2, and INFC3-BD circuit pack configuration. Must have a PI circuit pack configuration. 1) Ignore test result when using INFC1, INFC2, and IN FC3-BD circuit packs.
4000 4001 4002 4003 4004	FAIL	Hardware on the PI circuit pack failed. 4000:- Hardware failure. 4001:- Hardware failure. 4002:- PI function test failed - hardware failure. 4003:- PI RAM memory test failed - hardware failure. 4004:- PI EPROM memory test failed - hardware failure. 1) For all of the above errors, retry the test. If it fails again, the Communication Interface should be restarted. Type in a reset interface command. If the reset is successful, retry the test interface command. If test 231 still fails with error codes other than 4001, then replace the PI circuit pack. If the test fails with error code 4001, than an on-board failure is associated with a non-used port on the PI circuit pack. The pl circuit pack should be replaced if this port will be used in the future.

Test # 231 SCI Self Test (Contd)		
Error Code	Test Result	Description / Recommendation
3 4 102	FAIL	Internal System Error 3:- SPE did not respond to request. 4:- System Failure. 102:- System Error. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If problem still exists, redownload firmware via reset interface command. 3) If the test continues to fail, escalate the problem.
103 160	FAIL	Internal System Error 103:- Test Timeout Occurred. 160:- PI did not respond to test request. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If problem still exists, redownload firmware via reset interface command. 3) If the test continues to fail, then replace PI circuit pack. 4) If the test continues to fail, escalate the problem.
	PASS	TN765 PI circuit pack SELFTEST. On-board hardware is functioning correctly.

SC-LINK (Processor Interface Link)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
SC-LINK	MAJOR	test link link-no I	Processor Interface Link
SC-LINK	MINOR	test link link-no I	Processor Interface Link
SC-LINK	WARNING	test link link-no I	Processor Interface Link

(a) Reference link-no via the display communication link craft command.

The Processor Interface Link is the physical link that connects a System 75 to an adjunct like an Audix or another node in a DCS network using the BX.25 protocol. In R1V3 and R1V2, up to four links are allowed. R1V2 (see Figure 6-29) and software prior to R1V3 1.4 in the medium cabinet (see Figure 6-30) supports only the Interface-1 ,2,3 circuit packs. R1V3 software (1.4 and greater) in the medium cabinet supports the use of both (though not simultaneously) the PI circuit pack and the three circuit pack sets composed of TN716 Interface-1, TN738 interface-2, and TN719 interface-3 (see Figures 6-30 and 6-31). Both R1V2 and R1V3 XE only support the use of the PI circuit pack. The interface circuit packs are also called the SBUS interface (Interface-1), the System Communication Processor or SCP (interface-2), and the Synchronous/Asynchronous Interface or SAI (Interface-3). SC-LINK maintenance actually monitors several other hardware devices besides the PI or interface ports: TN754 Digital-Line ports PDMs, TDMs, MPDMs, and MTDMs when they are used as part of the link. Henceforth, data module will refer to either PDM, TDM, MPDM, or MTDM. In much of the following link documentation the repair procedures described will mention various hardware configurations. Choose the procedure appropriate to your configuration.

The Processor Interface circuit pack in XE also provides an EIA connection and can only be administered on Link 1. The EIA port can also be used to connect two PBXS together via DCS.

The Processor Interface Link can be in three different states. These states can be seen via the status link link-no craft command. If the link is in a maintenance busy state, then the craft had instructed the SCI link to be in maintenance busy by entering the busy link link-no command, or the SCI link is not established and maintenance is trying to bring it up. This probably means that an error condition is occurring somewhere on the link that keeps the link from being logically connected and carrying data. If the link is busied out, then it can be put back into service by issuing a release link link-no command. This will restart the link. If the link is for DCS, then it may speed the recovery of the link if busyout link link-no and release link link-no are executed on the switch that is establishing the connection. The link can be in a disconnected state if the link can't be started up; in this case maintenance will try to establish the link periodically. If the link is up and data is being sent successfully, then the link is in the in-service state. Note that it may take up to 5 minutes for the software to recognize the failure of a link.

If an error or alarm is detected by SC-LINK that can be associated with a physical port on the interface-3 or PI circuit pack, then the interface-3 or PI port maintenance object (INT-PT) is alarmed with an error type of O, which indicates a bad port on the circuit pack. The data module may also be alarmed if it fails the loop around test.

It is useful to use the status communication processor-channel channel-no command when troubleshooting the Processor Interface Link. A processor channel corresponds to a processor application (also called a session) and more than one may be using the same physical link. The relevant field of the status screen is the “channel status:” which can be in one of five different states. State 6 is normal state for the processor channel.

Processor Channel Status	
Status	Description
1	Incorrect translations or channel not assigned.
3	Attempting to reset the channel but no response from the other end. Getting stuck in this state may be caused by hardware problems, a DS1 synchronization problem, or a DCE/DTE conflict (one end of the link must be DCE and the other must be DTE).
4	The other end acknowledged the channel reset (which means that the two ends are physically connected) but a processor channel' connection has not occurred yet. Getting stuck in this state may indicate that translations are incorrect, such as remote processor channel mismatch. Also a problem with software prior to V3 1.5 sometimes caused both ends of a DCS link to get stuck in this state; recover from this situation by executing the busy link link-no and release link link-no commands. If this is unsuccessful, then use the reset interface command (this is a destructive command that tears down all four links). This problem may also be caused by a noisy link or DS1 synchronization problems.
6	This is the normal state of the channel. The link is in data transfer state which means that the application is able to send data over the link.
7	One or more unexpected messages have arrived; software is attempting to desynchronize the two ends. Usually it takes up to 5 minutes for the software to recover once it is in this state.

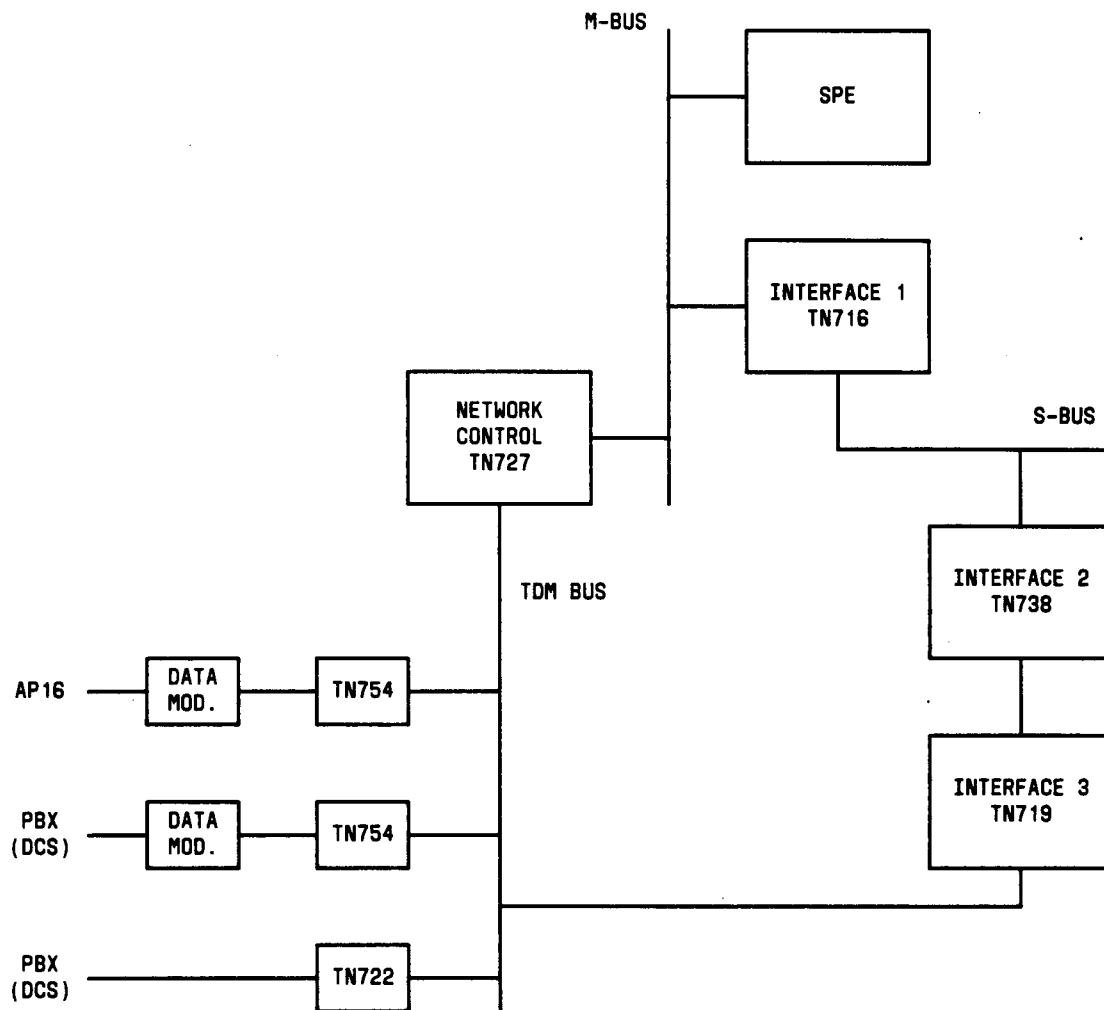


Figure 6-29. R1V2 Communication Interfaces Architecture (SC-Link)

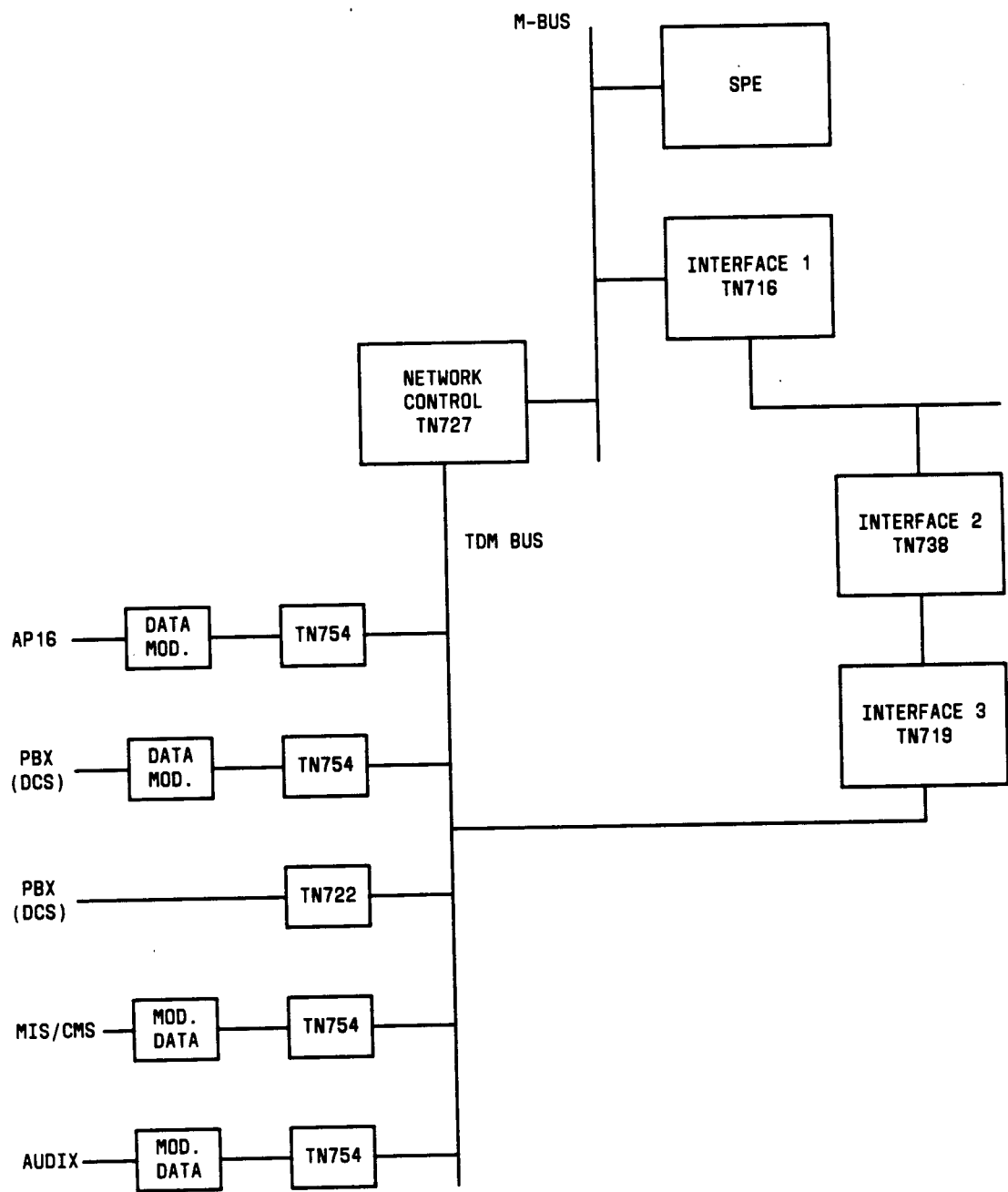


Figure 6-30 R1V3 Communication Interfaces Architecture With Three Interfdace Boards (SC-Link)

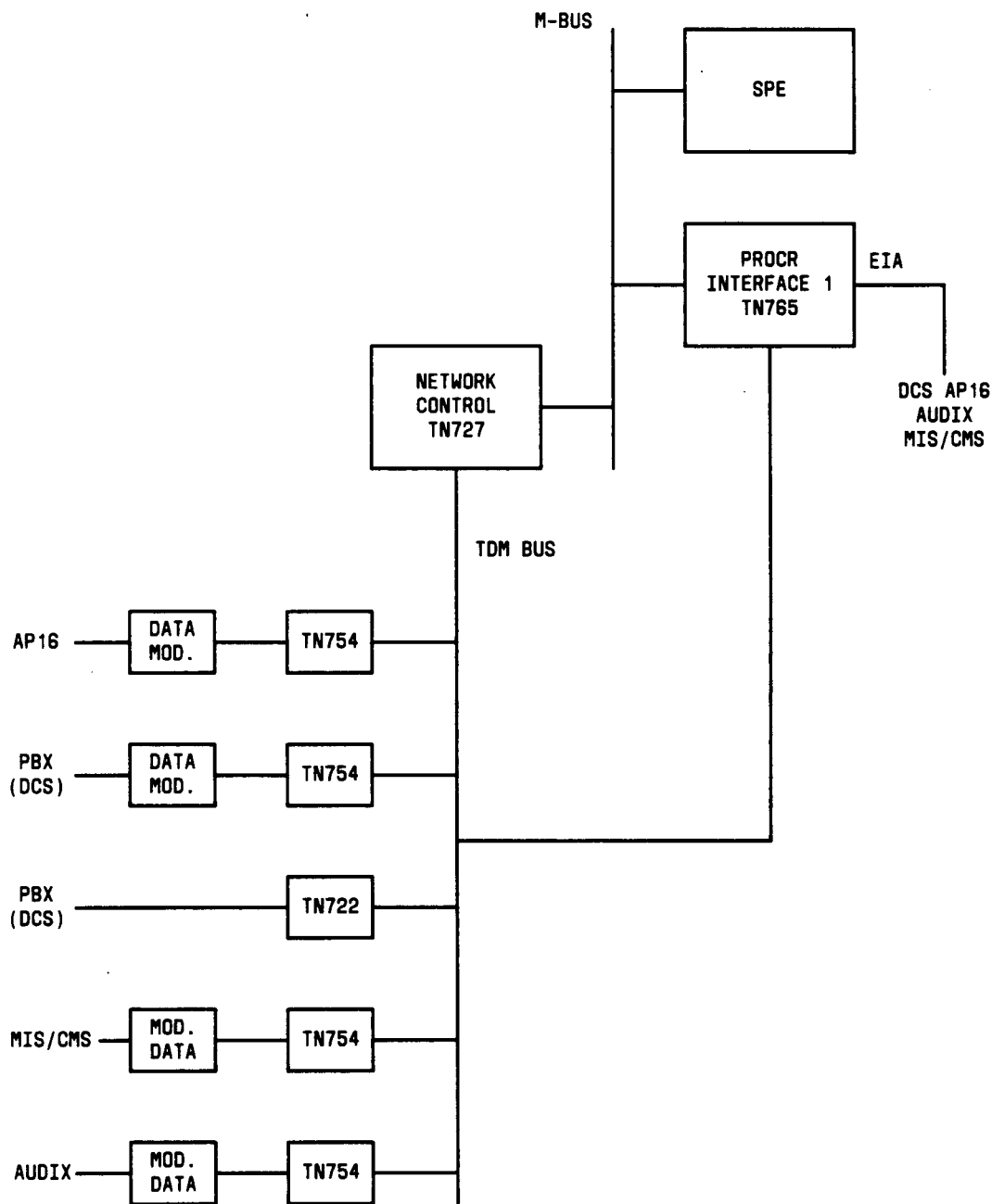


Figure 6-31. R1V3 Communication Interfaces Architechture With PI Board (SC-Link)

Hardware Error Log Entries and Test to Clear Values

Processor Interface Link Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test link link-no s
1(a)	Any	busyout link link-no	MAJOR	OFF	release link link-no
18	0	busyout link link-no	WARNING	OFF	release link link-no
257(b)	Any	busyout link link-no	MINOR	OFF	busyout/release link link-no
513(C)		busyout link link-no	MAJOR	OFF	busyout/release link link-no
769(d)		SA1/PI Loop Around Test (#182)	MAJOR	ON	test link link-no l r 2
1025(e)		TDM Loop Around Test (#183)	MAJOR	OFF	test link link-no l r 2
1281 (f)		Data Module Loop Around (#184)	MAJOR	OFF	test link link-no l r 2
1537(g)		None	MAJOR	OFF	busyout/release link link-no
2049(h)	0	None	WARNING	OFF	test link link-no s r 9
2305(i)	Any	None	WARNING	OFF	test link link-no s r 9
3841 (j)		busyout link link-no	MINOR	OFF	release link link-no

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) A permanent switched call was dropped. Check Link Recovery section.
- (b) The TN765 Processor Interface circuit pack or the TN738 interface-2 circuit pack detected an error on a specific link via background maintenance. If link is down, busyout and then release the link. If this fails, check all connections. If error reappears more than two times in 5 minutes, see the Link Recovery section for procedure to clear the error.
- (c) Translation Error. Check all administration for the link. Possibly the destination circuit pack (DS1 or Digital Line) is not inserted. Busyout and then release the link to restart it. This is not a hardware problem. If problem persists, then escalate the problem.

Aux values of concern:

- 2 Link translations not correct, refer to the Link Recovery section.
- 8 Port not administered in software
- 9 Destination circuit pack not installed; install circuit pack.
- (d) This error occurs when Test #182 fails in background testing. This does not necessarily mean that hardware should be replaced, because this test sometimes fails spuriously. See Link Recovery section.

Aux Values

12 TN738 and TN719 or TN765 loop around failed.

other Ignore all other aux values. The loop around test did not fail. See Link Recovery section.

(e) This error occurs when Test #183 fails in background testing. See Link Recovery section.

Aux Values

12 TN756 loop around failed.

other Ignore all other aux values. The loop around test did not fail. See Link Recovery section.

(f) This error occurs when Test #184 fails in background testing. See Link Recovery Section.

Aux Values

12 Data module loop around failed.

other Ignore all other aux values. The loop around test did not fail. See Link Recovery section.

(9) This error occurs when the link fails to be established. Check all connections and administration. This could also occur as a result of another error, the failure of the Test #182, for example. If the other error on the link can be cleared, then this error can also clear. Refer to the Aux data for recovery procedures.

Aux Values

1,2 System error. If error continues and link doesn't establish, then escalate the problem.

7 System error. If this error is occurring on all administered links with the same aux data and all links are alarmed, then execute the `reset interface` command to restore all the links. If error continues or if error is not on all links, then escalate the problem.

12 One of the three loop around tests failed (182, 183, or 184). See Link Recovery.

32771 The remote endpoint still thinks that the call is up or the local PBX can't complete the call. Check trunk status. If it is active, then `busyout trunk trk-grp/member` and `release trunk trk-grp/member` (on both sides of the link if this is a DCS link). If this fails, then check the status of the TN765 or TN719 port using `status data ext-no` where `ext-no` is the extension of the port from the interface extension in the Display Communication Link form. If the state is in-service/idle, then manually call the TN765 or TN719 port and transfer the call to appropriate destination, either a DS1 Trunk Access Code or the data module extension. See Link Recovery if error still occurs and link doesn't establish.

32779 Administration problem, check all administration.

32xxx See Link Recovery section.

65528 Check administration translations.

65532 Call setup timed out, retry and check remote PBX.

65535 Link specified is out of range (1 —4).

- (h) Excessive resets on link. Usually indicates that remote end is down or the physical connection is broken. See Link Recovery section.
- (i) Excessive I-frame retransmission. Could indicate a noisy link. Recover as in preceding note. Aux values indicate the retransmission rate per minute. See Link Recovery section.
- (j) The application level process associated with the link has failed to establish a data connection with the far end. This problem prevents data from being processed. The condition may exist even if the link is in a data transfer rate. Busyout and release the link to restart it. This is not a Processor Interface hardware problem. If problem persists, then follow normal escalation procedures.

Link Recovery

This section describes the general procedure to take to recover from link errors and alarms.

1. Determine the link status using the status link command. If the link status is in-service and all the pairs of processor channels are complete under LOCAL/REMOTE PROCESSOR CHANNELS (that is, every “/” is followed by a processor channel number, not a blank), then the link is operating correctly and no further action should be taken. If the link status is not in-service, then go to step 2). If the link status is in-service and some of the processor channel pairs are incomplete (remote channel not specified, meaning that the processor channels aren’t connected), then look at the status of “status processor-channel” for the local processor channels that aren’t connected.
2. Look for SC-INTF alarms, if there are any, and follow the procedure for those alarms. If there are no SC-INTF problems, then go on to the next step.
3. If the link is still down, restart the link via the busyout link link-no craft command followed by release link link-no craft command. This sequence tears down the call and then tries to bring it back up. If the link is for DCS, then it may speed the recovery of the link if busyout link link-no and release link link-no are executed on the switch that is establishing the connection (see Communication Link form). If the link does not recover, then go on to the next step.
4. Check the status of the remote endpoint:
 - a. If the link busied out, then release it.

b. Is the switch down or restarting?

5. If link was never brought up:

a. Verify that the administration is correct. Check the following forms:

- i. Display Communication link
- ii. Display Communication processor
- iii. Display Communication hop-channel (if they are being used)
- iv. Trunk forms (if DS1 is being used for DCS)
- v. Synchronization (if DS1 is being used)—make sure the primary synchronization is administered. Use status sync to determine if synchronization is working correctly. Also, make sure that the TN756 Tone Detector/Generator is not being used, because it does not support external TDM clock synchronization.

b. If link is an EIA link:

- i. Verify via the Communication Link form that the information for the EIA connection is correct on the local and remote PBXS.

6. Try to isolate problem in link if hardware is at fault. Test link via the test link link-no long craft command.

- a. If Test 182 fails three times, replace the TN765 or TN719 circuit pack; if Test 182 still fails after replacing the TN719, then replace the TN738 interface-2 circuit pack. Refer to “Handling the Network Control Circuit Pack” in Chapter 3. If Test 182 still fails, then escalate the problem.
- b. If Test 182 passes and Test 183 fails, replace the TN754 Digital Line or the DS-1 (TN722 or TN767) circuit pack, whichever is used in the link. If Test 183 still fails, replace the TN765 or TN719 circuit pack; if Test 183 fails after replacing the TN719, then replace the TN738 Interface 2 circuit pack. Refer to “Handling the Network Control Circuit Pack” in Chapter 3. If Test 183 still fails, escalate the problem.
- c. If Tests 182 and 183 pass, but Test 184 fails, then replace the data module. If, after replacing the data module, Test 184 still fails, then replace the TN754 circuit pack. If Test 184 still fails, replace the TN765 or TN719 circuit pack; if Test 184 fails after replacing the TN719, then replace the TN738 Interface 2 circuit pack. Refer to “Handling the Network Control Circuit Pack” in Chapter 3. Further failures should be escalated.

If the above tests pass:

7. Check the physical transmission link:

- a. Are all the circuit packs physically installed?
- b. Are the cables still connected throughout?
- c. Check DS1-BD maintenance documentation for possible connectivity problems if DS-1 is used in link connection.

If the preceding procedure is followed and links still do not recover, then escalate the problem.

Craft-Damandad Tests: Descriptions and Error Codes

The tests can be run by issuing the test link link-no short/long craft command on the link in question.

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the interface-3/PI *Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
interface-3/PI Loop Around Test (#182)		x	D
Digital-line Loop Around Test (#183)		x	D
Data Module Loop Around Test (#184)		x	D
Link Quality Test (#233)	x	x	ND

- D = Destructive
- ND = Non-destructive

interface-3/PI Loop Around Test (#182)

This test is destructive.

The interface-3/PI Loop Around Test is an on-board loop around test. The test requires that the craft issue a busyout link link-no command before this test is run. This means that the DCS or Audix link, for example, will be torn down. It does not access the TDM Bus at all. When the PI circuit pack is put into local loop around mode, data generated in the circuit pack is looped internally on the circuit pack. When the Interface-1 ,2,3 circuit packs are used, data is generated in interface-2, sent to interface-3 where it is looped around internally, and returned to interface-2. This checks most of the hardware on the Processor Interface port or interface-2 and interface-3 ports except the TDM bus buffers on the interface-3 or P1. This test is not run on EIA ports.

This test produces spurious failures on the 3-board Interface; don't replace any hardware unless the test fails three times in a row.

Test #182 interface-3/PI Loop Around Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	This is a normal abort. Link was not busied out via craft. 1) Busyout the link via the busyout link link-no command. 2) Retry the test command. If this continues to abort, escalate the problem.
2	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
6	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 182 Interface 3/PI Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
8 11 14 16 22 28 32 80 81 82 83 84 85 86 87 88 93 94 102 103 160	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) Escalate if problem reappears.
1005	ABORT	This test is not applicable to the link configuration. The link is administered as an EIA port.
12	FAIL	Loop around test failed. 1) Retry test two more times. 2) If it continues to fail, try resetting the circuit pack by the test interface long command. This will TEAR down all other links on this circuit pack (DCS, Audix, etc.). 3) If the problem still exists, replace the TN765 or TN719 circuit pack. 4) If after replacing the TN719, the test still fails three times in a row, replace the TN738. 5) If after replacing the TN738, the test still fails three times in a row, replace the TN716. 6) Escalate if problem reappears.

Test #182 interface-3/PI Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	The on-board loop around test on the TN765 or TN719 port passed. Most of the hardware on the circuit pack was tested except for the TDM Bus buffers. If problem is isolated to TN765 or TN719 (because Test #183 failed) and this test passes, then replace the TN765 or TN719 circuit pack since TDM Bus buffers could be at fault.

Digital Line Loop Around Test (#183)⁴

This test is destructive.

The test requires that the craft issue a busyout link link-no command before this test is run. This means that the DCS or Audix link, for example, will be torn down. This test checks the health of the TN754 Digital Line if it is used on the link. Data from the interface (TN765 or TN719) is looped through the Digital Line port in loop around mode. If this test fails, and the previous Test 182 passes, then the Digital Line circuit pack should be replaced. It is not run on ports administered as EIA or on links using DS1.

Test #183 Digital Line Loop Around Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	This is a normal abort. Link was not busied out via craft. 1) Busyout the link via the busyout link link-no command. 2) Retry the test command twice. If it continues to abort, escalate.
2 3 4	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
6	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
8	ABORT	Internal system error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
9	ABORT	Digital Line (TN754) circuit pack is not installed. 1) Install circuit pack and retry test. 2) If it continues to abort with a 9 abort code, then escalate the problem.

Test #183 Digital Line Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
10	ABORT	Unable to send a downlink message to the Digital port to put it in loop around mode. 1) Repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
11 14 16 22 28 32 80 81 82 83 84 85 86 87 88 93 94 102 103 160	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times, 2) Escalate if problem reappears.
1005	ABORT	1) This test is not applicable to the link being tested. Digital Line is not being used on this link.
12	FAIL	PI or interface-2 circuit pack reported that loop around test failed. 1) Retry test. 2) If Test 182 fails, then see section for Test 182 first. 3) If Test 182 passes and Test 183 continues to fail, replace the TN754 Digital Line circuit pack. 4) If Test 183 still fails, then replace the TN765 PI or TN719 interface-3 circuit pack. 5) Escalate on further failures.
	PASS	The loop around from the TN765 PI circuit pack or the TN719 interface-3 circuit pack to the Digital Line circuit pack and then back to the PI passed. The TN754 port and the interface port or the TN765 port are functioning properly.

Data Module Loop Around Test (#184)

This test is destructive.

This test requires that the craft issue a busyout link link-no command before the test is run. This means that the DCS or Audix link, for example, will be torn down. If the remote loop around test is enabled on the appropriate data module administration form, then the data module is sent a message requesting it to be put into remote loop around mode. The TN765 or TN738 circuit pack initiates the loop around test. The test exercises all data module circuitry except the EIA drivers and receivers. If the test fails consistently and Tests #183 and #184 both pass, then follow the instructions in the manual supplied with the data module for performing a self-test and replace the data module if necessary. This test is not run when the link is administered as EIA or the link uses DS-1.

Note that this test always passes if tests for this data module are disabled from administration. The default is to disable this test because the results of this test are not always conclusive and may generate false alarms. Follow the instructions in the manual supplied with the data module for performing a self-test and replace the data module if necessary.

Test #184 Data Module Loop Around Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	Link was not busied <i>out</i> via craft. 1) Busyout the link via the busyout link link-no command. 2) Retry the test command.
2	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the' problem.
6	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
8	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #184 Data Module Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
9	ABORT	Digital Line circuit pack (TN754) is not installed. 1) Install circuit pack and retry test.
11 14 16 22 28 32 80 81 82 83 84 85 86 87 88 93 94 102 103 160	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) Escalate if problem reappears.
1005	ABORT	This test is not applicable to the link being tested. No data module is being used on this link.
10	FAIL	Data module is disconnected. 1) Reconnect data module and rerun the test. 2) If it continues to fail with a failure code of 10, escalate the problem.

Test #184 Data Module Loop Around Test (Contd)		
Error Code	Test Result	Description / Recommendation
12	FAIL	PI circuit pack reported that loop around test failed. 1) Run this test four more times. If all five fail, then replace the data module. 2) If it continues to fail, check the physical dip switch settings on the data module. If settings are not correct, then make necessary changes and retry test. 3) If switch settings are correct and if Tests 182 and 183 pass, check cabling to the data module. If Test 182 or 183 fails, see those test writeups for details on recovery. 4) If cabling is correct, then follow the instructions in the manual supplied with the data module for performing a self-test and replace the data module if necessary. 5) Run this test four more times. If it fails again, replace TN754 Digital Line circuit pack. 6) If problem still exists, replace TN765 or TN719 circuit pack. 7) Escalate if problem still appears.
	PASS	The remote loop around test passed. The test is from the TN765 or TN719 circuit pack through the TN754 circuit pack to the data module and then back again through the TN754 to the TN765 or the TN719 passed. The TN765 or TN719 port is absolved of failure; however, the data module may still be at fault. Follow the instructions in the manual supplied with the data module for performing a self-test and replace the data module if necessary. Note that this test always passes if tests for this data module are disabled from administration. The default value for this field in the administration form is to disable this test because the results of this test are not always conclusive and may generate false alarms.

Link Quality Test (#233)

This test queries the TN765 or TN738 circuit pack for the latest error rates (number/minute) for certain counters that are kept by the TN765 or TN738. The test passes if all the error rates are below a certain threshold and otherwise fail. The counters that are queried are the Level 2 Reset (SABM) counter and the Level 2 I-frame Retransmission counter.

Test #233 Link Quality Test		
Error Code	Test Result	Description / Recommendation
11	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
16385	FAIL	Excessive Level 2 resets (SABM) on link.
16386	FAIL	Excessive Level 2 I-frame retransmission. Possible noisy link.
16387	FAIL	Excessive Level 2 resets and excessive Level 2 I-frame retransmission. 1) See Link Recovery section for this maintenance object.
	PASS	Link quality acceptable.

S-SYN-PT (Speech Synthesis Port), S-SYN-BD (Speech Synthesis Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
S-SYN-PT	MAJOR	test port CSSpp s	Speech Synthesis Port
S-SYN-PT	MINOR	test port CSSpp l	Speech Synthesis Port
S-SYN-BD	WARNING (b)	test board CSS s	Speech Synthesis Circuit Pack
S-SYN-BD	MINOR (b)	test board CSS s	Speech Synthesis Circuit Pack

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Alarms that are logged due to Speech Synthesis circuit pack test failures are related to board problems that are reported during the common board testing phase. Refer to the XXX-BD (Common Port Board) maintenance documentation.

The TN725 Speech Synthesis circuit pack provides four independent Speech Synthesis Ports which may be connected to any of the voice time slots on the Time Division Multiplex (TDM) bus. Each Speech Synthesis Port consists of a speech synthesizer device (SSD) and all are managed by a custom-coded programmable speech synthesizer (PSS) controller. The PSS controller is, in turn, controlled by the on-board microprocessor via a command interface specifically designed for this application. The PSS controller's main function is the orderly transfer of encoded speech from the speech vocabulary read-only-memory (ROM) to the SSDS. The SSDS decode it and produce 64 kb/s μ -255 PCM (Pulse Code Modulation) speech. The encoded speech is stored in up to 512K bytes of on-board ROM. In addition, each Speech Synthesis Port has an associated dual-tone multifrequency (DTMF) receiver to receive touch-tone digits from a station set connected to the port via a voice time slot. The station set may be connected to the Speech Synthesis Port through either a line or trunk circuit.

When there is an incoming call to a port, the "listen" network time slot is connected to the DTMF receiver input and the "talk" network time slot is connected to the SSD output. This enables the Speech Synthesis Port to support speech synthesis features or touch-tone input with voice response features. Some of the features that use the Speech Synthesis Port's capabilities include Leave Word Calling, Automatic Circuit Assurance, Automatic Wakeup (hotel-motel), and Do Not Disturb (hotel-motel).

The Speech Synthesis circuit pack should not be confused with the Announcement circuit pack because different voice features are supported by each circuit pack.

Hardware Error Log Entries and Test to Clear Values

Speech Synthesis Port Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test port CSSpp s
1(a)	17672	None	NONE	ON	
18	0	busyout port CSSpp	WARNING	OFF	release port CSSpp
257		Speech Synthesis PSS Handshake (#168)	MAJOR	ON	test port CSSpp s r 2
513	17922	Speech Synthesis Memory (#166)	MINOR	ON	test port CSSpp s r 2
769	17664	Speech Synthesis DTMF Receiver Inquiry (#164)	MINOR	ON	test port CSSpp s r 2
1025	17670	Speech Synthesis SSD Inquiry (#167)	MINOR	ON	test port CSSpp s r 2
1281		Speech Synthesis DSP Tone (#165)	MINOR	ON	test port CSSpp s r 2
1537		Speech Synthesis Memory (#166)	MINOR	ON	test port CSSpp s r 2
1793		Speech Synthesis DTMF Receiver (#163)	MINOR	ON	test port CSSpp l r 2
2049		Conference Circuit (#7)	MINOR	ON	test port CSSpp l r 2
2305		NPE Crosstalk (#6)	MINOR	ON	test port CSSpp l r 2

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

- (a) An in-line failure of the on-board microprocessor/PSS handshake has occurred. Refer to Speech Synthesis PSS Handshake Test #168 for repair procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Speech Synthesis PSS Handshake Test (#168)	x	x	ND
NPE Crosstalk Test (#6)		x	ND
Conference Circuit Test (#7)		x	ND
Speech Synthesis DTMF Receiver Test (#163)		x	ND
Speech Synthesis Memory Test (#166)	x	x	ND
Speech Synthesis DSP Tone Test (#165)	x	x	ND
Speech Synthesis SSD Inquiry Test (#167)	x	x	ND
Speech Synthesis DTMF Receiver Inquiry Test (#164)	x	x	ND
Speech Synthesis Parameter Update Test (#169)	x	x	ND

• D = Destructive
 ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may occur. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. You must wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test and the test has been aborted. You must wait until the port is idle (yellow LED if off) before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1) Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system' resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and by examining the Error Log.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The Conference Circuit Test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a tone detector port. If the level of the tone is within a certain range the test passes.

Test #7 Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test and the test has been aborted. Wait until the port is idle (yellow LED if off) before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
1020	ABORT	The test did not run due to an already existing error on the specific port or a more general board error. 1) Examine Error Log for existing errors against this port or the board and attempt to diagnose the already existing error.

test # 7 Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port did not conference the tones correctly. This will cause noisy and unreliable connections. 1) Replace the circuit pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and by examining the Error Log.

Speech Synthesis DTMF Receiver Test (#163)

A series of dual-tone multifrequency (DTMF) tones are conference from the TDM Bus into the port's DTMF receiver and checked to see if the correct tones have been detected during the correct intervals. If all the DTMF tones were detected correctly, the test passes. If any of the tones were not detected correctly, the test fails.

		Test #163 Speech Synthesis DTMF Receiver Test
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle, (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	DTMF tones were not detected. This type of failure may cause features using touch-tone input to the Speech Synthesis Port to malfunction. 1) Verify the Tone/Clock circuit pack is functioning correctly by checking the Error Log and using the test tone-clock long command. 2) If the test fails again, replace the circuit pack.
	PASS	The port has detected all DTMF tones correctly. User-reported troubles should be investigated using other tests and verifying that other ports on this circuit pack are working correctly.

Speech Synthesis PSS Handshake Test (#168)

This test verifies control functionality between the on-board microprocessor and programmable speech synthesizer (PSS) controller. A failure occurs if either of the following events occur:

- a. The on-board microprocessor times out while waiting for the PSS controller to respond.
- b. An invalid command is received by the on-board microprocessor from the PSS controller.

This type of failure will affect all four ports on the Speech Synthesis circuit pack, resulting in errors or alarms on each port.

Test #168 Speech Synthesis PSS Handshake Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #168 Speech Synthesis PSS Handshake Test (Contd)		
Error Code	Test Result	Description / Recommendation
Any	FAIL	The on-board microprocessor has timed out while waiting for the PSS controller to respond or an invalid command has been received by the on-board microprocessor from the PSS controller. This type of failure may cause features using the Speech Synthesis Port's speech services to malfunction. 1) Replace the circuit pack.
	PASS	The on-board microprocessor/PSS handshake is working correctly. User-reported troubles should be investigated using other tests and verifying other ports on this circuit pack are working correctly.

Speech Synthesis Memory Test (#166)

The encoded speech for the Speech Synthesis circuit pack is stored in on-board read-only-memory (ROM). A checksum is computed for each 32K speech memory block and compared against a known checksum value. If all computed checksum values are successfully compared against the stored checksum values, the test passes. If, while testing the speech complex memory, the on-board microprocessor finds a memory error, the test is terminated and a failure is reported. This type of failure may affect other ports on the Speech Synthesis circuit pack, resulting in errors or alarms on each port.

Test #166 Speech Synthesis Memory Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1019	ABORT	Test is already running on a different port, possibly due to background maintenance activity. Only one of these tests may be active on a circuit pack at a time. Response to the test request was not received within the allowable time period. Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	
2100	ABORT	
Any	FAIL	The computed checksum from the speech vocabulary ROM did not compare correctly with the stored checksum. This type of failure may cause features using the Speech Synthesis Port's speech services to malfunction and result in degradation of synthesized speech quality ranging from insignificant to major. 1) Replace the circuit pack.

Test #166 Speech Synthesis Memory Test (Contd)		
Error Code	Test Result	Description / Recommendation
	PASS	The computed checksum values were successfully compared against the stored checksum values. User-reported troubles should be investigated using other tests and verifying other ports on this circuit pack are working correctly.

Speech Synthesis DSP Tone Test (#165)

The digital signal processor (DSP) associated with each port can generate a 440-Hz tone whose presence can be detected by TN748 General Purpose Tone Detector circuits. A 440-Hz tone is generated for 500 msec on a specified time slot which is being listened to by the detector circuit. If the detector determines the tone is present on the time slot, the test passes; otherwise, it fails.

Test #165 Speech Synthesis DSP Tone Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1001 1002 1003	ABORT	System resources required to run this test are not available. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1021	ABORT	The 440-Hz tone was not detected by the tone detector circuit and interdigit time-out has occurred on the tone detector circuit. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) Verify all Tone Detector circuit packs in the system are functioning correctly by checking the Error Log and using the test board CSS long command. Replace any faulty Tone Detector circuit packs and repeat the test. 3) If the test continues to abort, replace the circuit pack.

Test #165 Speech Synthesis DSP Tone Test (Contd)		
Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The 440-Hz tone was not detected by the tone detector circuits. 1) Verify all Tone Detector circuit packs in the system are functioning correctly by checking the error log and using the test board CSS long command. Replace any faulty Tone Detector circuit packs and repeat the test. 2) If the test fails again, replace the circuit pack.
	PASS	The 440-Hz tone has been detected correctly. User-reported troubles should be investigated using other tests and verifying other ports on this circuit pack are working correctly.

Speech Synthesis SSD Inquiry Test (#167)

This test determines the sanity of the specified port's speech synthesis device (SSD). The on-board microprocessor tests the port's SSD and determines if it is in a sane (test passes) or insane (test fails) condition. Other ports on the Speech Synthesis circuit pack will continue to function correctly during this type of failure.

Test #167 Speech Synthesis SSD Inquiry Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The SSD is insane. 1) Replace the circuit pack.
	PASS	The SSD is sane. User-reported troubles should be investigated using other tests and verifying other ports on this circuit pack are working correctly.

Speech Synthesis DTMF Receiver Inquiry Test (#164)

This test determines the sanity of the port's dual-tone multifrequency (DTMF) receiver. The on-board microprocessor tests the port's DTMF receiver and determines if it is in a sane (test passes) or" insane (test fails) condition.

Test #164 Speech Synthesis DTMF Receiver Inquiry Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	The DTMF receiver for this port is insane. 1) Replace the circuit pack.
	PASS	The DTMF receiver for this port is sane. User-reported troubles should be investigated using other tests and verifying other ports on this circuit pack are working correctly.

Speech Synthesis Parameter Update Test (#169)

I

This test updates the dual-tone multifrequency (DTMF) interdigit time-out parameter used by the Speech Synthesis circuit pack to be consistent with that specified by the Switch Processing Element (SPE).

Test #169 Speech Synthesis Parameter Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (yellow LED if off) before retesting. 1) If the port is idle, retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
Any	FAIL	An internal system error has occurred. If the test continues to fail, escalate the problem.
	PASS	The DTMF interdigit time-out parameter has been updated. User-reported troubles should be investigated using other tests and verifying other ports on this circuit pack are working correctly.

SW-CTL (Switch Control)

MO Name As It Appears In Alarm Loci	Alarm Level	initial Craft Command To Run	Full Name Of MO
SW-CTL	MINOR	test network-control s	Switch Control
SW-CTL	MAJOR	test network-control s	Switch Control

The Switch Control resides on the TN727 Network Control (Netcon) circuit pack. The data channels (DATA-CON, DATA-BD and DATA-CHL) also reside on the Network Control circuit pack. The Network Control cannot be replaced without bringing the system down.

The Switch Control is used to send control information between port circuit packs and the SPE (see Figure 6-32). This control information is sent via the TDM (Time Division Multiplex) Bus. The portion of the TDM Bus used to transmit control messages is called the control channel.

The Switch Control is critical in the setup and takedown of all calls but is not involved in the voice or data transmission that takes place during established calls. It is the Switch Control that detects when port circuit packs are plugged into or removed from the cabinet. This information is then sent to the SPE.

The Switch Control contains the hardware Time of Day (TOD) clock that the system uses for all its date and time information. In addition, the Switch Control also contains hardware to monitor critical system timing signals and informs the SPE when these signals fail. For example, if the timing signals from a Tone/Clock circuit pack fail, the Switch Control will inform the SPE.

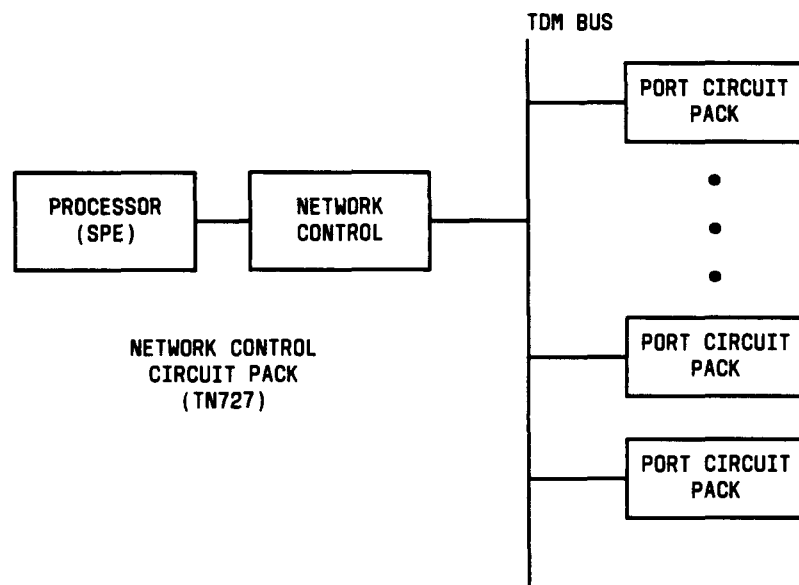


Figure 6-32. Switch Control Connectivity

Hardware Error Log Entries and Test to Clear Values

Switch Control Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test network-control s
1		Control Channel Transmission Test (#94)	MAJOR	On	test network-control r 3
2(a)		Control Channel Transmission Test (#94)	MAJOR	On	test network-control r 3
257(b)	0 or 1	None			
513		Time of Day Clock Test (#95)	MINOR	On	test network-control l r 3
769(c)		None			
1025		Control Channel Interface Test (#92)	MAJOR	On	test network-control r 3
1281(d)		None			
1537		Switch Control Reset Test (#93)	MAJOR	On	test network-control l r 2
1793(e)		None		On	

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error may not cause a Switch Control alarm if Error Type 769 is also present since this error may actually be caused by the loss of clock signals and not by a Switch Control failure.
- (b) 257 errors are reported to the SPE by the Switch Control and indicate possible hardware problems on the Network Control circuit pack. The receipt of these errors causes Switch Control maintenance to run specific Switch Control tests. If there is a problem, the Switch Control tests will normally cause other errors to be logged. In the rare case where no other errors are logged but 257 errors are occurring at a high rate (more than 10 in the last hour), the Network Control circuit pack should be replaced at the customer's convenience.
- (c) A 769 error occurs when the Switch Control reports a loss of timing signals to the SPE. When this error is present, the Switch Control will not normally be alarmed since any Switch Control test failures are really the result of faulty signals from the Tone/Clock circuit pack. See TDM-CLK (TDM Bus Clock) maintenance documentation for the procedures needed to diagnose Tone/Clock circuit pack troubles.
- (d) The Aux Data for this error is not meaningful. Craft can ignore these errors.
- (e) The Aux Data for this error is not meaningful. 1793 errors are in-line errors that indicate a possible problem with the interface between the Switch Control and the SPE. The receipt of these errors causes Switch Control maintenance to run specific Switch Control tests. If there is a problem, the Switch Control tests will normally cause other errors to be logged. In the rare case where no other errors are logged but 1793 errors are occurring at a high rate (more than 10 in the last hour), the Network Control circuit pack should be replaced at the customer's convenience.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Control Channel/ Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Control Channel Loop Around Test (DATA-BD) (#52)	x	x	ND
NPE Audit Test (DATA-BD) (#50)		x	ND
Data Channel Reset Test (DATA-CHL) (#107) (a)		x	D
Data Channel Interface Test (DATA-CHL) (#108) (a)		x	D
Maintenance Loop Around Test (DATA-CHL) (#109) (a)	.x	x	ND
Data Channel Crosstalk Test (DATA-CHL) (#1 10) (a)	x	x	ND
Data Channel Local Loop Back Test (DATA-CHL) (#111) (a)	x	x	ND
Switch Control Reset Test (#93)		x	D
Time of Day Clock Test (#95)		x	ND
Control Channel Interface Test (#92)	x	x	ND
Control Channel Transmission Test (#94)	x	x	ND

.D = Destructive
ND = Non-destructive

(a) Tests #107, #108, #109, #1 10, and #111 are run for each administered data channel port. If no ports are administered, these tests will not run. A maximum of four ports can be administered.

Control Channel Interface Test (#92)

Loop back messages are sent to the Switch Control via the interface used for control channel messages. The messages are returned to the SPE for verification via the same interface. The TDM Bus is not involved in this test since the messages are looped back on the Network Control circuit pack.

Test #92 Control Channel Interface Test		
Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal System Error
2013 2100 none	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #92 Control Channel Interface Test (Contd)		
Error Code	Test Result	Description / Recommendation
Other	FAIL	Messages could not be looped back through the control channel interface. The customer will probably not be able to make or receive calls. 1) This failure could be due to either a Network Control circuit pack hardware failure or the loss of system timing signals. If the Switch Control is alarmed, then a Network Control circuit pack failure should be suspected. If the Switch Control is not alarmed, then investigate the possibility of the loss of system timing signals. [See TDM-CLK (TDM Bus Clock) maintenance documentation. If many port circuit pack red LEDs are lit, suspect a TDM CLK problem. If only the Network Control circuit pack LED is lit, suspect the Network Control circuit pack. [f Test #94 passes, then do not suspect the loss of timing signals. If the Network Control circuit pack is determined to be at fault, proceed to step 2. 2) Run the short test sequence several times to make sure that this failure is occurring consistently. Then run the long test sequence to reset the Switch Control. Running the long test sequence may clear the problem. If the test is still failing, proceed to step 3. 3) If the system is still able to process calls, replace the Network Control circuit pack at the customer's convenience. 4) If calls cannot be made, then replace the Network Control circuit pack immediately. 5) The procedure for replacing the Network Control circuit pack is as follows: 1. Turn off power to the system. 2. Replace the Network Control circuit pack. 3. Turn system power back on. 4. Run the set time command after the system reboots.
	PASS	The control channel interface between the SPE and the Switch Control is working correctly.

Switch Control Reset Test (#93)

This test is destructive.

This test resets the Switch Control and determines if it can successfully go through its initialization sequence. The test is destructive since there is the possibility of losing some control messages to or from port circuit packs. This test will not affect established calls but call setup may be affected for several seconds.

Test #93 Switch Control		
Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal System Error
2013 2100 none	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 _ times. 2) If the test continues to abort, escalate the problem.
	FAIL	The Switch Control could not be successfully reset. The customer will probably not be able to make or receive calls. 1) This failure could be due to either a Network Control circuit pack hardware failure or the loss of system timing signals. If the Switch Control is alarmed, then a Network Control circuit pack failure should be suspected. If the Switch Control is not alarmed, then investigate the possibility of the loss of system timing signals. (See TDM-CLK maintenance documentation.) If many port circuit pack red LEDs are lit, suspect a TDM-CLK problem. If only the Network Control circuit pack LED is lit, suspect the Network Control circuit pack. If Test #92 or Test #94 passes, then do not suspect the loss of timing signals. If the Network Control circuit pack is determined to be at fault, proceed to step 2 on next page.

Test #93 Switch Control Reset Test (Contd)		
Error Code	Test Result	Description / Recommendation
		2) If the system is still able to process calls, replace the Network Control circuit pack at the customer's convenience. 3) If calls cannot be made, then replace the Network Control circuit pack immediately. 4) The procedure for replacing the Network Control circuit pack is as follows: 1. Turn off power to the system. 2. Replace the Network Control circuit pack. 3. Turn system power back on. 4. Run the set time command after the system reboots.
	PASS	The Switch Control has initialized correctly. Look at results of the other tests to see if it is operating correctly.

Control Channel Transmission Test (#94)

Control channel messages are sent from the processor to selected port circuit packs and the response from the port circuit packs is checked. This tests the ability of the Switch Control to send and receive messages on the control channel of the TDM Bus.

Test #94 Control Channel Transmission Test		
Error Code	Test Result	Description / Recommendation
0	ABORT	System resources necessary for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test keeps aborting for this reason, then the Network Control circuit pack should be replaced. See Error Code O FAIL for the procedure for replacing the Network Control circuit pack.
2012	ABORT	Internal System Error
2013 2100 none	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 "minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
0	FAIL	The Switch Control cannot communicate on the TDM Bus control channel. The customer will probably not be able to make or receive calls. 1) This failure could be due to either a Network Control circuit pack hardware failure or the loss of system timing signals. If the Switch Control is alarmed, then a Network Control circuit pack failure should be suspected. If the Switch Control is not alarmed, then investigate the possibility of the loss of system timing signals. (See TDM-CLK maintenance documentation.) If many port circuit pack red LEDs are lit, suspect a TDM-CLK problem. If only the Network Control circuit pack LED is lit, suspect the Network Control circuit pack. If Test #92 passes, then do not suspect the loss of timing signals. If the Network Control circuit pack is determined to be at fault, proceed to Step 2 on next page.

Test #94 Control Channel Transmission Test (Contd)		
Error Code	Test Result	Description / Recommendation
		2) Run the short test sequence several times to make sure that this failure is occurring consistently. Then run the long test sequence to reset the Switch Control. Running the long test sequence may clear the problem. Remember that the long test sequence is destructive. Placing and receiving of calls will be affected for several seconds. If the test is still failing, proceed to Step 3. 3) If the system is still able to process calls, replace the Network Control circuit pack at the customer's convenience. 4) If calls cannot be made, then replace the Network Control circuit pack immediately. 5) The procedure for replacing the Network Control circuit pack is as follows: 1. Turn off power to the system. 2. Replace the Network Control circuit pack. 3. Turn system power back on. 4. Run the set time command after the system reboots.
	PASS	The Switch Control can communicate with selected port circuit packs over the TDM Bus.

Time of Day Clock Test (#95)

The short term accuracy of the Time of Day (TOD) clock is tested. The test reads the clock once, waits a short time, and reads the clock again. The second reading of the clock must be within certain limits relative to the first reading for the test to pass. The display time command can be used to display the current setting of the TOD clock.

Test #95 Time of Day Clock Test		
Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal System Error
2013	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
2001	FAIL	The Time of Day clock could not be read. 1) Run the set time command and set the time to the current time. 2) Run the long test sequence several times to make sure the error is occurring consistently. Remember that the long test sequence is destructive. Placing and receiving of calls will be affected for several seconds. 2) Replace the Network Control circuit pack at the customer's convenience. See the following (on the next page) for the procedure for replacing the Network Control circuit pack.

Test #95 Time of Day Clock Test (Contd)		
Error Code	Test Result	Description / Recommendation
other	FAIL	The accuracy of time of day clock is not within limits. 1) Run the long test sequence several times to make sure the error is occurring consistently. Remember that the long test sequence is destructive. Placing and receiving of calls will be affected for several seconds. 2) Replace the Network Control circuit pack at the customer's convenience. 3) The procedure for replacing the Network Control circuit pack is as follows: 1. Turn off power to the system. 2. Replace the Network Control circuit pack. 3. Turn system power back on. 4. Run the set time command after the system reboots.
	PASS	The Time of Day clock on the Network Control circuit pack is operating correctly.

TAPE (Tape Unit)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TAPE	WARNING	test tape I	Tape Unit
TAPE	MINOR	test tape I	Tape Unit
TAPE	MAJOR (a)	test tape I	Tape Unit

(a) This alarm only occurs at boot up time when the switch cannot load translations from tape. See Hardware Error Log table error type 3329.

Warning: Make sure that the switch has a healthy Tape Unit before powering it down.

The Tape Unit is used to boot up the system, among other things. Technicians should be aware that a working tape system is needed to power up a switch. It is therefore imperative that all non-destructive repair activities be tried before powering down the switch. The Tape Unit is also used for saving or *loading* translations and announcements on tape. Although the general principles are the same, the Tape Unit has many different hardware configurations. In an effort to simplify procedures, the hardware has been broken down by the system. The following two paragraphs describe the Tape Unit hardware associated with both a System 75 medium cabinet and a System 75 XE.

System 75 Medium Cabinet

The medium system can have either a high capacity minirecorder (HCMR) Tape Unit or a removable mass storage subsystem (RMSS) Tape Unit. The HCMR Tape Unit consists of an SN504 Transport circuit pack, an SN505 Data Servo circuit pack, and a TN1138 Controller circuit pack. The entire HCMR Tape Unit is powered by an SN503 Power Supply. The RMSS Tape Unit is a single replaceable unit consisting of a tape drive and a controller. The RMSS Tape Unit is powered by the 631DB1 or 631BR Power Supply in the A carrier. The RMSS Tape Unit requires the use of a TN711B Processor board and a TN729 Version 4 Tape Controller board, and will not work properly with earlier versions of either board.

System 75 XE

The Tape Unit on a system 75 XE consists of a TN764 Tape Drive circuit pack, which is controlled by the TN759 Processor circuit pack. The processor uses memory on the TN761 Memory circuit pack for tape controller functions. System 75 XES use RMSS formatted tapes.

General Maintenance and Repair Notes

Here are a few general notes that should be kept in mind when troubleshooting tape problems. In some cases, a procedure will be described here in detail, and will be referred to throughout this maintenance object (for example, checking for power).

1. If there is something wrong with the Tape Unit, an attempt to save translations or announcements can destroy good copies of the files on the tape cartridge. **DO NOT** “save translations or announcements on the backup tape cartridge if all other tape drive alarms/problems have not been resolved.
2. Since maintenance cannot distinguish between errors caused by the tape cartridge and those caused by the tape drive, check for tape cartridge errors first.
 - a. Make sure there is a tape cartridge in the tape drive.
 - b. Make sure that the write protect function is not active. To do this, turn the “file protect switch” on the tape cartridge so that the arrow on the switch points *away* from safe.
3. If the tape cartridge needs to be replaced, follow this procedure.
 - a. **DO NOT** save translations or announcements on the backup tape if all other tape drive alarms/problems have not been resolved.
 - b. Resolve all other tape drive alarms/problems.
 - c. Get a new tape cartridge (not the backup tape cartridge) and make sure that it is not write protected. RMSS tape cartridges will be marked *RMSS* on the cartridge label, while HCMR tape cartridges have no such marking. Save translations. If there is a TN750 Announcement circuit pack in the system, then save announcements.
 - d. If a new tape cartridge is not available, but all other tape alarms/problems have been resolved, then replace the damaged tape cartridge with the backup tape cartridge. Verify that the tape cartridge has the latest translations by using the list configuration software command. If the tape cartridge does not have the latest translations, then save translations. If there is a TN750 Announcement circuit pack in the system, save , announcements.
4. Check the Error Log for power-related problems and refer to **POWER** maintenance documentation. If no power errors exist, then check the tape drive for power as follows:
 - a. On HCMR Tape Unit—check to make sure that the power switch on the Tape Unit is in the ON position. If the green dc voltage status LEDs on the power supply (SN503) are not on, then replace the power supply.
 - b. On RMSS Tape Unit—if the green LED on the faceplate of the RMSS Tape Unit is not blinking, remove the white faceplate and check that the 6 pin (-48 V) plug is inserted correctly. If it is not inserted correctly, reinsert the plug, being careful to align the pins correctly.

Caution: There may be a spark when the plug is inserted.

- c. On XE Tape Units—there is no visible way to determine if the tape drive has power. However, the following can be used to determine if the tape drive has power:

Insert a tape cartridge into the tape drive and lock it into position. There should be a spinning noise indicating that the tape drive is doing a short retention pass. If there is no noise, the power may be disconnected.

5. The tape cartridge will likely be destroyed if:

- a. The tape cartridge is removed when the yellow LED on the tape drive is on.
- b. Power is removed from the tape drive while the yellow LED on the tape drive is on.
- c. The tape drive is removed while the yellow LED on the tape drive is on.

6. Dirty tape drive heads may cause problems that appear to be hardware related. To clean the tape heads in the tape drive, use TF-Freon and a polyurethane swab. The tape head is inside of the drive opening (in an HCMR Tape Unit it is a gold bar, and in an RMSS Tape Unit it is a white and black bar).

7. On System 75 medium cabinets, check the cabling between the TN729 Tape Control circuit pack and the Tape Unit. Problems with the cabling may cause other hardware problems.

Hardware Error Log Entries and Test to Clear Values

Tape Unit Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level (a)	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test tape s
1	See Table 6-C	Tape Status Test (#69)	WARNING	OFF	test tape
257	See Table 6-C	Tape Status Test (#69)	WARNING	OFF	test tape
513(b)	See Table 6-C	Tape Loop Back Test (#68)	MINOR	ON	test tape r 3
769(b)	See Table 6-C	Tape Buffer Test (#67)	MINOR	ON	test tape r 3
1025	See Table 6-C	Tape Diagnostic Test (#66)	MINOR	OFF	
1281	See Tables 6-C and 6-E	Tape Diagnostic Test (#66)	MINOR	OFF	
	See Tables 6-C and	Tape Diagnostic Test (#66)	MINOR	OFF	test tape r 3
1793(c)	See Table 6-D	Tape Read/Write Test (#65)	MINOR	OFF	
1828(c)	See Table 6-D	Tape Read/Write Test (#65)	MINOR	OFF	
2049(c)	See Table 6-C	Tape Read/Write Test (#65)	WARNING	OFF	

Tape Unit Error Log Entries (Contd)					
Error Type	Aux Data	Associated Test	Alarm	On/Off Board	Test to Clear Value
2084(c)	See Table 6-D	Tape Read/Write Test (#65)	WARNING	OFF	
2305(d)	See Table 6-C	None			
2561(e)	See Table 6-C	Tape DMA Latch Test (#230	MINOR	ON	test tape r 3
	23003				
	23004				
	23005				
	23006				
	23007				
	23008				
	23011				
	23012				
	23013				
	23014				
	23015				
	23016				
	23017				
3329(f)	0	None	MAJOR	OFF	
3841(g)	1	None			
	3				
	4				
	5				

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

(a) If these errors occur in conjunction with error type 3329 a major alarm will be logged against the error type. In order to resolve this alarm, follow the instructions given to resolve error type 3329.

(b) Error Types 513 and 769 only apply to System 75 medium cabinets.

(c) Leaky Bucket strategy for error types 1793, 1828, 2049, and 2084:

When any of these errors appear in the Error Log, it takes 48 hours to clear them. Every tape test checks only a small portion of the tape. Since there may be other problems in the rest of the tape, periodic maintenance will test the tape hourly and will decrement the counter responsible. At the end of the 48-hour cycle, if no further tape problems have been encountered, the alarm and Error Log entry will disappear.

- (d) As a part of scheduled maintenance, RMSS tape cartridges are moved from beginning to end and back to adjust the tension. This error cannot occur on systems with HCMR Tape Units.
- (e) The aux data is a direct result of the DMA Latch Test (#230) failing. For an explanation of these errors and a repair strategy, refer to the Tape DMA Latch Test (#230) section, matching this aux data with the error codes in the table for that test.
- (f) Error loading translations. This error only occurs on a reset system 3, 4, or 5 when the switch cannot load all translations from tape. It is possible that the switch was able to load most of the translations. If an error was detected with any part of the translations, however, this error will be logged, and Emergency Transfer will be invoked. To clear this alarm, follow these repair procedures (proceed to the next step only if the alarm is not resolved):
 1. Resolve all other tape problems first, and then issue a reset system 3 command from the SAT.

Note: If the tape translation is created in configurations where Processor Interface circuit pack is inserted, but Interface circuit pack is not translated, it may cause corruption of other port translations during a reboot or reset system 3.
 2. Issue the list configuration software command from the SAT. If the tape resident translations date is "none", insert the backup tape cartridge and issue a reset system 3 command from the SAT.
 3. If the problem is not resolved, follow normal escalation procedures.
- (g) Error saving translations. Clean up other tape errors and save translations again.

Aux Data/Error Codes Tables

When using the Aux Data/Error Codes Tables 6-B, 6-C, 6-D, and 6-E, the following procedure must be followed:

1. Find the aux data/error code in Aux Data/Error Codes Tables 6-C, 6-D, or 6-E.
2. Execute one repair action and then run test tape long.
3. If any of the tape tests fail, go back to step 2.
4. If all the tape tests pass, the problem may be fixed. Run test tape long repeat 3 to resolve the tape alarm.
5. Display alarms for tape.
6. If there is still an active tape alarm, display errors for tape and follow the procedure outlined in the preceding Tape Unit Error Log Entries table.

Table 6-B. Tape Unit Aux Data/Error Codes

Aux Data	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
9000	Internal system error	Escalate the problem	Escalate the problem
9001	Internal system error	Escalate the problem	Escalate the problem
9002	Internal system error	Escalate the problem	Escalate the problem
9003	Hardware not responding	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace the TN729 Tape Control Board. This requires that the system be powered down. Therefore, work all other errors first.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace the TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 3) Look for MEM1-BD errors in the Error Log. If present, refer to MEM-BD (Memory) maintenance documentation. 4) If no tests fail on the Memory circuit pack, then escalate the problem.
9004	Internal system error	Escalate the problem	Escalate the problem
9005	Internal system error	Escalate the problem	Escalate the problem

Table 6-B. Tape Unit Aux Data/Error Codes (Contd)

Aux Data	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
9009	Operation timed out.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) If HCMR Tape Unit, replace SN504 Transport. 3) If HCMR Tape Unit, replace TN1 138 Controller. 4) If RMSS Tape Unit, replace RMSS unit. 5) Replace TN729 Tape Control. This requires that the system be powered down. Therefore, work all other errors first.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace the TN764 Tape Drive circuit pack. 3) Replace the TN759 Processor circuit pack and put back the old TN764 Tape Drive circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 4) Look for MEM1-BD errors in the Error Log. If present, refer to MEM-BD (Memory) maintenance documentation. 5) If no tests fail on the Memory circuit pack, then escalate the problem.
9012	tape already in use.	1) If the Tape Unit is in use (the yellow LED on the tape drive is on and there is tape cartridge motion), then wait until the first request is complete. If there does not appear to be tape motion and/or the yellow LED on the tape drive is not on, then go to step 2. 2) Retry the command at 1 minute intervals for a maximum of 5 times. If the command continues to abort, then escalate the problem.	1) If the Tape Unit is in use (the yellow LED on the tape drive is on and there is tape cartridge motion), then wait until the first request is complete. If there does not appear to be tape motion and/or the yellow LED on the tape drive is not on, then go to step 2. 2) Retry the command at 1 minute intervals for a maximum of 5 times. If the command continues to abort, then escalate the problem.

Table 6-B. Tape Unit Aux Data/Error Codes (Contd)

Aux Data	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
9015	Test detected hardware failure.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) If HCMR Tape Unit, replace TN1138 Controller. 3) If RMSS Tape Unit, replace RMSS unit. 4) Replace TN729 Tape Control. This requires that the system be powered down. Therefore, work all other errors first.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace the TN764 Tape Drive circuit pack. 3) Replace the TN759 Processor circuit pack and put back the old TN764 Tape Drive circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 4) Look for MEM-BD errors in the Error Log. If present, refer to MEM-BD (Memory) maintenance documentation. 5) If no tests fail on the Memory circuit pack, then escalate the problem.
9017	Could not reset tape.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) If HCMR Tape Unit, replace TN1138 Controller. 3) If RMSS Tape Unit, replace RMSS unit. 4) Replace TN729 Tape Control. This requires that the system be powered down. Therefore, work all other errors first.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first.

Table 6-B. Tape Unit Aux Data/Error Codes (Contd)

Aux Data	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
9020	Warning, tape cartridge is starting to wear, but is still functional.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) If HCMR Tape Unit, replace SN504 Transport. 3) If RMSS Tape Unit, replace RMSS unit.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Replace the TN764 Tape Drive circuit pack.
9023	Write protected tape.	1) Un-write protect the tape cartridge. Refer to the General Maintenance and Repair Notes section, item 2. 2) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 3) If HCMR Tape Unit, replace SN504 Transport. 4) If RMSS Tape Unit, replace RMSS unit.	1) Un-write protect the tape cartridge. Refer to the Maintenance and Repair Notes section, item 2. 2) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 3) Replace the TN764 Tape Drive circuit pack.
9024	No tape cartridge in tape drive.	1) Put the proper tape cartridge in the tape drive. Refer to the General Maintenance and Repair Notes section, item 3. 2) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 3) If HCMR Tape Unit, replace SN504 Transport. 4) If RMSS Tape Unit, replace RMSS unit.	1) Put the proper tape cartridge in the tape drive. Refer to the General Maintenance and Repair Notes section, item 3. 2) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 3) Replace the TN764 Tape Drive circuit pack.

Table 6-B. Tape Unit Aux Data/Error Codes (Contd)

Aux Data	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
9025	Tape cartridge is worn, and is NOT functional.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) If HCMR Tape Unit, replace SN504 Transport. 3) If RMSS Tape Unit, replace RMSS unit.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Replace the TN764 Tape Drive circuit pack.
9026	Hardware error detected.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) If HCMR Tape Unit, replace SN504 Transport. 3) If RMSS Tape Unit, replace RMSS unit. 4) Replace TN729 Tape Control. This requires that the system be powered down. Therefore, work all other errors first.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Replace the TN764 Tape Drive circuit pack. 3) Replace the TN759 Processor circuit pack and put back the old TN764 Tape Drive circuit pack. This requires that the system be powered down. Therefore, work all other errors first.
9027	Test failed because software could not access tape hardware.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) If HCMR Tape Unit, replace TN1 138 Controller. 3) If RMSS Tape Unit, replace RMSS unit. 4) Replace TN729 Tape Control. This requires that the system be powered down. Therefore, work all other errors first.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first.

Table 6-C. Tape Unit Aux Data/Error Codes and Repair Strategy (Error Types 1537, 1828, and 2084)

Digit	Aux data/ Error Codes (a)	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
0	0	Probably missing tape cartridge.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 3) If HCMR Tape Unit, replace SN504 Transport. 4) If RMSS Tape Unit, replace RMSS unit.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 3) Replace the TN764 Tape Drive circuit pack.
1	1XXXX	Non-fatal Error	Ignore	Ignore
2	X2XXX	The tape cartridge should be replaced soon.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) If HCMR Tape Unit, replace SN504 Transport. 3) If RMSS Tape Unit, replace RMSS unit.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Replace the TN764 Tape Drive circuit pack.
3	XX3XX	Cannot read or write at least one block of data from the tape.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) If HCMR Tape Unit, replace SN504 Transport. 3) If RMSS Tape Unit, replace RMSS unit.	1) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 2) Replace the TN764 Tape Drive circuit pack.

(a) See Note at end of table.

Table 6-C. Tape Unit Aux Data/Error Codes and Repair Strategy (Error Types 1537, 1828, and 2084) (Contd)

Digit	Aux data/ Error Codes (a)	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
4	XXX4X	A problem was found reading the shared memory.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) If HCMR Tape Unit, replace TN1138 Controller. 3) If RMSS Tape Unit, replace RMSS unit. 4) Replace TN729 Tape Control. This requires that the system be powered down. Therefore, work all other errors first.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace the TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 3) Look for MEM1-BD errors in the Error Log. If present, refer to MEM-BD (Memory) maintenance documentation. 4) If no tests fail on the Memory circuit pack, then “escalate the problem.”

(a) See Note at end of table.

Table 6-C. Tape Unit Aux Data/Error Codes and Repair Strategy (Error Types 1537, 1828, and 2084) (Contd)

Digit	Aux data/ Error Codes (a)	Explanation	Strategy (Medium Configuration)	Strategy (XE Configuration)
5	XXXX5	Tape self-test failed.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 3) If HCMR Tape Unit, replace SN504 Transport. 4) If HCMR Tape Unit, replace TN1138 Controller. 5) If RMSS Tape Unit, replace RMSS unit.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 3) Replace the TN764 Tape Drive circuit pack. 4) Replace the TN759 Processor circuit pack and put back the old TN764 Tape Drive circuit pack. This requires that the system be powered down. Therefore, work all other errors first.

(a) Attach leading zeroes to the Aux Data obtained in order to get a 5-digit number. The first or leftmost digit can only be a 1, the next digit can only be a 2, the third can only be a 3, the fourth can only be a 4, and the fifth or rightmost digit can only be a 5. That is, if the Aux Data is 2300, then by making it a 5-digit number it becomes 02300. The 2 means that the tape cartridge should be replaced soon. The 3 means that the Tape Drive could not read or write at least one block of data from the tape.

Table 6-D. Tape Unit Aux Data/Error Codes and Repair Strategy

Digit	Aux data/ Error Codes (a)	Strategy (Medium Confirmation)	Strategy (XE Configuration)
1	1xxx	1) Check power. Refer to the General Maintenance and repair Notes section, item 4. 2) If HCMR Tape Unit, replace TN1138 Controller. 3) If HCMR Tape Unit, replace SN504 Transport. 4) If RMSS Tape Unit, replace RMSS unit.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace the TN764 Tape Drive circuit pack. 3) Replace the TN759 Processor circuit pack and put back the old TN764 Tape Drive circuit pack. This requires that the system be powered down. Therefore, work all other errors first.
2	X2XX	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 3) If HCMR Tape Unit, replace SN504 Transport. 4) If HCMR Tape Unit, replace TN1 138 Controller. 5) If RMSS Tape Unit, replace RMSS unit.	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) Replace tape cartridge. Refer to the General Maintenance and Repair Notes section, item 3. 3) Replace the TN764 Tape Drive circuit pack. 4) Replace the TN759 Processor circuit pack and put back the old TN764 Tape Drive circuit pack. This requires that the system be powered down. Therefore, work all other errors first.
3	XX3X	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) if HCMR Tape Unit, replace SN505 Data Servo. Not applicable to RMSS Tape Units.	Not applicable

(a) See Note at end of table.

Table 6-D. Tape Unit Aux Data/Error Codes and Repair Strategy (Contd)

Digit	Aux data/ Error Codes (a)	Strategy (Medium Configuration)	Strategy (XE Configuration)
4	XXX4	1) Check power. Refer to the General Maintenance and Repair Notes section, item 4. 2) If HCMR Tape Unit, replace SN503 Power Supply. Not applicable to RMSS Tape Units.	Not applicable

(a) Attach leading zeroes to the Aux Data obtained in order to get a 4-digit number. The first or leftmost digit can only be a 1, the next digit can only be a 2, the third can only be a 3, and the fourth or rightmost digit can only be a 4. That is, if the Aux Data is 230, then by making it a 4-digit number, it becomes 0230. The action described for digits 2 and 3 in the table should be taken.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Tape Read/Write Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tape DMA Latch Test (#230) (a)	x	x	ND
Tape Buffer Test (#67) (b)	x	x	ND
Tape Loop Back Test (#68) (b)	x	x	ND
Tape Diagnostic Test (#66)	x	x	ND
Tape Read/Write Test (#65)		x	ND
Tape Status Test (#69)	x	x	ND

- D = Destructive
ND = Non-destructive

(a) XE System 75s only.

(b) Medium Cabinet System 75s only.

Tape Read/Write Test (#65)

The purpose of this test is to exercise the hardware read/write circuitry and the basic functionality of the tape cartridge. This test is done by reading ten blocks of data and then writing ten blocks of data into reserved space on the tape cartridge.

Note: This test does not check for tape cartridge data consistency and it does not check the integrity of every block on tape.

Test #65 Tape Read/Write Test		
Error Code	Test Result	Description / Recommendation
Any	ABORT	Refer to Table 6-C, Tape Unit Aux Data/Error Codes, and follow the steps listed under the given error code.
Any	FAIL	If the error code is in the 9000s, refer to Table 6-B, Tape Unit Aux Data/Error Codes, and follow the steps listed under the given error code. Otherwise, refer to Table 6-D, Tape Unit Aux Data/Error Codes and Repair Strategy, and follow the steps listed under the given error code.
	PASS	All tape hardware is in good working order. Passing this test does not guarantee that every single data block on the tape cartridge can be read or written to.

Tape Diagnostic Test (#66)

This test activates the diagnostic tests built into the controller circuit pack firmware for medium configurations and into the maintenance/tape *processor* (MTP) firmware on the TN759 Processor circuit pack for XE configurations. The test will verify the basic read/write capability of the tape drive and tape cartridge, as well as perform controller/MTP hardware diagnostics. It does not test every data block on the tape.

Test #66 Tape Diagnostic Command Test/11		
Error Code	Test Result	Description / Recommendation
Any	ABORT	Refer to Table 6-C, Tape Unit Aux Data/Error Codes and Repair Strategy, and follow the steps listed under the given error code.
Any	FAIL	If the error code is in the 9000s, refer to Table 6-B, Tape Unit Aux Data/Error Codes, and follow the steps listed under the given error code. Otherwise, refer to Table 6-C, Tape Unit Aux Data/Error Codes and Repair Strategy, and follow the steps listed under the given error code.
	PASS	This is a comprehensive test of the Tape Unit, and verifies that the tape drive is in good working order.

Tape Buffer Test (#67)

This test only runs on System 75 medium cabinets.

This test checks the *Shared RAM* on the HCMR or RMSS Tape Units.

Test #67 Tape Buffer Test		
Error Code	Test Result	Description / Recommendation
1005	ABORT	Normal response for System 75 XES. This test only runs on System 75 medium cabinets. No action is necessary.
Any error code in the 9000s	ABORT	Find the error code in Table 6-B, Tape Unit Aux Data/Error Codes, and follow the associated repair strategy.
Any	FAIL	If the error code is in the 9000's, find the error code in Table 6-B and follow the associated repair strategy. Otherwise, find the error code in Table 6-C, Tape Unit Aux Data/Error Codes and Repair Strategy, and follow" the associated repair strategy. -
	PASS	If this test passes, the processor can communicate properly with the HCMR or RMSS Tape Units.

Tape Loop Back Test (#68)

This test only runs on System 75 medium cabinets.

This test verifies that the processor can send and receive data from the TN729 Tape Control circuit pack.

Test #68 Tape Loop Back Test		
Error Code	Test Result	Description / Recommendation
1005	ABORT	Normal response for System 75 XES. This test only runs on System 75 medium cabinets. No action is necessary.
Any error code in the 9000s	ABORT	Find the error code in Table 6-B, Tape Unit Aux Data/Error Codes, and follow the associated repair strategy.
Any	FAIL	Find the error code in Table 6-C, Tape Unit Aux Data/Error Codes and Repair Strategy, and follow the associated repair strategy.
	PASS	This test verifies operation between the TN729 Tape Control circuit pack and the processor. More than likely, the TN729 is good.

Status Request Test (#69)

This test requests the controller board (on System 75 medium cabinets) or *maintenance/tape processor* (MTP) firmware on the TN759 Processor circuit pack (for System 75 XES) for the current Tape Unit status and displays the results.

Test #69 Status Request Test		
Error Code	Test Result	Description / Recommendation
Any	ABORT	Find the error code in Table 6-C, Tape Unit Aux Data/Error Codes and Repair Strategy, and follow the associated repair strategy.
Any	FAIL	Find the error code in Table 6-C and follow the associated repair strategy.
	PASS	This test verifies basic communication between the processor and the Tape Unit.

Tape DMA Latch Test (#230)

This test only runs on System 75 XES.

This test, also known as the Tape Interface Test, checks the *Shared RAM* on the TN761 memory board. It also checks the communication paths on the TN759 Processor circuit pack.

Test #230 Tape DMA Address Latch Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1005	ABORT	Normal response for System 75 medium cabinets. This test only runs on System 75 XES. No action is necessary.
Any error code in the 9000's	ABORT	Refer to Table 6-B, Tape Unit Aux Data/Error Codes, and follow the steps listed under the given error code.
23001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #230 Tape DMA Address Latch (Contd)		
Error Code	Test Result	Description / Recommendation
23002 to 23005	FAIL	Hardware not responding. 1) Replace the TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 2) Replace the TN761 Memory circuit pack. This requires that the system be powered down. Therefore, work all other errors first.
23006	FAIL	Could not send test message to MTP. 1) Repeat the same test again. 2) Look for PROCR and MEM1-BD errors in the Error Log. If present, refer to Processor circuit pack and MEM-BD (Memory) maintenance documentation. 3) If no tests fail on the Memory circuit pack or Processor circuit pack, then escalate the problem.
23007	FAIL	Operation timed out. 1) Repeat the same test again. 2) Replace the TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 3) Look for MEM1-BD errors in the Error Log. If present, refer to MEM-BD (Memory) maintenance documentation. 4) If no tests fail on the Memory circuit pack, then escalate the problem.
23008	FAIL	MTP indicates test failure. 1) Replace the TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 2) Replace the TN761 Memory circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 3) Escalate the problem.

Test #230 Tape DMA Address Latch Test (Contd)		
Error Code	Test Result	Description / Recommendation
23009 to 23017	FAIL	Hardware problem. Problem accessing test memory locations #1, #2, and #3. 1) Replace the TN761 Memory circuit pack. This requires that the system be powered down. Therefore, work all other errors first. 2) Replace the TN759 Processor circuit pack. This requires that the system be powered down. Therefore, work all other errors first.
	PASS	If this test passes, the TN761 Memory and the TN759 Processor are in good working order. This is not a test of the tape cartridge or of the TN764 Tape Drive circuit pack.

TDM-BUS (TDM Bus)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TDM-BUS	MINOR	test tdm	TDM Bus
TDM-BUS	WARNING	test tdm	TDM Bus

The Time Division Multiplex Bus (TDM Bus) consists of two TDM Buses: TDM Bus A and TDM Bus B. Each TDM Bus consists of 256 time slots. The first five time slots on TDM Bus A are called the Control Channel. TDM Bus B has 17 time slots dedicated for tones (that is, dial tone) which are called the dedicated tone time slots. The rest of the time slots on each bus are for general system use (that is, phone calls).

Throughout this manual, TDM Bus refers to both TDM Bus A and TDM Bus B.

TDM Bus Fault Detection and Isolation Procedure

TDM Bus faults will most likely be caused by a faulty circuit pack connected to the backplane or bent pins on the backplane. It is possible that a circuit pack can cause a TDM Bus fault but still exhibit trouble-free operation. For example, the insertion of an M-Bus (Memory Bus) only circuit pack could bend the TDM Bus pins on the backplane and short two leads together. The two circuit packs that may cause this problem are the Memory circuit pack and the Processor circuit pack. Since the TDM Bus is a shared resource, automatic identification of the cause of a TDM Bus fault is difficult. If a TDM Bus problem is suspected, the system technician should run the test tdm craft command. If the test fails, then the system technician must manually perform a TDM Bus isolation procedure to identify the cause of the problem. Since the TDM Bus fault isolation procedure involves removing circuit packs and possibly disconnecting entire carriers, the procedure is extremely destructive to the system. If possible, this procedure should be used after hours or during hours with minimum system use.

As circuit packs are removed or entire carriers are disconnected, any active calls terminating on those circuit packs or carriers will be dropped. If the system technician has any hints about a particular circuit pack that may be causing the TDM Bus problem (for example, a new circuit pack was inserted into the system just before the TDM Bus problem appeared), then those hints should be investigated before performing this procedure.

For this procedure, make sure there is at least one TN748, TN748B, TN748C, or TN756 Tone Detector circuit pack in the system. The Tone Detector circuit pack is needed by maintenance to test the TDM Bus.

Step 1:

This step is an attempt to isolate the TDM Bus fault to boards that are essential to the system operation. For each of the circuit packs listed in the following table, perform Step 1.

Circuit Pack	Error Log Names
Tone/Clock circuit pack (TN714, TN741, or TN756)	TONE-BD, TONE-PT, TDM-CLK
Network Control circuit pack (TN727)	SW-CTL
Tone Detector circuit pack	DETR-BD, GPTD-PT, DTMR-PT
Interface circuit pack (TN716 or TN716B) or Interface 2 circuit pack (TN720) or S/A Interface 3 circuit pack (TN719)	INFC1 , INFC2, INFC3-BD
Processor Interface circuit pack (TN765)	P-INT-BD

1. Display the hardware error and alarm logs for the circuit pack in turn via the display errors and display alarms commands.
2. If there are errors for the circuit pack, refer to its documentation and try to resolve the errors.
3. Whether or not all the errors can be cleared, test the TDM Bus again via the test tdm command.
4. If the TDM Bus test fails, then continue with the next circuit pack.
5. If there are no more circuit packs in the list, then proceed with Step 2.
6. If the TDM Bus test passes, then the problem has been fixed.

Step 2:

Use this step to remove and re-insert port circuit packs (purple slot), one or several at a time.

If the TDM Bus test passes when the circuit pack is removed, but the test fails when the circuit pack is inserted, then the circuit pack is the cause of the problem and should be replaced. If the test fails regardless of whether the circuit pack is inserted or removed, then the circuit pack is not the cause of the problem.¹ Repeat this step for each purple slot circuit pack in the system.

1. Of course, in a multiple failure situation, the circuit pack could be one cause of the TDM Bus problem and there could be other failures that are causing TDM Bus faults. Also, the circuit pack itself may not be the cause of the problem, but the backplane pins may have been bent when the circuit pack was inserted.

1. Remove port circuit packs that have failed the Network Processing Element (NPE) Crosstalk Test (Test #6) first. To find which circuit packs failed this test, display the Hardware Error Log via the display errors command. Refer to the documentation of each port circuit pack that has port errors to check if any error indicates the failure of the NPE Crosstalk Test.
2. If no circuit pack failed the NPE Crosstalk Test (#6), then remove one or several purple slot circuit packs.
3. Run the test tdm command.
 - a. If the TDM Bus Test fails:
 - Check if the backplane pins in the removed circuit pack's slot appear to be bent.
 - If the backplane pins are bent, then power down the carrier, straighten or replace the pins, re-insert the circuit pack, and perform Step 2 again for the same circuit pack.
 - If the backplane pins are not bent, then re-insert the circuit pack and perform Step 2 for the next set of circuit packs.
 - b. If the TDM Bus test passes:
 - Re-insert the circuit pack.
 - Run the test tdm craft command.
 - If the TDM Bus test fails, then the re-inserted circuit pack is faulty. Replace the circuit pack and perform Step 2 again for the new circuit pack.
 - If the TDM Bus test passes, then the problem has been fixed.

Step 3:

Use this step to remove and re-insert control carrier circuit packs one at a time. The Network Control circuit pack, the Interface circuit pack, and the Interface 2 circuit pack are the only processor complex circuit packs that communicate on the TDM Bus, and thus are the only processor complex circuit packs likely to cause a TDM Bus problem in a stable system. This step should be performed for the Interface circuit pack and Interface 2 circuit pack before it is attempted for any other processor complex circuit packs.

To perform this step for the Network Control circuit pack, this circuit pack must be replaced. The system cannot operate without the Network Control circuit pack.

1. Power down the control carrier.
2. Remove the suspected circuit pack.

3. Check if the backplane pins in the removed circuit pack's slot appear to be bent.
4. If the backplane pins are bent:
 - a. Straighten or replace the pins.
 - b. Insert the same circuit pack.
 - c. Return to Step 2. with the same circuit pack.
5. If the backplane pins are not bent, insert or replace the circuit pack
6. Turn the power back on to reboot the system.
7. Run the test tdm command.
8. If the TDM Bus test fails:
 - a. If the circuit pack in Step 5 was inserted, then perform this Step 3 again replacing the circuit pack.
 - b. If the circuit pack in Step 5 was replaced, then perform this Step 3 again with the next circuit pack.
9. If the TDM Bus test passes, then the problem has been fixed.
10. [f this Step fails to identify the cause of the problem, proceed with the following Step 4.

Step 4

This step attempts to isolate the failure to a particular set of carriers, and then only checks the circuit packs in those carriers. This procedure involves terminating the TDM Bus so that certain carriers are disconnected from the TDM Bus. This is done by moving the TDM Bus terminators (AHF1) on the carrier backplane. To terminate a TDM Bus at the end of a particular carrier, the TDM Bus cable that connects the carrier to the next carrier should be unplugged and replaced with the TDM Bus terminator. The TDM Bus terminators can be taken from one carrier to the other. To get to the TDM Bus cables, remove the cover of the back of the cabinet. When the length of the TDM Bus is modified via this procedure, the circuit packs that are essential to system operation and TDM Bus maintenance (for example, Network Control circuit pack, Tone/Clock circuit pack, Tone Detector circuit pack) must still be connected to the new shortened TDM Bus.

1. Terminate the TDM Bus so that it extends within the control carrier.
2. Run the test tdm craft command.
3. If the TDM Bus test fails, then perform Step 2 and/or Step 3 for only the circuit packs in the carriers connected to the shortened TDM Bus. Step 2 is performed for port circuit packs (purple slots) and Step 3 for control carrier circuit packs.

4. If the TDM Bus test passes, then extend the TDM Bus to another carrier and repeat this procedure. When a carrier is added that causes the TDM Bus test to fail, then perform Step 2 and/or Step 3 for only the circuit packs in that carrier.

If the preceding steps fail to identify a particular circuit pack or slot, then the problem may be caused by a TDM Bus common component such as the TDM Bus terminators on the ends of the bus.

Hardware Error Log Entries and Test to Clear Values

TDM Bus (TDM-BUS:			Error Log Entries		
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test tdm
1-50 (a)	0	Idle Time Slot Test	WARNING	ON	test tdm
51-504 (b)	0	Idle Time Slot Test	MINOR	ON	test tdm

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error type indicates the number of bad time slots found by the test. This number should be less than or equal to 50.
- (b) This error type indicates the number of bad time slots found by the test. This number should be greater than 50.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Idle Time Slot Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Idle Time Slot Test (#4)	x	x	ND

- D = Destructive
- ND = Non-destructive

Idle Time Slot Test (#4)

The Idle Time Slot Test detects noisy time slots on the bus and takes them out-of-service. A Tone Detector circuit pack is told to listen to idle time slots and, if it detects any noise on a time slot, it returns a failure. At the end of the test, any out-of-service time slots are retested to see if they are still noisy and restored to service if they are idle. After all the time slots have been tested, maintenance counts the number of bad time slots and reports the number to the technician in the Error Code field. No more than 260 time slots will be taken out-of-service at one time.

Test #4 Idle Time Slot Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	Maintenance was not able to allocate all the resources needed to execute this test. For example, maintenance could be running on the Tone Detector circuit pack and it is using the CPTRS.
1115	ABORT	Maintenance was not able to allocate all the resources needed to execute this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1 to 504	FAIL	The error code indicates the number of bad time slots that were detected. The cause of this failure is most likely due to a bad port circuit pack and not the TDM Bus itself. 1) Run the test again. 2) If the error persists, check the Alarm Log for alarms on port circuit packs. 3) Refer to the appropriate circuit pack's documentation to clear the circuit pack's problem. 4) Then test the TDM Bus again. If the error continues, refer to the TOM Bus Fault Detection and Isolation Procedure section.
	PASS	The success of this test indicates all the idle time slots that are supposed to be idle are indeed idle. There is no noise on any of the idle time slots.

TDM-CLK (TDM BUS Clock)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TDM-CLK	MAJOR	test tone-clock s	TDM Bus Clock
TDM-CLK	MINOR (a)	display errors	TDM Bus Clock
TDM-CLK	WARNING	enable synchronization	TDM Bus Clock

(a) DS1 synchronization should also be checked when attempting to resolve TDM Bus Clock minor alarm.

The Time Division Multiplex (TDM) Bus Clock resides on the Tone/Clock circuit pack. The Tone/Clock circuit pack is a critical component in the system and is necessary to ensure the operation of all port circuit packs in the system. TDM-CLK (TDM Bus Clock) maintenance documentation addresses the clock portion of the Tone/Clock circuit pack and the synchronization facility. TDM Bus Clock maintenance provides error free digital communications between System 75 and other PBXS, Central Offices (COS), or Customer Premises Equipment (CPE). The TN714, TN741, and TN756 Tone/Clock circuit packs are available in System 75 R1V3. The TN741 Tone/Clock circuit pack supports synchronization with an external timing source and neither the TN714 nor TN756 support this feature. The following description of the synchronization feature only applies to a system containing a TN741 Tone/Clock circuit pack.

Synchronization is achieved via the use of TN741 Tone/Clock and TN722 or TN722B Digital Signal 1 circuit packs. The system timing reference can be derived from the Tone/Clock circuit pack or an external (off-board) timing reference. The Tone/Clock circuit pack aids in monitoring and selecting system synchronization references. The Tone/Clock circuit pack, after detecting that the external source of timing is not valid, will automatically switch from the external synchronization reference to its local oscillator and then TDM Bus Clock maintenance will select a valid (if available) external timing source. There can be at most two external timing sources for the system and these are administered as primary and secondary synchronization sources. TDM Bus Clock maintenance selects a valid timing reference from these two references and if neither are valid (or neither administered) the timing reference for the system will be the local oscillator on the Tone/Clock circuit pack.

Major and minor alarms indicate that there is a problem with the system synchronization references. These alarms will be resolved when the alarmed synchronization reference is restored. The status synchronization and display synchronization craft commands are used to determine the current system synchronization reference and the primary and secondary references that are administered respectively.

Note: If the synchronization switches from primary to secondary, it will NOT switch back unless there is some sort of failure on the secondary.

Other craft commands associated with TDM Bus Clock maintenance are disable synchronization and enable synchronization. These commands are used to disable the ability of TDM Bus Clock Maintenance to switch between synchronization references and enable the switching ability, respectively. The set synchronization craft command is executed only after synchronization has been disabled and is used to manually switch to a specific synchronization reference. This command is useful to diagnose synchronization

problems by forcing a specific reference (DS1 or Tone/Clock) to be the system synchronization reference to determine if a specific reference is providing a valid timing signal or not. The change synchronization command is used to change administration of the system synchronization references (primary and/or secondary).

The system synchronization planner must avoid creating a “timing loop” when administering the primary and secondary synchronization references in a system. A “timing loop” exists whenever a system receives timing from another system whose timing reference is directly or indirectly derived from itself. Timing loops can lead to loss of digital data between systems that are exchanging data with any system within the loop. An invalid timing signal will also be generated by any system within the loop, thus propagating the invalid timing signal to any system(s) that uses a system within the loop as a synchronization reference. The following diagram depicts a “timing loop” and a correct distribution of timing between the systems.

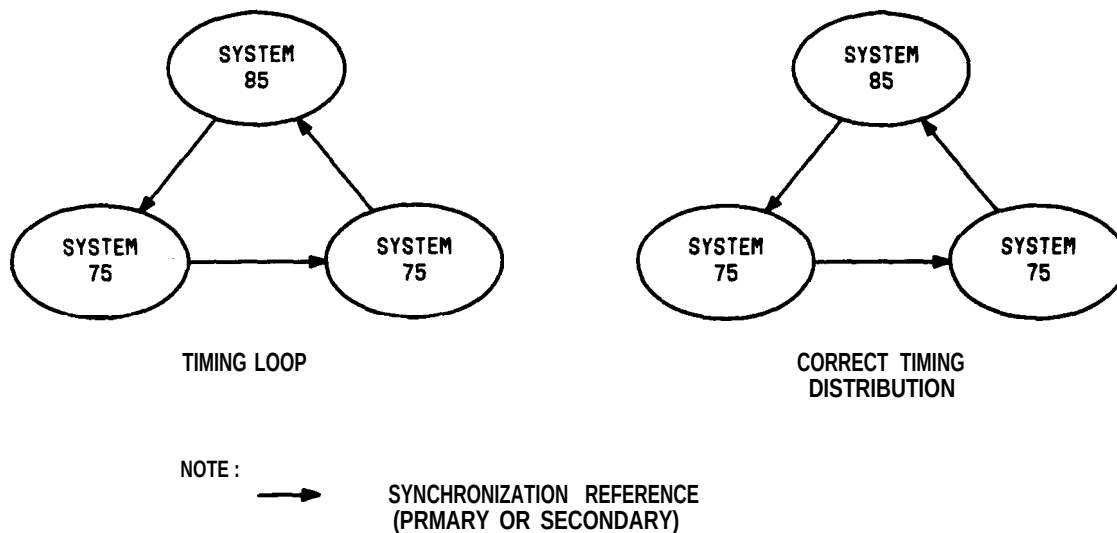


Figure 6-33. Synchronization Timing Loop

“Timing slips” occur when two systems are exchanging data and each are operating at different clock rates (frequencies). A slip implies that data is being lost because the receiving system is running at a faster or slower clock rate than the transmitting system. Parts Per Million (PPM) errors are an indication that the timing signal derived from the synchronization timing reference (primary or secondary) has degraded below the timing specifications defined for the system. Switching systems are divided into synchronization performance levels known as stratum levels. The levels are numbered from stratum 1 through 4 and System 75 R 1V3 belongs to the stratum 4 level. Each stratum from 1 to 4 has a progressively less stable clock.

The yellow LEDs of the TN741 Tone/Clock circuit pack flash in a specific pattern to indicate the status of the circuit pack. These flashing LED patterns are used to indicate if a Tone/Clock circuit pack is deriving timing from an external source or whether the Tone/Clock circuit pack is providing the timing signal for the system. The yellow LED pattern for the TN741 Tone/Clock circuit pack is as follows:

1. Yellow LED is on 2.7 seconds and off .3 second—This light pattern indicates that an external timing source is being used as a synchronization reference.
2. Yellow LED is on .3 second and off 2.7 seconds—This light pattern indicates that the local oscillator on the Tone/Clock circuit pack is being used as a synchronization reference.
3. Yellow LED stays on—This light pattern indicates that the Tone/Clock circuit pack did not receive translation data.
4. Yellow LED is blinking on and off 10 times a second—This light pattern indicates that the circuit pack has a problem using a synchronization reference. This problem happens when the circuit pack is reset and may indicate that the local oscillator is bad.

How to Replace the Tone/Clock Circuit Pack

TDM Bus Clock failures may require replacement of the Tone/Clock circuit pack. Replacing the Tone/Clock circuit pack is a service disruptive procedure because the Tone/Clock circuit pack generates clocks for the system. When replacing the Tone/Clock circuit pack, always make sure to replace it with a comparable Tone/Clock circuit pack for the system. A “comparable” Tone/Clock circuit pack is defined as a circuit pack of the same or later vintage as the circuit pack to be replaced. Refer to “Handling the Network Control Circuit Pack” in Chapter 3. After the Tone/Clock circuit pack has been replaced, execute the following steps:

1. Test the new Tone/Clock circuit pack to make sure it is healthy.
2. Verify the system is operational by placing several phone calls.

Hardware Error Log Entries and Test to Clear Values

TDM Bus Clock Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test tone-clock s
1(a)		None	MINOR	OFF	None
18(b)	0	None	WARNING	OFF	enable synchronization
257(c)		None	MINOR	OFF	None
513(d)	18240	None	MAJOR	OFF	None
769-774	18177-18208	Clock Circuit Status Inquiry (#148)	MAJOR	ON	test tone-clocks r 10
1025-1278	18433-18687	Clock Slip Inquiry (#149)			test tone-clock s
1281 (e)	18368	None			None
1537-1791	18689-18942	Clock PPM Inquiry (#150)			test tone-clock s
1793(f)	18240	None	MAJOR	OFF	None

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error indicates a problem with the primary DS1 reference. It will be cleared when the primary reference is restored. The following steps should give an indication of the source of the problem:
1. Display the system synchronization references via the display synchronization craft command to determine the primary synchronization reference.
 2. Check if the primary DS1 circuit pack is inserted in the carrier via the list configuration board CSS craft command.
 3. Check the connection of the cable supplying the external timing source to the primary DS1 circuit pack.
 4. Test the primary DS1 circuit pack via the test board CSS long craft command. Check the Error Log for DS1-BD errors and refer to DS1-BD (DS1 Trunk circuit pack) maintenance documentation to resolve any errors associated with the primary DS1 circuit pack. If no errors are listed in the Error Log for the primary DS1 circuit pack, continue with the following steps.
 5. Test the Tone/Clock circuit pack via the test tone-clock long craft command. Check the Error Log for TDM-CLK errors and verify that TDM Bus Clock Circuit Status Inquiry (#148) passes successfully. If Test #148 fails with an error code of 2 thru 32, refer to TDM Bus Clock Circuit Status Inquiry error code table to resolve the problem; otherwise, continue with the following step.

6. Execute the disable synchronization and then the enable synchronization craft command. These two commands (executed together) will switch the system synchronization reference to the primary DS1 circuit pack. Wait 1 minute and then check the Error Log and execute the status synchronization craft command to verify that the primary DS1 circuit pack is the system synchronization reference. If the primary DS1 circuit pack is not the system synchronization reference, escalate the problem.
- (b) This error indicates that TDM Bus Clock maintenance reference switching ability has been disabled via a disable synchronization craft command. Execute the “ enable synchronization craft command to enable the reference switching ability and resolve this alarm.
 - (c) This error indicates a problem with the secondary DS1 reference. It will be cleared when the secondary reference is restored. Refer to Note (a) to resolve this error (substitute secondary for primary in the resolution steps).
 - (d) This error indicates that the Tone/Clock circuit pack is providing the timing source for the system. The primary and secondary (if administered) are not providing a valid timing signal. Investigate errors 1 and 257 to resolve this error.
 - (e) This error is an indication that the Clock circuit pack has detected a loss of timing signal from the system synchronization reference. The system synchronization reference (primary and/or secondary) is not providing a valid timing signal. Investigate errors 1 and 257 to resolve this error.
 - (f) This error indicates that excessive switching of system synchronization references has occurred. When this error occurs, the TDM Bus Clock maintenance reference switching ability has been disabled and the Tone/Clock circuit pack becomes the synchronization reference for the system. Execute the following steps to resolve this error:
 - 1. The system synchronization planner should check for timing loops and resolve any loops that exist.
 - 2. Test the Tone/Clock circuit pack via the test tone-clock long craft command. Check the Error Log for TDM-CLK errors and verify that TDM Bus Clock Circuit Status Inquiry Test (#1 48) passes successfully. If Test #148 fails with an error code of 2 thru 32, refer to TDM Bus Clock Circuit Status Inquiry Test (#148) error code table to resolve the problem; otherwise, continue with the following steps.
 - 3. Replace the primary and secondary (if administered) DS1 circuit packs.
 - 4. If the problem still persists, escalate the problem.

CHAPTER 6. ERRORS AND ALARMS: REPAIR PROCEDURES

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *TDM Bus Clock Circuit Status Inquiry Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
TDM Bus Clock Circuit Status Inquiry Test (#148)	X	X	ND
Control Channel Loop Around Test (#52) (a)	X	X	ND
SAKI Reset Test (#53) (a)		X	D
Tone Generator Crosstalk Test (#90) (b)		X	ND
Tone Generator Transmission Test (#40) (b)	X	X	ND
Tone Generator Audit/Update Test (#41) (b)	X	X	ND
TDM Bus Clock Slip Inquiry Test (#149)	X	X	ND
TDM Bus Clock PPM Inquiry Test (#150)	X	X	ND
TDM Bus Clock Parameter Update Test (#151)	X	X	ND

- D = Destructive
ND = Non-destructive

- (a) Refer to XXX-BD (Common Port Board) maintenance documentation for descriptions of these tests.
- (b) Refer to TONE-PT (Tone Generator) maintenance documentation for descriptions of these tests.

TDM Bus Clock Circuit Status Inquiry Test (#148)

The TDM Bus Clock circuitry is checked for sanity and problems that are found are reported via error codes.

Test # 148 TDM Bus Clock Circuit Test		
Error Code	Test Result	Description / Recommendation
1001 2000 2100	ABORT	The system could not allocate the necessary resources for the test.
	ABORT	The system could not allocate the necessary resources for the test.
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this . test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	This error indicates that the PPM slip detector detects a continuous slip condition—the system synchronization reference is providing a bad timing source. 1) Refer to the results of TDM Bus Clock PPM Inquiry Test (#150).
2	FAIL	This error indicates that the Tone/Clock circuit pack has inaccurately detected loss of signal on the external synchronization timing source.
4	FAIL	The local oscillator on the Tone/Clock circuit pack has failed. 1) The Tone/Clock circuit pack is faulty, refer to the Tone/Clock circuit pack replacement procedures.

Test #148 TDM Bus Clock Circuit Status Inquiry Test (Contd)		
Error Code	Test Result	Description / Recommendation
8	FAIL	The local oscillator on the Tone/Clock circuit pack has failed.
16	FAIL	The circuitry on the Tone/Clock circuit pack used to detect synchronization timing errors has failed.
32	FAIL	The circuitry on the Tone/Clock circuit pack used to detect synchronization timing errors has failed. 1) The Tone/Clock circuit pack is faulty, refer to the Tone/Clock circuit pack replacement procedures.
64	FAIL	This message is only sent when an external synchronization reference is providing a timing signal for the Tone/Clock circuit pack. This error indicates that the Tone/Clock circuit pack has detected a loss of timing signal from the external synchronization reference. 1) TDM Bus Clock maintenance automatically switches system synchronization references on detection of this error. Check the Error Log (errors 1 and/or 257) to determine which external synchronization reference (primary or secondary) is not providing a valid timing signal.
ALL OTHERS	FAIL	A variable amount can also appear in the error code field representing combinations of the above mentioned error values. 1) The Tone/Clock circuit pack is faulty, refer to the Tone/Clock circuit pack replacement procedures.
	PASS	TDM Bus Clock Circuit Status is sane—there are no circuit problems on the Tone/Clock circuit pack.

TDM Bus Clock Slip Inquiry Test (#149)

This test evaluates the quality of the synchronization source for the Clock circuit pack.

Test #149 TDM Bus Clock Slip Inquiry Test		
Error Code	Test Result	Description / Recommendation
1001 2000 2100	ABORT	The system could not allocate the necessary resources for the test.
	ABORT	The system could not allocate the necessary resources for the test.
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1-255	FAIL	This error represents the number of timing slips detected on the external synchronization source (DS1) since the last slip inquiry was sent to the Tone/Clock circuit pack. 1) The current on-line synchronization reference (status synchronization) is not providing a valid timing source—switch references via the change synchronization craft command. 2) Wait 1 minute and retry the test. 3) If test continues to fail, disable TDM Bus Clock synchronization via disable synchronization and set the Tone/Clock circuit pack as the system timing source via the set synchronization command. The external timing sources administered are not providing a valid timing source—investigate other timing references.
	PASS	The Tone/Clock circuit pack does not detect any timing slips. This indicates that the external synchronization timing source is valid or that the system synchronization reference is the Tone/Clock circuit pack. The status synchronization craft command should be used to verify that the desired synchronization reference is providing timing for the system.

TDM Bus Clock PPM Inquiry Test (#150)

This test evaluates the quality of the synchronization source for the Tone/Clock circuit pack.

Test #150 TDM Bus Clock PPM Inquiry Test		
Error Code	Test Result	Description / Recommendation
1001 2000 2100	ABORT	The system could not allocate the necessary resources for test.
	ABORT	The system could not allocate the necessary resources for test
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1-254	FAIL	This error represents the number of PPM (Parts Per Million) errors detected on the incoming synchronization source since the last PPM inquiry was sent to the Tone/Clock circuit pack. A failure of this test indicates that we are outside of Stratum 4 timing specifications on the external timing source. This error will produce an invalid timing signal for any system that uses this system for a synchronization reference. 1) The current on-line synchronization reference (status synchronization) is not providing a valid timing source—switch references via the change synchronization craft command. 2) Wait 1 minute and retry the test. 3) If test continues to fail, disable TDM Bus Clock synchronization via disable synchronization and set the Tone/Clock circuit pack as the system timing source via the set synchronization command. The external timing sources administered are not providing a valid timing source—investigate other timing references.
	PASS	The Tone/Clock circuit pack does not detect any PPM errors. This indicates that the external synchronization timing source is valid or that the system synchronization reference is the Tone/Clock circuit pack. The status synchronization craft command should be used to verify that the desired synchronization reference is providing timing for the system.

TDM Bus Clock Parameter Update Test (#1 51)

This test updates the Clock circuit pack parameters.

Test #151 TDM Bus Clock Parameter Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	The Tone/Clock circuit pack parameters have been successfully updated. The Tone/Clock circuit pack yellow LED pattern should match the #1 or #2 case in the LED pattern description after successful completion of this update.

TIE-DS1 (DS1 TIE Trunk)

MO Name As H Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TIE-DS1	MINOR	test trunk <grp/mbr> I	DS1 TIE Trunk
TIE-DS1	WARNING	test trunk <grp/mbr>	DS1 TIE Trunk

The DS1 TIE trunk provides both voice and data inter-PBX communication. A DS1 circuit pack can support up to 24 digital tie trunks through a 1.544 Mbps DS1 link. DS1 TIE trunks are used widely in the Distributed Communications System (DCS) and Central Attendant Service (CAS) features of System 75.

Note: In R1V2 software, the maintenance object that appears in the Alarm Log is TIE-TRK. Therefore, use this section also for R1V2 Digital Tie Trunk maintenance.

DS1 TIE Trunk maintenance provides a strategy to maintain a DS1 TIE trunk via a port on the DS1 circuit pack. The maintenance strategy covers logging DS1 TIE trunk hardware errors, running tests for trunk initialization, periodic and scheduled maintenance, craft-demanded tests, and alarm escalation and resolution. Three different trunk service states are specified in the DS1 TIE trunk maintenance. They are: *out-of-service* in which the trunk is in a deactivated state and cannot be used for either incoming or outgoing calls; *in-service* in which the trunk is in an activated state and can be used for both incoming and outgoing calls; *disconnect* (ready-for-service) in which the trunk is in an activated state but can only be used for an incoming call. If the DS1 circuit pack is out-of-service, then all trunks on the DS1 circuit pack are placed into out-of-service state, and a warning alarm is raised.

Hardware Error Log Entries and Test to Clear Values

Error Type	Aux Data	TIE Trunk Maintenance Error Log Entries			
		Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0 †	0	Any	Any	Any	test trunk <grp/mbr> s
1(a)	57476 57477 57485				
1 (b)	57487				
15(c)	Any	Port Audit Update Test (#36)			
18(d)	0	busyout trunk <grp/mbr>	WARNING	OFF	release trunk <grps/mbr>
257(e)	57473 57474				
513(f)	57392				
769(g)	57393				
1025		DS1 TIE Trunk Seizure Test (#1 36)	WARNING	OFF	test trunk<grp/mbr> r 2
1281		Conference Circuit Test (#7)	MINOR	ON	test trunk <grp/mbr> l r 4
1537		NPE Crosstalk Test (#6)	MINOR	ON	test trunk<grp/mbrs> l r 3
1793(h)				ON	test board CSS l
2305(i)	50944				
3840(j)		Port Audit and Update Test (#36)			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures. .

- (a) The DS1 circuit pack detects a hardware error on the DS1 TIE trunk. The Aux Data field contains one of the following hardware error types: 57476—on-hook before wink [E084]; 57477—on-hook before ready to receive digits [E085]; and 57485—wink too short for valid signal [E08D]. Escalate this error to the next tier.
- (b) Answer supervision failed. This error applies only to TN767 circuit pack. No maintenance action is necessary.
- (c) This is a software audit error that does not indicate any hardware malfunction. Run short test sequence and investigate associated errors (if any).
- (d) The DS1 TIE trunk has been busied out by a busyout trunk <grp>/<mbr> command. No calls can be made on this trunk except the Facility Access Test Call. Refer to Facility Access Test Call in the *System 75 Feature Description, 555-200-201*, for details.
- (e) The DS1 circuit pack detects a hardware error on the DS1 TIE trunk. The Aux Data field contains one of the following hardware error types: 57473—rotary dial rate below 8 pulses per second [E081]; or 57474—rotary dial rate above 12 pulses per second [E082]. Escalate this error to the next tier.

- (f) DS1 circuit pack detects a hardware error on the DS1 TIE trunk. The Aux Data field shows the following hardware error type: 57392—no external release on PBX disconnect [E030]. Escalate this error to the next tier.
- (g) The DS1 circuit pack detects a hardware error on the DS1 TIE trunk. The Aux Data field contains the following hardware error type: 57393—delayed external release on PBX disconnect [E031]. Escalate this error to the next tier.
- (h) The DS1 circuit pack is out-of-service. See DS1 -BD (DS1 Trunk Circuit Pack) maintenance documentation for details.
- (i) Reorder messages. The trunk could not be seized. This error will cause the Trunk Seizure Test (#1 36) to run and it is only considered a problem if the seizure test fails (in which case error type 1025 will also show up). In this case the trunk may be put in ready-for-service state (shown as disconnected by status command), which allows only incoming calls. Run the DS1 TIE Trunk Seizure Test (#1 36) and follow its outlined procedures.
- (j) Port Audit and Update Test (#36) failed due to an internal system error. Enter status trunk command and verify the status of the trunk. If the trunk is out-of-service, then enter release trunk command to put it back to in-service. Retry the test command. If the-test continues to abort, then escalate the problem.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Crosstalk Test (#6)	x	x	ND
Conference Circuit Test (#7)	x	x	ND
DS1 TIE Trunk Seizure Test (#1 36)	x	x	ND
Port Audit and Update Test (#36)	x	x	ND

• D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use the status station or status trunk command to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, and the port is not in use, escalate the problem.
1001	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to the TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port has been seized by a user for a valid call. Use status trunk to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, and the port is not in use, escalate the problem.
1020	ABORT	The test did not run because of a previously existing error on the specific port or a more general circuit pack error. 1) Examine the Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1) Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The Conference Circuit Test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a tone detector port. If the level of the tone is within a certain range, the test passes.

Test # 7 Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use the status station or status trunk command to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, and the port is not in use, escalate the problem.
1004	ABORT	The port has been seized by a user for a valid call. Use the status station or status trunk command to determine when the port is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, and the port is not in use, escalate the problem.
1018	ABORT	Test disabled via administration. This only applies to analog stations. 1) To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y". Use the change station <extension> command.

Test #7 Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1020	ABORT	The test did not run due to a previously existing error on the specific port or because of a more general circuit pack error. 1) Examine the Error Log for existing errors against this port or circuit pack, and attempt to diagnose the previously existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The NPE of the tested port did not conference the tones correctly. This will cause noisy and unreliable connections. 1) If the remaining ports are currently not in use (yellow LED is off), attempt to reset the circuit pack. Then, repeat the test. 2) If the test fails again, replace the circuit pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring. Note: This test will always pass for TN712 Analog circuit packs prior to Vintage 14 and TN742 prior to Vintage 4.

DS1 TIE Trunk Seizure Test (#136)

The DS1 TIE Trunk Seizure Test is run to verify the trunk's signaling capability. This test is performed by sending a seizure message to the DS1 circuit pack and expecting an active reply by the DS1 circuit pack. If maintenance software does not receive any reply and the timer expires, the test is aborted. Once the active message is received, a dial pause message is sent to the DS1 circuit pack. If the DS1 circuit pack replies with a dial pulse tone message when the far end responds to the seizure, then the DS1 TIE Trunk Seizure Test passes. If the far end does not respond to the seizure and the timer expires, and the DS1 circuit pack sends a reorder message back to the maintenance software, then the test fails.

This test CANNOT be run on a trunk if one of the following cases is true:

1. The trunk direction is administered as an incoming only trunk.
2. The trunk is the 24th Port on a DS1 circuit pack that is. administered using 24th Common Channel Signaling.
3. The trunk has been seized by a normal trunk call.
4. The trunk is administered with maintenance test disabled.
5. The outgoing signal type of the trunk is either automatic or immediate-start.

Test # 138 DS1 TIE Truck Seizure Test		
Error Code	Test Result	Description / Recommendation
1000	ABORT	Internal System Error
	ABORT	System resources required to run this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1004	ABORT	Far end is seizing the trunk while the test is ongoing. A glare situation is detected. Current test is designed to be aborted. Use status trunk command to determine when the trunk is available for testing. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, and the port is not in use, escalate the problem.

Test #136 DS1 TIE Trunk Seizure Test (Contd)		
Error Code	Test Result	Description / Recommendation
1005	ABORT	Test failed due to incompatible configuration administered in trunk group form. 1) Verify the following fields on the trunk group administration screen: - Is trunk direction incoming only? - Is trunk the outgoing type (not wink-start or delay-dial)? - Is trunk the port 24 of the DS1 circuit pack while common control channel signaling is specified? 2) If the trunk has been administered using the above information, then this test should abort.
1018	ABORT	Test has been disabled by trunk group administration. 1) Verify that the Maintenance Test field in trunk administration screen is "n". To enable the test, change the trunk administration and enter "y" into the Maintenance Test field. 2) Repeat the test.
1020	ABORT	The DS1 circuit pack is out-of-service. 1) Look for DS1-ED errors in the Hardware Error Log. If present, refer to DS1-BD (DS1 Trunk Circuit Pack) maintenance documentation. 2) Retry the command. 3) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The trunk cannot be seized for an outgoing call. 1) Verify that the Trunk Type (in/out) field on the trunk administration screen matches the trunk type administered on the far end switch. 2) Look for DS1-BD errors in Hardware Error Log. If present, refer to DS1-BD (DS1 Trunk Circuit Pack) maintenance documentation. 3) Retry the test at 1 minute intervals for a maximum of 4 times. 4) If test continues to fail, escalate the problem.
	PASS	The trunk can be seized for an outgoing call.

Port Audit and Update Test (#36)

This test sends port level translation data from switch processor to the DS1 circuit pack to ensure that the trunk's translation is correct. Translation updates include the following. data: trunk type (in/out), dial type, timing parameters, and signaling bits enabled. The port audit operation verifies the consistency of the current state of the trunk kept by the DS1 circuit pack and the switch software.

Test #36 Audit and Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1006	ABORT	The DS1 Tie trunk is out-of-service. 1) Enter status trunk command to verify that the trunk is out-of-service. 2) Enter release trunk command to put it back to in-service. 3) Retry the test command. 4) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	Trunk translation has been updated successfully. The current trunk states kept in the DS1 circuit pack and switch software are consistent.

TIE-TRK (TIE Trunk), TIE-BD (TIE Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
TIE-TRK	MINOR	test port CSSpp l	T I E T r u n k
TIE-TRK	WARNING	test port s	TIE Trunk
TIE-BD	MINOR (b)	test port CSSpp s	TIE Circuit Pack

Notes:

(a) Where C is the carrier number (for example, A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.); and pp is the 2-digit port number (for example, 01).

(b) Refer to the XXX-BD (Common Port Board) maintenance documentation.

In R1V2 software, TIE-TRK maintenance object is displayed for both TN760 Analog and TN722 Digital trunks. This section is applicable only for Analog tie trunks. For R1V2 Digital Tie Trunk maintenance, follow procedures described in TIE-DS1 maintenance documentation.

The TN760 Analog tie trunk circuit pack fits into a port slot and contains four trunk circuits. Each of these circuits interface a digital PBX to an Analog tie trunk going to another PBX, across one- or two-way dedicated circuits. Each tie trunk has a 4-wire audio connection and may have two signaling leads (E and M),

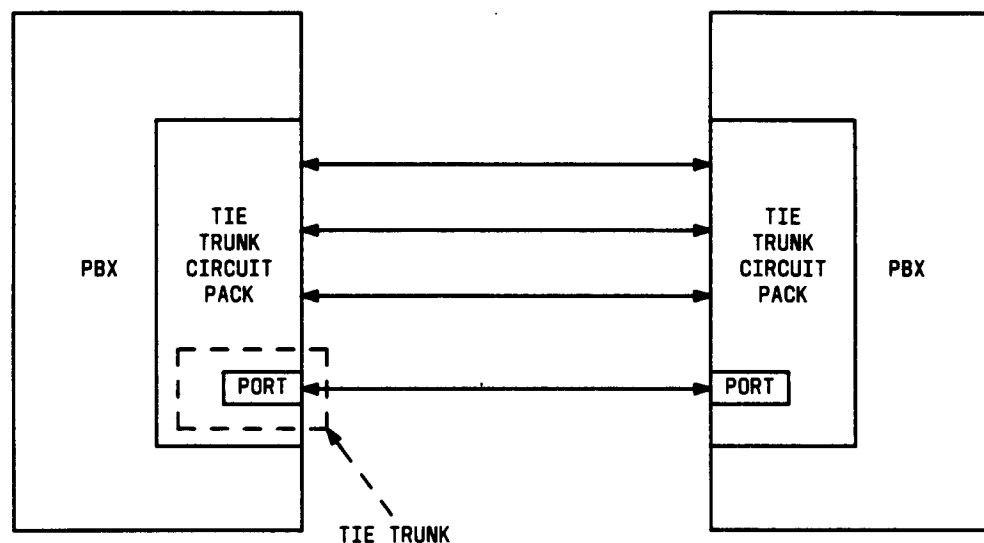


Figure 6-34. TIE Trunk Interactions

There are five software-defined tests for Tie Trunk maintenance. Another test, which requires manual interactions, is also available. This test, titled “Analog Tie Trunk Back-to-Back Testing,” is used to verify operation of Tie Trunk ports and is in “Chapter 4, Trouble Clearing Aids.” The five software-defined tests are as follows:

1. **NPE Crosstalk Test**—Verifies the switch connection operation of the circuit pack. It verifies that the trunk circuitry only talks on the selected time slot on the TDM Bus, and never crosses over to time slots reserved for other connections.
2. **Loop Around and Conference Circuit Test**—verifies the transmission operation of the circuit pack. It verifies that signals are transmitted to and from each port (loop around within the port) and tests the conference capabilities of all ports.

This test may fail due to noise induced by adjacent electric power lines. Customers having this problem should resolve it with their local power company. To temporarily alleviate the alarm caused by the failure of this test, the test may be disabled from . trunk administration Test field.

3. **Tie Trunk Seizure Test**—This verifies the seizure capabilities of the circuit pack. For wink start and delay dial outgoing trunks only, this test activates the M lead and checks for a response from the distant end on the E lead within 10 seconds.
4. **Electronic power feed (EPF), M and E Lead Test**—This test is made up of two separate parts:
 - **E lead test**—checks for the ability of the E lead to detect ground.
 - **M lead test**—checks the M lead current flow. The results of this test allow for distinguishing between circuit pack and external facility failures.
5. **Port Audit Update Test**—These are non-disruptive administrative updates that are sent to the . circuit pack with no expected response. They update the translation information on individual ports of the TIE trunk. These updates include:
 - Immediate, automatic, wink start, or delay dial
 - Rotary or DTMF senderization in or out
 - Disconnect timing
 - DTMF time slot.

Hardware Error Log Entries and Test to Clear Values

TIE Trunk Error Log Entries					
Error Type	AUX Data	Associated Test	Alarm Level	ON/OFF Board	Test to Clear Value
		Any	Any	Any	test port CSSpp s
O(a)	0	None	WARNING	ON	
		None	WARNING	OFF	
		None	WARNING	OFF	
1 (d)	57477	None	WARNING	OFF	
1 (e)	57485	None	WARNING	OFF	
1(f)	57487				
15(g)	Any	Port Audit Update (#36)			
18(h)	0	busyout trunk <grp/mbr>	WARNING	OFF	release trunk <grp/mbr>
257(i)	57473	None	WARNING	OFF	
257(j)	57474	None	WARNING	OFF	
257(k)	57475	None	WARNING	OFF	
513	57478	EPF M and E Lead (#74)	MINOR	OFF	test port CSSpp s r 3
769	57481	EPF M and E Lead (#74)	MINOR	ON	test port CSSpp s r 3
1025(l)	57392	None	MINOR	OFF	
1281		EPF M and E Lead (#74)	MINOR	ON	test port CSSpp s r 3
1537		Loop Around and Conference (#33)	MINOR	ON	test port CSSpp l r 3
1793		Tie Trunk Seizure (#73)	MINOR	OFF	test port CSSpp s r 5
2049		NPE Crosstalk (#6)	MINOR	ON	test port CSSpp l r 3
2305(m)	50944	None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) Circuit pack was alarmed without logging errors. This occurs when the circuit pack is reinserted.
- (b) Digit timeout—this occurs when the far end PBX began transmitting digits too late (10 seconds, refer to the Trunk Administration form for more details) after receiving the signal indicating ready to receive digits (if any). This can occur on an incoming immediate, wink, or delay dial line. Check the far end PBX to ensure a translation match at both ends.
- (c) Rotary dial before wink. This occurs when the far end PBX starts dialing before the PBX sends the wink on a wink-start or delay-dial trunk. Check the far end PBX to ensure a translation match at both ends.
- (d) Rotary dial too early. This occurs when the far end PBX starts dialing too soon (about 50ms) after seizure on a wink start or delay dial line. Check the far end PBX to ensure a translation match at both ends.

- (e) On an outgoing wink-start or delay-dial trunk, the wink time was too short (less than 80ms) for a valid signal. Check the far end PBX to ensure a translation match at both ends.
- (f) Answer supervision failed. This error applies only to TN767 circuit pack. No maintenance action is necessary.
- (g) This is a software audit error that does not indicate any hardware malfunction. Run short test sequence and investigate any associated errors (if any).
- (h) This indicates that the trunk in question has been busied-out by maintenance personnel.
- (i) The rotary dial rate was too slow—less than 8 pulses per second. The call will be accepted, but the far end PBX should be adjusted to provide 10 pulses per second if possible.
- (j) The rotary dial rate was too fast—above 12 pulses per second. The call will be accepted, but the far end PBX should be adjusted to provide 10 pulses per second if possible.
- (k) The time between digits was too short (less than 300ms). Check the far end PBX to ensure a translation match at both ends.
- (l) This indicates that the trunk is still seized with an incoming call. The far end PBX is not releasing the trunk after the call was dropped. The error count will increase every 4 minutes while this condition is present. Check the far end PBX for problems.

Once the trunk is released from the call, the severity of this problem is decreased. If error type 1025 does not appear again, the problem has been corrected. Verify that error type 1025 does not reappear in the Error Log.

- (m) Reorder message. Trunk could not be seized. This error will cause the Tie Trunk Seizure Test (#73) to run and it is only considered a problem if the seizure test fails (in which case error type 1793 will also show up). In this case the trunk may be put in ready-for-service state (shown as disconnected by status command) which allows only incoming calls. Run the Tie Trunk Seizure Test (#73) and follow its outlined procedures.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Crosstalk Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Crosstalk Test (#6)		x	ND
Loop Around and Conference Circuit Test (#33)		x	ND
Tie Trunk Seizure Test (#73)	x	x	ND
Tie Trunk EPF Test (#74)	x	x	ND
Audit Update Test (#36)	x	x	ND

* D = Destructive
ND = Non-destructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM Bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per port basis. The NPE Crosstalk Test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Test #6 NPE Crosstalk Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort escalate the problem.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is active, but the port is not in use (no connected ports), then check the Error Log for error type 1025. The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test # 6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the test at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #6 NPE Crosstalk Test (Contd)		
Error Code	Test Result	Description / Recommendation
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. This problem may be caused by bad tone detectors or tone generators. 1) Test all tone circuit packs: a. Look for TTR-LEV errors in the Error Log. If present, refer to the TTR-LEV (TTR Level) maintenance documentation. b. Look for TONE-PT errors in the Error Log. If present, refer to the TONE-PT (Tone Generator) maintenance documentation. Resolve any errors on these circuit packs before any action is taken on the TIE circuit. 2) Check the remaining ports to see if they are currently in use or not by using status trunk xx command or observing the yellow LED on the circuit pack. If yellow LED is off, the port is not in use. The following steps can be used to clear the errors: a. Busy out the circuit pack. b. Use reset board command to reset the circuit pack. c. Use release board command. d. Repeat the test. 3) If the test fails again, replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and examining station, trunk, or external wiring.

Loop Around and Conference Circuit Test (#33)

This test checks the reflective loop around and conference capabilities of a tie trunk port circuit. The test uses 404-Hz, 1004-Hz, and 2804-HZ tones. This is an on-board test only, and each tone is transmitted through the loop and checked upon return.

This test may fail due to noise induced by adjacent electric power lines. Customers having this problem should resolve it with their local power company. To temporarily alleviate the alarm caused by the failure of this test, the test may be disabled from the trunk administration Test field.

Test #33 Loop Around and Conference Circuit Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is active, but the port is not in use (no calls), then check the Error Log for error type 1025. The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM Bus errors. Refer to TDM-BUS maintenance documentation to diagnose any active TDM Bus errors. 1) If system has no TDM Bus errors and is not handling heavy traffic, repeat test at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #33 Loop Around and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1) Look for TTR-LEV errors in the Error Log. If present, refer to TTR-LEV (TTR Level) maintenance documentation. 2) Look for TONE-PT errors in the Error Log. If present, refer to TONE-PT (Tone Generator) maintenance documentation. 3) If neither condition exists, retry the command at 1 minute intervals for a maximum of 5 times. 4) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.
	ABORT	Response to the test request was not received within the allowable time period.
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
7	FAIL	The conference capabilities of the port failed. The port may still be operational, or the problem may be off-board. 1) Test all tone circuit packs in the same carrier, and resolve any errors that occur on these circuit packs. 2) To make sure the problem is on-board, disconnect port from the loop and retry test. 3) If test fails, replace circuit pack.

Test #33 Loop Around and Conference Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
129	FAIL	The reflective 404-Hz tone test failed. Poor quality transmission was detected to or from the port. The problem may be off-board.
131	FAIL	The reflective 1004-Hz tone test failed. Poor quality transmission was detected to or from the port. The problem may be off-board.
133	FAIL	The reflective 2804-Hz tone test failed. Poor quality transmission was detected to or from the port. The problem may be off-board. 1) Test all tone circuit packs in the same carrier, and resolve any errors that occur on these circuit packs. 2) To make sure the problem is on-board, disconnect port from the loop and retry test. 3) if test fails, replace circuit pack.
	PASS	Tie trunk loop around and conference test is successful. This port is functioning properly. 1) If users are reporting troubles, examine loop connections to the port.

Port Audit Update Test (#36)

This test will send updates of the Tie Trunk port translation for all ports on the circuit pack that have been translated. The update is non-disruptive and guards against possible corruption of translation data contained on the circuit pack. No response message is expected from the circuit pack once it receives translation updates. The port translation data includes: Immediate, automatic, wink-start or delay dial trunk, rotary or DTMF senderization in or out, disconnect timing from 10 to 2550ms in 10ms increments, and DMTF time slot.

Test #36 Port Audit Update Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1006	ABORT	The port is in out-of-service state. This test cannot be run. 1) Retry the command once the port is in service.
2100	ABORT FAIL	Could not allocate the necessary' system resources to run the test. Internal system error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If test continues to fail, escalate the problem.
	PASS	This test passed. Translation information was successfully " updated on the circuit pack. 1) If signaling troubles are reported, verify translation information for this port.

Tie Trunk Seizure Test (#73)

This seizure test activates the M lead and checks for a response from the external end within 10 seconds. This test is only applicable to wink start and delay dial outgoing trunks.

Test #73 Tie Trunk Seizure Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is active, but the port is not in use (no calls), then check the Error Log for error type 1025. The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test # 73 Tie Trunk Seizure Test (Contd)		
Error Code	Test Result	Description / Recommendation
1005	ABORT	This test is not valid for this trunk translation. Must be a wink-start or delay dial trunk and must be outgoing or two-way for this test to run. 1) Check trunk translation. If it is not a wink-start or delay dial trunk, this abort message should be ignored.
1018	ABORT	Test disabled via administration. The maintenance Test field is set to "n". 1) To enable test, set the Test field on the trunk administration screen for the particular trunk group being tested to "y". Use the change trunk group xxx command.
2000	FAIL	Seizure message is not received back within 10 seconds. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to fail, check the far end PBX to ensure a translation match at both ends. 3) Check the facility.
2100	ABORT	Could not allocate the necessary system resources to run the test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	The tie trunk seizure test passes. This port is functioning properly. 1) If users are reporting troubles, examine loop connections to the port, wiring, and stations.

Tie Trunk EPF Test (#74)

This test consists of an E lead and an M lead test. The E lead test checks for proper activation and deactivation of the port's E lead. The M lead test checks the M lead electronic power feed current flow. The processor sends an M lead test request to the circuit pack and receives the results. The returned results are measured to see if a port or external tie trunk line fail.

Test # 74 Tie Trunk EPF Test		
Error Code	Test Result	Description / Recommendation
1	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the display trunk xx command to determine trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) If the port status is active, but the port is not in use (no calls), then check the Error Log for error type 1025. The port may be locked up. 2) If the port status is idle, then retry the command at 1 minute intervals for a maximum of 5 times. 3) If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display trunk xx command to determine the trunk group/member number of the port. Use the status trunk command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort and the port is not in use, escalate the problem.

Test # 74 Tie Trunk EPF Test (Contd)		
Error Code	Test Result	Description / Recommendation
1005	ABORT	This test is no tvalid for this trunk translation. Must be a type-I standard trunk for this test to run. 1) Check trunk configuration. If it is not a type-1 standard trunk, this abort message should be ignored.
1014	ABORT	The circuit pack has not been inserted into the system. 1) Make sure circuit pack is inserted in carrier and fully seated. 2) If test continues to fail, escalate problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run the test. 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	The E lead test failed. On-board port problem. 1) Replace circuit pack.
2	FAIL	The M lead test failed. The EPF is in an overcurrent condition while connected to the external M lead. 1) To make sure the problem is on-board, disconnect facility from the pack and retry test. 2) If test fails, replace circuit pack.
	PASS	Tie Trunk EPF test is successful. This port is functioning properly. 1) If users are reporting troubles, examine loop connections to the port.

TIME-DAY (Time Of Day)

MO Name As It Appears In Alarm Loci	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TIME-DAY	MIN	set time	Time Of Day

The Time-of-Day clock contains the current month, day of the week, day of the month, hour, minute, and second. The current year is not part of the time-of-day clock and is kept on tape as part of the translation information. The TIME-DAY (Time Of Day) maintenance object is responsible for monitoring the time-of-day clock and raising an alarm if the time-of-day clock is not set or cannot be read by the software. If the time-of-day clock is not set or cannot be read by the software, many features will be either inoperative or incorrect. The time-of-day clock should always be set using the set time command when a system is initially powered up or a TN727 Network Control circuit pack is replaced.

The time-of-day clock can be read by using the display time craft command and set using the set time craft command. The time-of-day clock resides on the TN727 Network Control circuit pack and has a battery backup to save the time-of-day over power failures. If the TN727 Network Control circuit pack is physically removed from the carrier, the contents of the time-of-day clock will be lost and the time-of-day must be set when the TN727 Network Control circuit pack is re-inserted.

Hardware Error Log Entries and Test to Clear Values

Time Of Day Error Log				Entries	
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	set time
0 (a)	o	None	MINOR	OFF	set time

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the , appropriate test description and follow the recommended procedures.

Note:

- (a) This error indicates that the software cannot read the time-of-day clock on the TN727 Network Control circuit pack. During this condition all time stamps on Alarm Log entries, Hardware Error Log entries, and Software Error Log entries are potentially inaccurate. In addition, any features that are sensitive to the time-of-day will not function correctly.

Follow these steps to resolve the alarm:

1. Use the set time craft command to set the time-of-day.
2. Use the display time craft command to display the time-of-day. If the time-of-day is displayed correctly, wait 15 minutes and verify that the alarm is retired; otherwise, continue with the next step.

3. Test the TN727 Network Control circuit pack using test network-control long. If any tests fail, refer to the repair procedures in DATA-CON maintenance documentation before investigating Time Of Day problems further. If all tests PASS and the alarm has not been retired, proceed to the next step.
4. The TN727 Network Control circuit pack must be replaced. Refer to “Handling the Network Control Circuit Pack” in Chapter 3. After the TN727 Network Control circuit pack has been replaced and the set time command has been entered, the alarm should be resolved within 15 minutes.

TONE-BD (Tone/Clock Circuit Pack)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
TONE-BD	MAJOR	test tone/clock	Tone/Clock Circuit Pack
TONE-BD	MINOR	test tone/clock or set tone/clock	Tone/Clock Circuit Pack
TONE-BD	WARNING	test tone/clock or release tone/clock	Tone/Clock Circuit Pack

The Tone/Clock circuit pack functionality is provided by two independent objects in the same circuit pack. The Tone Generator provides all the tones needed by the system and the Clock generates the system clocks for the Time Division Multiplex (TDM) bus and aids in monitoring and selecting internal synchronization references.

When resolving errors/alarms on the Tone/Clock circuit pack, the following sections should be used also:

- TONE-PT (Tone Generator) maintenance.
- TDM-CLK (TDM Bus Clock) maintenance.

R1V3 and prior systems have one Tone/Clock circuit pack in the A carrier.. This Tone/Clock circuit pack generates clocks and provides system tones for the port network it resides on.

How to Replace the Tone/Clock Circuit Pack

System clock failures require replacement of the Tone/Clock circuit pack. Replacing the Tone/Clock circuit pack is a service disrupting procedure on Standard Systems because the Tone/Clock circuit pack generates clocks for the system. When replacing the Tone/Clock circuit pack, always replace it with a comparable Tone/Clock circuit pack for the system. See the following table:

System Type	Release	Tone/Clock Circuit Pack Code
System 75 XE	R1V2, R1V3	TN756
System 75 (Medium cabinet)	R1V1	TN714
	R1V2, R1V3	TN741

On a Standard System:

This procedure is destructive.

1. Pull out the faulty Tone/Clock circuit pack. If the Tone/Clock circuit pack is being replaced for a reason other than loss of clocks (Clock Health Inquiry #46), pulling it out will cause the clocks to go away.

2. Insert a new Tone/Clock circuit pack. The system will detect that the clocks came back and it will automatically recover as follows:
 - The system will perform a reset system 2 automatically.
 - All the red LEDs will come on and off within 30 seconds.
3. If the red LEDs are lighted, as explained above, then go to Step 5. If the red LEDs do NOT light, as explained above, then go to Step 4.
4. Restart the system via the reset system 2 command.
5. Test the new Tone/Clock circuit pack to make sure it is healthy.
6. Verify the system is operational by placing several phone calls.

Hardware Error Log Entries and Test to Clear Values

Tone/Clock Circuit Pack Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test tone-clock s
0(a)	0	None	MINOR	ON	
1(b)	0	SAKI Test (#53)	MINOR	ON	test tone/clock l
23(c)	0	None	WARNING	OFF	
257	65535	Control Channel Test (#52)	MINOR	ON	test tone/clock r 20
257(d)	0	None			
513(e)	4352	None			
513(e)	4353	None			
513(e)	4355	None			
513(e)	4357	None			
769(f)	4358	None			
1025(g)	4363	NPE Audit Test (#50)			test tone/clock s
1538(h)		None			
2049(i)	0	Clock Health Inquiry Test (#46)	MAJOR	ON	test tone/clock r 1
2305(j)	0	Clock Health Inquiry Test (#46)	MAJOR	ON	test tone/clock r 1
2561(k)	1001 1002 1003 1004 1005	None	MAJOR	ON	
3840(l)	4096	None			
3840(l)	4097	None			
3840(l)	4098	None			
3840(l)	4099	None			
3840(l)	4100	None			
3848(m)	0	Clock Health Inquiry Test (#46)			test tone/clock r 1
3872(n)	0	Clock Health Inquiry Test (#46)			test tone/clock r 1

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error will appear in the Error Log if the Tone/Clock circuit pack has been removed since the Error Log was last cleared. Verify that the circuit pack has been reinserted.
- (b) This error indicates the circuit pack totally stopped functioning or it was physically removed from the system.

Note: The alarm will be logged approximately 11 minutes after the circuit pack has been removed/SAKI Test (#53).

If the circuit pack is not in the system, re-inserting the circuit pack will resolve this error (in the same slot as the error indicates). Or, if the circuit pack is in the system, and the red LED is on, then replace the circuit pack. See the Handling Port Circuit Pack section in Chapter 3 for details of alarming strategy.

Check if the circuit pack is physically in the system (in the same slot as the error indicates). If the circuit pack is there, reset it via the test tone/clock long command. If the red LED stays on, then replace the circuit pack. See the "How to Replace the Tone/Clock Circuit Pack" section.

If after replacing the Tone/Clock circuit pack, the Tone/Clock circuit pack still has the red LED on, the problem could be with the Network Control circuit pack. Refer to the SW-CTL MO for procedures to clear the error.

- (c) The circuit pack has been logically administered but not physically installed. The alarm will be cleared when the circuit pack is installed.
- (d) This error indicates transient communication problems with this circuit pack. This error is not service-affecting and can be ignored.
- (e) This error indicates the circuit pack has reported a hardware failure on the circuit pack. The circuit pack should be replaced. See the "How to Replace the Tone/Clock Circuit Pack" section.
- (f) This error can be ignored, but look for other errors on this circuit pack.
- (g) This error is not service-affecting and can be ignored.
- (h) The circuit pack is out-of-service. Reset it via the test tone/clock long command. If the command is not successful, replace the Tone/Clock circuit pack. See the (How to Replace the Tone/Clock Circuit Pack" section.
- (i) This error indicates a loss of Data Clock and the Tone/Clock circuit pack should be replaced. See the "How to Replace the Tone/Clock Circuit Pack" section.

This error will typically appear with error type 3872. See Note (n).

- (j) This error indicates there was a loss of clock on this Tone/Clock circuit pack. Circuit pack should be replaced. See the "How to Replace the Tone/Clock Circuit Pack" section. This error will typically appear with error type 3848. See Note (m).
- (k) This error indicates that a Tone/Clock circuit pack, with a different circuit pack code as required for this system, has been inserted in the port slot as shown in the Hardware Error Log. To resolve this error, refer to "How to Replace the Tone/Clock Circuit Pack" section for an appropriate circuit pack code and replace the Tone/Clock circuit pack according to the procedures indicated for this system.

The meanings of the aux data values are as follows:

1001 A TN756 Tone/Clock circuit pack is in the System 75 XE.

1003 Either TN741 or TN714 Tone/Clock circuit pack is in a System 75 (Medium Cabinet).

(1) This error is not service-affecting and can be ignored.

(m) These errors indicate this Tone/Clock circuit pack had a loss of clock. If error 2305 is also logged, see Note (j).

(n) These errors indicate the Tone/Clock circuit pack had a loss of Data Clocks. This error will mainly impact users on stations connected to Digital circuit packs. These users could be without service. If error 2049 is also logged, see Note (i).

Craft-Demanded Tests: Descriptions and Error Codes

Use the list configuration control command to find the Tone/Clock circuit pack code of the system, and then proceed to look for the short and long test sequences according to the Tone/Clock circuit pack code.

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *ControlChannel Loop Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

System With TN756 Tone/Clock Circuit Pack			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
SAKI Reset Test (#53) (a)	x	x	D
Clock Health Inquiry Test (#46)	x	x	ND
Control Channel Loop Around Test (#52) (a)	x	x	ND
Tone Detection Verification Test (#42) (b)	x	x	ND
Tone Detector Audit/Update Test (#43) (b)	x	x	ND
Tone Generator Crosstalk Test (#90) (c)		x	ND
Tone Generator Transmission Test (#40) (c)	x	x	ND
Tone Generator Audit/Update Test (#41) (c)	x	x	ND

(See Notes on next page.)

System With TN741 Tone/Clock Circuit Pack			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tone Generator Crosstalk Test (#90) (C)			ND
Tone Generator Transmission Test (#40) (c)	x	x	ND
Tone Generator Audit/Update Test (#41) (c)	x	x	ND
TDM Bus Clock Circuit Status Inquiry Test (#1 48) (d)	x	x	ND
TDM Bus Clock Circuit Slip Inquiry Test (#149) (d)	x	x	ND
TDM Bus Clock Circuit PPM Inquiry Test (#150) (d)	x	x	ND
TDM Bus Clock Circuit Parameter Update Test (#1 51) (d)	x	x	ND
Control Channel Loop Around Test (#52) (a)	x	x	ND
SAKI Reset Test (#53) (a)		x	D

System With TN714 Tone/Clock Circuit Pack			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tone Generator Crosstalk Test (#90) (c)			ND
Tone Generator Transmission Test (#40) (c)	x	x	ND
Tone Generator Audit/Update Test (#41) (c)	x	x	ND
Control Channel Loop Around Test (#52) (a)	x	x	ND
SAKI Reset Test (#53) (a)		x	D

•D = Destructive
ND = Non-destructive

Notes:

- (a) Refer to the XXX-BD (Common Port Board) maintenance documentation for descriptions of this test.
- (b) Refer to the Dual Tone Multi-Frequency Receiver Port (TTR) (DTMR-PT) or the GPTD-PT (General Purpose Tone Detector Port (CPTR)) maintenance documentation for descriptions of this test.
- (c) Refer to TONE-PT (Tone Generator) maintenance documentation for descriptions of this test.
- (d) Refer to the TDM-CLK (TDM Bus Clock) maintenance documentation for descriptions of this test.

Clock Health Inquiry Test (#46)

This inquiry reads special data stored in memory to determine if this Tone/Clock circuit pack had a loss of clock. If this data indicates this Tone/Clock circuit pack had a loss of clock, the inquiry reports a failure. If the circuit pack did not have a loss of clock, the inquiry reports a pass.

Test #46 Clock Health Inquiry Test		
Error Code	Test Result	Description / Recommendation
	ABORT	Internal System Error 1) Retry the command at 1 minute intervals for a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
none	FAIL	This Tone/Clock circuit pack had a loss of clock. The circuit pack should be replaced by following the steps in the "How to Replace the Tone/Clock Circuit Pack" section.
	PASS	This Tone/Clock circuit pack has not reported a loss of clock.

TONE-PT (Tone Generator)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TONE-PT	MAJOR	test tone/clock s	Tone Generator
TONE-PT	MINOR	test tone/clock s	Tone Generator

The tone generation facility exists on the Tone/Clock circuit pack and provides all the tone services for the system (that is, dial tone, busy tone, etc.).

The Tone/Clock circuit pack also provides the clocks for the system and can serve as the synchronization reference. Therefore, when resolving alarms on the Tone/Clock circuit pack, the TDM-CLK (TDM Bus Clock) and the TONE-BD (Tone/Clock Circuit Pack) maintenance documentation should be utilized.

Standard systems have one Tone/Clock circuit pack in the A carrier. This Tone/Clock circuit pack generates clocks and provides system tones for the port network it resides on.

If the tone generation facility fails, the system may not have tones (see the Tone Generator Transmission Test #40). That is, a user may go off-hook and hear no dial tone. The system will be able to process certain types of calls (that is, internal calls will succeed while outgoing calls will not).

How to Replace the Tone/Clock Circuit Pack

Tone generation failures may require replacement of the Tone/Clock circuit pack. Replacing the Tone/Clock circuit pack is a service-disruptive procedure on standard systems because the Tone/Clock circuit pack generates clocks for the system. When replacing the Tone/Clock circuit pack, always make sure to replace it with a comparable Tone/Clock circuit pack for the system. See the following table:

System Type	Release	Tone/Clock Circuit Pack Code
System 75 XE	R1V2, R1V3	TN756
System 75 (Medium cabinet)	R1V1	TN714
	R1V2, R1V3	TN741

On a Standard System:

This procedure is destructive.

1. Pull out the faulty Tone/Clock circuit pack. This will cause the clocks to go away and the system to go into Emergency Transfer.
2. Insert a new Tone/Clock circuit pack. The system will detect that the clocks came back and it will automatically recover as follows:

- The system will perform a reset system 2 automatically.
 - All the red LEDs will come on and off within 30 seconds.
3. If the red LEDs lights as explained in Step 2, then go to Step 5. if the red LEDs do NOT light, as explained above, then go to Step 4.
 4. Restart the system via the reset system 2 command.
 5. Test the new Tone/Clock circuit pack to make sure it is healthy.
 6. Verify the system is operational by placing several phone calls.

Hardware Error Log Entries and Test to Clear Values

Tone Generator Error Log "Entries"					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	o	Any	Any	Any	test tone-clock s
0(a)	o	None	MINOR	ON	
1 (b)	17664	Tone Generator Audit/Update Test (#41)	MAJOR	ON	test tone/clock r 2
257(c)	17667	None	MINOR	ON	
513(d)	17666	Tone Generator Audit/Update Test (#41)	MINOR	ON	test tone/clock r 3
769	Any	Transmission Test (#40)	MAJOR	ON	test tone/clock r 3
1025		Crosstalk Test (#90)	MAJOR	ON	test tone/clock l r 2

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error type will appear in the Error Log if the Tone/Clock circuit pack has been removed since the Error Log was last cleared. Verify that the circuit pack has been reinserted.
- (b) This error indicates the tone generation facility is having problems monitoring the tones. If this error is being constantly logged, then the circuit pack should be replaced. See the "How to Replace a Tone/Clock Circuit Pack" section.
- (c) This error has the same affect on the system as Note (a). The tone generation facility may or may not be able to generate tones. If this error is being constantly logged, then the circuit pack should be replaced. See the "How to Replace a Tone/Clock Circuit Pack" section.
- (d) The tone generation lost its translation. Testing the circuit pack is sufficient to reload its translation. If testing the circuit pack does not clear the error, then the Tone/Clock circuit pack should be replaced.

Craft-Demanded Tests: Descriptions and Error Codes

Use the list configuration control command to find the Tone/Clock circuit pack code of the system, and then proceed to look for the short and long test sequences according to the Tone/Clock circuit pack code.

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the Control Channel Loop *Around Test*, for example, you may also clear errors generated from other tests in the testing sequence.

System With TN756 Tone/Clock Circuit Pack			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
SAKI Reset Test (#53) (a)	x	x	D
Clock Health Inquiry Test (#46)	x	x	ND
Control Channel Loop Around Test (#52) (a)	x	x	ND
Tone Detection Verification Test (#42) (b)	x	x	ND
Tone Detector Audit/Update Test (#43) (b)	x	x	ND
Tone Generator Crosstalk Test (#90) (c)		x	ND
Tone Generator Transmission Test (#40) (c)	x	x	ND
Tone Generator Audit/Update Test (#41) (c)	x	x	ND

System With TN741 Tone/Clock Circuit Pack			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tone Generator Crosstalk Test (#90) (c)			ND
Tone Generator Transmission Test (#40) (c)	x	x	ND
Tone Generator Audit/Update Test (#41) (c)	x	x	ND
TDM Bus Clock Circuit Status Inquiry Test (#1 48) (d)	x	x	ND
TDM Bus Clock Circuit Slip Inquiry Test (#1 49) (d)	x	x	ND
TDM Bus Clock Circuit PPM Inquiry Test (#150) (d)	x	x	ND
TDM Bus Clock Circuit Parameter Update Test (#1 51) (d)	x	x	ND
Control Channel Loop Around Test (#52) (a)	x	x	ND
SAKI Reset Test (#53) (a)		x	D

(See Notes on next page.)

System With TN714 Tone/Clock Circuit Pack			
Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Tone Generator Crosstalk Test (#90) (c)			ND
Tone Generator Transmission Test (#40) (c)	x	x	ND
Tone Generator Audit/Update Test (#41) (c)	x	x	ND
Control Channel Loop Around Test (#52) (a)	x	x	ND
SAKI Reset Test (#53) (a)		x	D

* D = Destructive
ND = Non-destructive

Notes:

- (a) Refer to the XXX-BD (Common Port Board) maintenance documentation for descriptions of this test.
- (b) Refer to the Dual Tone Multi-Frequency Receiver Port (TTR) (DTMR-PT) or the GPTD-PT (General Purpose Tone Detector Port (CPTR)) maintenance documentation for descriptions of this test.
- (c) Refer to TONE-PT (Tone Generator) maintenance documentation for descriptions of this test.
- (d) Refer to the TDM-CLK (TDM Bus Clock) maintenance documentation for descriptions of this test.

Tone Generator Transmission Test (#40)

The purpose of this test is to test all the tones the Tone Generator is capable of generating. The test is performed in three parts. For the first part, the Tone Generator is told to generate the touch-tone digits. The digits are received and checked by a Tone Detector touch-tone detector. If any of the digits fail, the test is repeated using a touch-tone detector in another Tone Detector circuit pack.

For the second part, the Tone Generator is told to generate call progress tones that are not assigned to dedicated time slots (that is, ring back). A Tone Detector general purpose tone detector (GPTD) listens for the tones and measures the quality of the tone. If any of the measured values are not within limits, the test is repeated using a GPTD in a different Tone Detector circuit pack. If the values are still out of the limits, the test will fail.

For the last part of the test, the Tone Generator is told to generate tones that are assigned a dedicated time slot (that is, dial tone). A Tone Detector GPTD listens for the tones and measures the quality of the tone. If any of the measured values are not within limits, the test is repeated using a GPTD in a different Tone Detector circuit pack. If the values are still out of the limits, the test will fail.

Test #40 Tone Generator Transmission Test		
Error Code	Test Result	Description / Recommendation
None	ABORT	The system was not able to allocate all the resources needed for this test or there was an Internal System Error.
1	ABORT	The system could not allocate all the resources needed to test the DTMF tones.
1001	ABORT	The system was not able to put the tone generation facility in the appropriate mode to test it.
1002	ABORT	The system could not allocate time slots for the test connection. This could happen when the system is heavily loaded. If the system is not heavily loaded, then test the TDM Bus via the test tdm command. Refer to TDM-BUS maintenance documentation for details. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test connection. This could happen when the system is heavily loaded or there is not a Tone Detector circuit pack in the port network where this test is being executed. 1) Make sure there is a Tone Detector circuit pack in the same port network. 2) If a Tone Detector circuit pack is missing, install one in the same port network. 3) Allow approximately 1 minute for Tone Detector maintenance to run on the new inserted Tone Detector circuit pack. 4) Retry the command at 1 minute intervals a maximum of 5 times. 5) If the test continues to abort, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #40 Tone Generator Transmission Test (Contd)		
Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1(a)	FAIL	DTMF generation failed.
101(a)	FAIL	Generation of dial tone failed.
102(a)	FAIL	Generation of ring back failed.
103(a)	FAIL	Generation of busy tone failed.
104(a)	FAIL	Generation of reorder failed.
105(a)	FAIL	Generation of dial tone failed.
106(a)	FAIL	Generation of recall dial tone failed.
107(a)	FAIL	Generation of confirmation tone failed.
109(a)	FAIL	Generation of intercept tone failed.
110(b)	FAIL	Generation of 2225-Hz level invalid.
111(b)	FAIL	Generation of 404-Hz level invalid.
112(b)	FAIL	Generation of 1004-Hz low level invalid.
113(b)	FAIL	Generation of 1004-Hz high level invalid.
114(b)	FAIL	Generation of 2804-Hz level invalid.
115(b)	FAIL	Generation of digital milliwatt level invalid.
116(b)	FAIL	Generation of count sequence invalid.(c)
121(a)	FAIL	Generation of quiet tone failed.
	PASS	The tone generation facility is able to generate and transmit all the tones.

For all the failure cases of Test #40, do the following:

1. Run the long test sequence: test tone/clock long repeat 1
2. If the problem persists, then replace the Tone/Clock circuit pack by following the steps outlined in the "How to Replace the Tone/Clock Circuit Pack" section.

Notes:

- (a) All the failure error codes marked with (a) may affect the user if the failure is on the active tone generator. When the tone generation facility fails in this way, the Tone/Clock circuit pack should be replaced promptly.
- (b) All the failure error codes marked with (b) are almost transparent to the user. Users may/may not hear any noisy tones. This type of failure affects maintenance on other objects. Maintenance may not be able to run on other objects which use the tone generation facility (that is, Tone Detector circuit pack maintenance). In this case, the Tone/Clock circuit pack can be replaced as suitable to the customer.

Tone Generator Update/Audit Test (#41)

The active tone generation facility is refreshed with all the time slot tone information. This test also triggers in-line error messages the Tone/Clock circuit pack generates when it detects problems by itself.

Test #41 Tone Generator Update/Audit Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	The system was not able to allocate all the resources needed for this test. 1) Wait 1 minute and try again.
2100	ABORT	System resources required for this test are not available.
	FAIL	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to fail, escalate the problem.
	PASS	The tone generation facility has been successfully refreshed with its translation. Display the Hardware Error Log via the display errors command to make sure this circuit pack did not generate new errors.

Tone Generator Crosstalk Test (#90)

The Tone Generator Crosstalk Test tests the ability of the Tone Generator to talk on a specific time slot. The tone generation facility is told to talk on a specific time slot and then the rest of the idle time slots are checked to make sure the Tone Generator put the tone only on the time slot specified.

Test #90 Tone Generator Crosstalk Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	Internal System Error 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem. 3) The idle-test() or isolate-ts() could have failed to allocate resources.
1001	ABORT	The system was not able to put the tone generation facility in the appropriate mode to test it.
1002	ABORT	The system could not allocate time slots for the test connection. This could happen when the system is heavily loaded. If the system is not heavily loaded, then test the TDM Bus via the test tdm command. Refer to TDM-BUS maintenance documentation for details.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The Tone Generator could be defective. 1) Test the Tone/Clock circuit pack again via the test tone/clock command. 2) If the test fails again, look at the Hardware Error Log for Tone Detector circuit pack errors. 3) If there are Tone Generator circuit pack errors, refer to Tone Generator maintenance documentation (TONE-PT, DTMR-PT, GPTD-PT) to resolve these errors first. 4) If there are no Tone Detector circuit pack errors, then the Tone/Clock circuit pack should be replaced by following the procedures in the "How to Replace the Tone/Clock Circuit Pack" section.
	PASS	The tone generation facility is able to put tones out.

TTR-LEV (TTR Level)

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
TTR-LEV	WARNING	See note (a)	TTR Level

Note:

(a) See the "Repair Procedure for the ITR Level" section.

TTR Level Maintenance

A TN748 Tone Detector circuit pack provides touch-tone receivers (TTRs or DTMR-PTs) which are devices used to interpret touch-tone calling signals and to translate the dual tones into the following valid digits: 0 through 9, *, and #. A Tone Detector circuit pack is a resource shared by all PBX users. The term "touch-tone" formerly bore an AT&T trademark while the term "dual tone multi-frequency receiver" has been the generic term used for this kind of device. A Tone Detector circuit pack also has general purpose tone detector ports (GPTD-PTs) to detect call progress tones, modem answer tones, and transmission test tones.

When a user places a call from a digital or analog voice terminal on the switch, a TTR is needed to interpret the dual tone multi-frequency signals sent from the voice terminal. The TTR is in use until the total number of digits needed is collected or until a time-out occurs. Dial tone is supplied to a user after receipt of an off-hook signal which signifies that a TTR is connected and ready to receive digits. For example, if there are 20 TTRs in the system being used simultaneously by 20 users at a given time, then the 21st user will not receive dial tone until a TTR becomes available. For this reason, it is necessary to have sufficient tone detectors in the system to prevent delay in receiving dial tone. The TTR-LEV errors can be used to determine a shortage of tone detectors. The minimum threshold values, assigned on the Maintenance-Related System Parameters Form for TTRs (DTMR-PTs) and CPTRS (GPTD-PTs), should match the number of TTRs and tone detectors (GPTD-PTs) in the system. The numbers are 4 TTRs and 2 GPTDs for each Tone Detector circuit pack (TN748, TN748B, TN748C, and the TN756 Combined Tone Detector/Tone/Clock in a single-carrier cabinet system) used in the switch. The threshold values are administered via the change system-parameters maintenance command on the Maintenance-Related System Parameters Form. The desired numbers are entered in the "TTR" (DTMR-PT) and "CPTR" (GPTD-PT) fields, respectively.

The ITR-LEV (TTR Level) maintenance object represents the following possible events:

1. The total number of General Purpose Tone Detector Ports (GPTD-PTs), also known as Call Progress Tone Receiver (CPTR), currently in service is less than the administered threshold number.
2. The total number of Dual Tone Multi-Frequency Receiver Ports (DTMR-PTs), also known as Touch-Tone Receiver (TTR), currently in service is less than the administered threshold number.

The TTR Level maintenance performs a monitoring function. When one of the preceding events occurs, the switch will report it. The system, at this point, is still operating properly but the system capacity will be reduced.

The preceding events can occur if:

- a. The threshold number of GPTD-PTs or the threshold number of DTMR-PTs for service is administered incorrectly. These thresholds are administered using the change system-parameters maintenance craft command.
- b. Too many GPTD-PTs or DTMR-PTs have been taken out-of-service (that is, busied out by craft or maintenance has taken the ports out-of-service).
- c. Insufficient number of GPTD-PTs or DTMR-PTs in the system.

Repair Procedure for the TTR Level

The following is a step-by-step approach to resolve the TTR Level maintenance alarm.

1. Execute the display error craft command. Determine if the TTR Level warning alarm is raised against the GPTD-PT level or the DTMR-PT level. The error type field of the TTR-LEV maintenance object will have a value of 2 for DTMR level or a value of 4 for GPTD level. See Hardware Error Log for more information.

Perform the actions described in Step 2 for either the DTMR-PT or the GPTD-PT.

2. Issue the change system-parameters maintenance craft command. Check the administered value for the desired number of GPTD-PTs or the desired number of DTMR-PTs for service. If the threshold value is set too high, change it to a lower value and wait 1 minute for the alarm to clear.

To determine the correct TTR and CPTR values, check the total number of Tone Detector circuit packs (for example, TN748, TN748B, TN748C, TN756 combine tone detector and tone clock) current in the system. A Tone Detector circuit pack has 2 GPTD-PTs and 4 DTMR-PTs. Verify that the total number of GPTD-PTs or DTMR-PTs is greater than or equal to the respective administered threshold value. If the total number is not greater than or equal, then either (a) add more Tone Detector circuit packs to the system as required or (b) reduce the threshold to match the number in the system. If after (a) adding more Tone Detector circuit packs or (b) reducing the threshold, the TTR level alarm "is still present, then proceed to Step 3.

If this does not clear the TTR Level alarm, proceed to Step 3.

3. Execute the display error craft command. Look for GPTD or DTMR port that has been busied out. A port that has been busied out will have a value of 18 in the error type field of the Hardware Error Log.

For each of the busied out ports, use the following procedure:

- Determine why the port was busied out.
- If the port can be placed back in service, then test the port via the test port CSSpp craft command.
- If all the tests pass, release the port via the release port CSSpp craft command and wait 1 minute for the TTR Level alarm to clear.

If this does not clear the ITR Level alarm, proceed to Step 4.

4. Execute the display alarm craft command. Determine the address of the Tone Detector circuit pack(s) which contains the defective (alarmed) GPTD-PT(s) or DTMR-PT(s).

Execute the test board CSS long rep 3 craft command 'where CSS is the address of the Tone Detector circuit pack that contains the defective (alarmed) GPTD-PT(s) or DTMR-PT(s).

If this does not clear the TTR Level alarm, proceed to Step 5.

5. At this point, the only way to clear the alarm is to replace the Tone Detector circuit pack(s) that contains the defective (alarmed) GPTD-PT(s) or DTMR-PT(s).

Hardware Error Log Entries and Test to Clear Values

TTR Level (TTR-LEV) Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	None
1(a)	1	None	None	None	None
2(b)	2		WARNING	OFF	
3(c)	3	None	None	None	None
4(d)	4		WARNING	OFF	

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This is NOT an error. This indicates that the total number of DTMR ports in service is greater than or equal to the administered threshold number for service.
- (b) This error indicates that the total number of DTMR ports currently in service is less than the administered threshold number for service. To clear the alarm, see the “Repair Procedure for the TTR Level”.
- (c) This is NOT an error. This indicates that the total number of GPTD ports in service is greater than or equal to the administered threshold number for service.
- (d) This error indicates that the total number of GPTD ports currently in service is less than the administered threshold number for service. To clear the alarm, see the “Repair Procedure for the TTR Level”.

XXX-BD (Common Port Board)

MO Name As It Appears in Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name Of MO
XXX-BD(b)	MAJOR	test board CSS	Common Port Board Maintenance
XXX-BD	MINOR	test board CSS	Common Port Board Maintenance
XXX-BD	WARNING	test board CSS	Common Port Board Maintenance

(a) where C is the carrier number (for example, A, B, C, D, or E); and SS is the address of the slot in the carrier where the circuit pack is located (for example, 01, 02, . . . etc.)

(b) Refer to the appropriate circuit pack documentation to get the correct MO name displayed in this field. It usually ends with BD.

The Common Port Board maintenance is a set of common tests used by all the circuit packs listed in this section.

The common portion of these circuit packs is the generic hardware that interfaces with the TDM Bus.

The circuit packs included in this category are:

•Trunk port circuit packs:

CODE	DESCRIPTION	MO NAME
TN747	CO Trunk	CO-BD
TN747B	CO Trunk	CO-BD
TN753	DID Trunk	DID-BD
TN760	Tie Trunk	TIE-BD
TN760B	Tie Trunk	TIE-BD
TN722	DS1 Tie Trunk	DS1-BD
TN722B	DS1 Tie Trunk	DS1-BD
TN763	Auxiliary Trunk	AUX-BD
TN763B	Auxiliary Trunk	AUX-BD

- Station port circuit packs:

CODE	DESCRIPTION	MO NAME
TN735	MET Line	MET-BD
TN742	Analog Line	ANL-BD
TN742B	Analog Line	ANL-BD
TN769	Analog Line	ANL-BD
TN746	Analog Line	ANL-BD
TN762	Hybrid Line	HYB-BD
TN7626	Hybrid Line	HYB-BD
TN754	Digital Line	DIG-BD
TN784	Digital Line	DIG - B D

- Data port circuit packs:

C O D E	DESCRIPTION	MO NAME
TN726	Data Line	DT-LN-BD
TN758	Pooled Modem	MODEM-BD

- Service port circuit packs:

CODE	DESCRIPTION	MO NAME
TN748	Tone Detector	DETR-BD
TN748B	Tone Detector	DETR-BD
TN756	Tone Detector/Generator	TONE-BD
TN714	Tone/Clock	TONE-BD
TN741	Tone/Clock	TONE-BD
TN768	Tone/Clock	TONE-BD
TN750	Announcement	ANN-BD
TN725	Speech Synthesizer	S-SYN-BD
TN725B	Speech Synthesizer	S-SYN-BD
TN765	Processor Interface	PROT-BD
TN727	Network Controller	DATA-BD

Handling Common Port Circuit Packs

When any of the Common Port circuit packs (except the TN754 Digital Line and TN758 Pooled Modem circuit packs) are physically removed from the backplane, no alarm will be logged for approximately 11 minutes. In the case of the Digital Line and Pooled Modem circuit packs, approximately 21 minutes will elapse before an alarm is logged. When a circuit pack that has been removed is alarmed, the alarm type is MINOR and is classified as an on-board alarm. The time delay permits maintenance activity to be performed without triggering an additional alarm. An alarm will only be logged against a Common Port circuit pack on which ports have been administered.

Note: In a heavily loaded system, the interval between the removal of a Common Port circuit pack and the logging of the alarm may be several minutes longer. .

Hardware Error Log Entries and Test to Clear Values

Common Port Board Maintenance Error Log Entries					
Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0†	0	Any	Any	Any	test board CSS
1 (a)	0	SAKI Test (#53)	MINOR	ON	
18 (b)	0	busyout board CSS	WARNING	OFF	release board CSS
23 (C)	0	None	WARNING	OFF	
257	65535	Control Channel Test (#52)	MINOR	ON	test board CSS s r 20
257 (d)	0	None			
513 (e)	4352	None			
513 (e)	4353	None			
513 (e)	4355	None			
513 (e)	4357	None			
769 (f)	4358	None			
1025 (g)	4363	NPE Audit Test (#50)			test board CSS l r 20
1281 (h)		Ring Application Test (#51)	MINOR	ON	test board CSS r 2
1538 (i)	Any	None	MINOR	ON	
1793 (j)		Neon Test (#220)	MINOR	ON	test board CSS r 2
3840 (k)	Any	None			
3840 (k)	Any	None			
3840 (k)	Any	None			
3840 (k)	Any	None			
3840 (k)	Any	None			

† Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Notes:

- (a) This error indicates the circuit pack totally stopped functioning or it was physically removed from the system. Check if the circuit pack is physically in the system (in the same slot as the error indicates). If the red LED is on, then replace the circuit pack.
- (b) This error indicates the circuit pack has been busied out. Release the circuit pack via release board CSS.
- (c) The circuit pack has been logically administered but not physically installed. The alarm will be cleared when the circuit pack is installed.
- (d) This error indicates transient communication problems with this circuit pack. This error is not service-affecting and can be ignored.
- (e) This error indicates the circuit pack has reported a hardware failure on the circuit pack. The circuit pack should be replaced.
- (f) This error can be ignored, but look for other errors on this circuit pack.
- (g) This error is not service-affecting and can be ignored.
- (h) This error indicates that no ringing current is detected. Run Test #51, Ringing Application Test, and follow the procedures for the test. This error is only applicable to Analog Line circuit packs.
- (i) The circuit pack is out-of-service. If the error happens again within 15 minutes, then replace the circuit pack.
- (j) This error indicates that no neon current is detected. Run Test #220, Neon Test, and follow the procedures for the test. This error is only applicable to TN769 and TN746 Analog Line circuit packs.
- (k) This error is. not service-affecting and can be ignored.

Craft-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *NPE Audit Test*, for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
NPE Audit Test (#50)		x	ND
Ringing Application Test (#51) (a)	x	x	ND
Control Channel Loop Around Test (#52)	x	x	ND
SAKI Sanity Test (#53) (b)		x	D
Neon Test (#220) (c)	x	x	ND

* D = Destructive
ND = Non-destructive

(a) Only applicable to Analog Line circuit packs.

(b) Only the Tone/Clock circuit pack and DS1 circuit packs include the SAKI Test as part of their long test sequence. All other common circuit packs can be reset via the reset board CSS command.

(c) Only applicable to TN746 and TN769 Analog Line circuit packs.

NPE Audit Test (#50)

The system sends a message to the on-board microprocessor to update the network connectivity translation for all the Network Processing Elements (NPEs) on the circuit pack.

Test #50 NPE Audit Test		
Error Code	Test Result	Description / Recommendation
none or 2100 1019	ABORT	System resources required for this test are not available.
	ABORT	Test already in progress.
	FAIL	Internal System Error
		1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	PASS	The circuit pack's NPEs have been updated with their translation.

Ringing Application Test (#51)

This test checks the ringing application circuitry common to all ports on an Analog Line circuit pack.

Test #51 Ringing Application Circuit Test		
Error Code	Test Result	Description / Recommendation
1 000 or 2100 2000 1004	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Could not allocate the necessary system resources to run this test. The circuit pack is not installed. Internal system error
	ABORT	Response to the request was not received within the allowable time period.
	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort and the port is idle, escalate the problem.
1008	ABORT	Could not allocate a ringing circuit. Either all the ringing circuits are in use or the ringing generator is defective or it is not wired correctly. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, run the test station <extension> command on other Analog (TN742, TN769, or TN746) circuit packs. If an ABORT 1008 occurs for this test on other circuit packs as well, then the ringing generator may be defective or isn't wired correctly. If it doesn't occur on the other ports, then all four ring generators are in use.

Test #51 Ringing Application Circuit Test (Contd)		
Error Code	Test Result	Description / Recommendation
	FAIL	No ringing current is detected. The ringing application circuitry on this circuit pack probably is not healthy. 1) Retry the command again. 2) Check if this test fails on other Analog circuit packs. If it does fail on other circuit packs, then there is a Ring Generator wiring problem. Check the wiring between the system and the ring generator. If it does not fail on other circuit packs, then replace the circuit pack. 3) Retry the command again. 4) If the test continues to fail, escalate the problem.
	PASS	Ringing current is detected or this vintage of Analog Line circuit pack does not support the Ringing Application circuit test. Analog Line circuit packs that DO NOT support Test #51 include TN712 vintage 13 and earlier and TN742 vintage 3 and earlier.

Control Channel Loop Around Test (#52)

This test queries the circuit pack for its circuit pack code and vintage and verifies its records.

Test #52 Control Channel Loop Around Test		
Error Code	Test Result	Description / Recommendation
none or 2100	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
	FAIL	The circuit pack failed to return the circuit pack code or vintage. 1) Retry the command a few times, a maximum of 5 times. 2) If the problem continues to fail, and if the circuit pack is one of the Port circuit packs, replace the circuit pack. Otherwise, if the circuit pack is one of the Processor Complex circuit packs, see "Handling the Network Control Circuit Pack" in Chapter 3 and replace the circuit pack. 3) Retry the command a few times, a maximum of 5 times. 4) If the test continues to fail, escalate the problem.
	PASS	Communication with this circuit pack is successful.

SAKI Sanity Test (#53)

This test is destructive.

This test resets the circuit pack.

This test is executed as part of the long test sequence only for the Tone/Clock circuit pack. All other common circuit packs can be reset via the reset board CSS command. The reset command executes this test.

Test #53 SAKI Sanity Test		
Error Code	Test Result	Description / Recommendation
none	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1005	ABORT	Wrong circuit pack configuration to run this test. This error applies only to DS1 circuit packs. It means the DS1 circuit pack is providing timing for the system and, therefore, it cannot be reset without major system disruptions. 1) If the circuit pack needs to be reset, then set synchronization to another DS1 circuit pack or the Tone/Clock circuit pack and try again.
1015	ABORT	Port is not out-of-service. 1) Busy out the circuit pack. 2) Execute command again.
2100	ABORT	System resources required for this test are not available. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.
1	FAIL	The circuit pack failed to reset.
2	FAIL	The circuit pack failed to restart. 1) Execute command again. 2) If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1) Run the short test sequence.

Neon Test (#220)

This test checks the voltage required to light the neon lamp on an analog terminal. A relay connects a 150-VDC source from the backplane of the board onto the voltage bus, and another relay connects a 2K shunt from the bus to ground. Current in the line is then monitored to determine if the voltage is present.

Test #220 Neon Test		
Error Code	Test Result	Description / Recommendation
None or 1018	ABORT	Cannot get the list of translated ports on the circuit pack. There are no translated ports on the circuit pack. 1) Make sure a TN752 or TN755 Power Unit is installed and at least one port is translated with neon. 2) Retry the command again. 3) If the test continues to abort, escalate the problem.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Could not allocate the necessary system resources to run this test. Internal system error
2000	ABORT	Response to the request was not received within the allowable time period.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the display port CSSpp command to determine the station extension. Use the status station command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to the Status Commands section in Chapter 4 for a full description of all possible states.) You must wait until the port is idle before retesting. 1) Retry the command at 1 minute intervals a maximum of 5 times. 2) If the test continues to abort, escalate the problem.

Test #220 Neon Test (Contd)		
Error Code	Test Result	Description / Recommendation
	FAIL	No neon current is detected. 1) Make sure a TN752 or TN755 Power Unit is installed. Also look for the failure of Test #220 on the other boards (TN746/TN769), if Test #220 fails on the other board too, replace the TN755 Power Unit. 2) Retry the command again. 3) If the test continues to fail, replace the circuit pack. 4) Retry the command again. 5) If the test continues to fail, escalate the problem.
	PASS	This circuit pack is a TN746 or TN769 Analog Line circuit pack and the neon current is detected. If this test passes, it can also mean that the circuit pack is not a TN746 or TN769 Analog Line circuit pack.

CHAPTER 7. REFERENCES

The following is an abbreviated listing of System 75 documents. Included is a brief description of each document in the list. For a complete listing of System 75 documents, refer to the *AT&T System 75—Documentation Guide and Subject Index, 555-200-010*.

AT&T Telecommunication Electrical Protection 350-060

Provides practical, functional information and application detail combined with training material for telecommunication engineers in the electrical protection field.

**DEFINITY Communications System and System 75 and System 85—
Terminals and Adjuncts Reference** 555-015-201

Provides concise physical and functional descriptions of the peripheral equipment that can be used with System 75 and System 85. It is intended as an aid for both AT&T and customer personnel in selecting appropriate components for these systems and in training and management.

AT&T System 75—Installation and Test 555-200-104

Provides the information necessary to perform the tasks of installing and testing the system's common equipment. Includes a description of the necessary tools and equipment.

AT&T System 75—Upgrades and Additions 555-200-106

Provides Procedures and information required to upgrade a R1V1 System 75 to a R1V2 or R1V3 System 75, to upgrade a R1V2 System 75 to a R1V3 System 75, and to make additions to an operational System 75, after the initial switch installation.

AT&T System 75—Wiring 555-200-111

Provides the information necessary for installing inside wiring for the AT&T System 75.

AT&T System 75—System Description 555-200-200

Provides a technical description of the system hardware, environmental and space requirements, and parameters. This document also provides a brief description of features and services.

DEFINITY Communications System Generic 1 and System 75— **555-200-201**
Feature Description

Provides a technical description of the Release 1 Version 1, Release 1 Version 2, and Release 1 Version 3 system features and parameters.

DEFINITY Communications System Generic 1 and System 75— **555-200-500**
Administration and Measurement Reports

Describes the management of the system's administration and operation. Includes the guidelines for initialization, reconfiguration, backup procedures, monitoring system performance, and maintaining system security. Includes a description of the tasks that can be performed via the System Access Terminal and the prerequisites for completion.

DEFINITY Communications System Generic 1 and System 75— **555-200-600**
Planning/Configuration

Provides a method for defining the customer's system requirements and for collecting the information used to estimate System 75 hardware Requirements.

AT&T System 75—Implementation—Release 1 Version 1* **555-200-650**

AT&T System 75 and System 75 XE—implementation—Release 1 **555-200-651**
Version 2*

AT&T System 75 and System 75 XE—Implementation—Release 1 **555-200-652**
Version 3*

* Provides the procedures and associated forms for collecting system and terminal software information. This information is used to initialize the system using the System Access Terminal. Each document supports the version system indicated in the title.

DEFINITY Communications System Generic 1 and System 75— **555-200-700**
Console Operation

Provides "how-to-operate" instructions for the attendant console. Serves as a reference when defining the console control keys and Incoming Call Identification requirements.

DEFINITY Communications System Generic 1 and System 75—Voice **555-200-701**
Terminal Operation

Describes all the voice features and provides the "how-to-operate" instructions for each voice terminal. Serves as a reference when defining user requirements.

AT&T System 75—Automatic Call Distribution (ACD)—Agent Instructions 555-200-722

Provides information for use by agents after training is completed. The various ACD features are described and the procedures for using them are provided in this document. The information in this document applies only to Release 1 Version 3 systems.

DEFINITY Communications System Generic 1 and System 75—Hospitality Operations 555-200-723

Contains the procedures for using the Hospitality Services of AT&T System 75, Release 1 Version 3. These services include a group of System 75-based features that support the lodging industry. Hotels and motels use the features to improve their property management and to provide assistance to their employees and clients.

AT8LT System 75—Automatic Call Distribution (ACD)—Supervisor Instructions 555-200-724

Provides information for use by supervisors after training is completed. The various ACD features are described and the procedures for using them are provided in this document. The information in this document applies only to Release 1 Version 3 systems.

AUDIX-M—Maintenance Service Manual 585-300-104

Provides the information necessary to identify problems, repair failed devices, and verify normal operation of the AUDIX-M. It also contains information on preventive maintenance.

Technical and Administration Escalation Plan

Identifies the four levels of field maintenance support (Tiers 1, 2, 3, and 4) and explains the procedures for escalating troubles between each level.

User instructions are also available for all terminals.

CHAPTER 8. ABBREVIATIONS AND ACRONYMS

A

ACA	Automatic Circuit Assurance
ACD	Automatic Call Distribution
ADU	Asynchronous Data Unit
ALU	Arithmetic and Logic Unit
AP	Applications Processor
AP/A	Applications Processor/Adjunct
Aux	Auxiliary
APLT	Advanced Private Line Termination
AUDIX	Audio Information Exchange

C

CCMS	Control Channel Message Set
CDRR	Call Detail Recording and Reporting
c o	Central Office
Codec	Coder/Decoder
CPE	Client-Provided Equipment
CPTR	Call Progress Tone Receiver
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
Cs s o	Customer Service Support Operations

D

DCE	Data Communications Equipment
DCP	Digital Communications Protocol
DID	Direct Inward Dialing
DLC	Data Line Circuit
DLI	Digital Line Interface
DMI	Digital Multiplexed Interface
DSP	Digital Signal Processor
DRAM	Dynamic Random-Access Memory
DTDM	Digital Terminal Data Module
DTMR	Dual Tone Multifrequency Receiver
DUCK	Data USART Clock

E

EIA	Electronic Industries Association
EMI	Electromagnetic Interference
EPF	Electronic Power Feed

EPROM Erasable Programmable Read-Only Memory

G

GPTD General Purpose Tone Detector

H

HCMR High Capacity Minirecorder

I

ID Identification
INADS Initialization and Administration System
I/O Input/Output

L

LED Light-Emitting Diode

M

MET Multibutton Electronic Telephone
MO Maintenance Object
Modem Modulator-Demodulator
MPSC Multi-Programmable Serial Controller

N

NCTE Network Circuit Terminating Equipment
NETCON Network Control
NMI Non-Maskable Interrupt
NPE Network Processing Element

P

PBX Private Branch Exchange
PCM Pulse Code Modulated
PD Processor Data
PDM Processor Data Module
PIC Programmable Interrupt Controller
PPM Parts Per Million
PSS Programmable Speech Synthesizer

R

RAM	Random-Access Memory
ROL	Readable Output Latch
ROM	Read-Only Memory
RTX	Real-Time Operating System

S

SAKI	Sanity and Control Interface
SAT	System Access Terminal
SC	Switch Communication
SMDR	Station Message Detail Recording
SPE	Switch Processing Element

T

TAC	Trunk Access Code
TD	Trunk Data
TDM	Time Division Multiplexer
TRIC	Transmit and Receive I-Channel Controller
TTR	Touch-Tone Receiver
TTT	Terminating Trunk Transmission

U

UDP	Uniform Dial Plan
USART	Universal Synchronous/Asynchronous Receiver and Transmitter

X

XACK	Transfer Acknowledge

CHAPTER 9. GLOSSARY

Access Code

A 1-, 2-, or 3-digit dial code used to activate or cancel a feature or access an outgoing trunk. The star (*) and pound (#) can be used as the first digit of an access code.

Access Tie Trunks

Tie trunks used to handle normal ETN calls between Main and Tandem switches.

Administer

To access and change the parameters associated with the services or features of the system.

Answer-Back Code

A code dialed to retrieve a parked call.

Appearance

See Call Appearance.

Applications Processor

A minicomputer used to support several user-controlled applications such as traffic analysis and electronic documentation.

Asynchronous Data Transmission

A scheme for transmitting data where each character is preceded by a start bit and followed by a stop bit, thus permitting data elements to occur at irregular intervals. This type transmission is advantageous when transmission is not regular (characters typed at a keyboard).

Asynchronous Data Unit (ADU)

A data communications equipment (DCE) type device that allows direct connection between RS-232C equipment and the system digital switch.

Attendant

The operator of the console.

Attendant Console

An electronic call-handling position with pushbutton control.. Used by attendants to answer and place calls and to manage and monitor some of the system operations.

Automatic Trunk

A trunk that does not require the sending or receiving of digits. The destination is predetermined. A request for service on the trunk (called a seizure) is sufficient to route the call. The normal destination of an automatic trunk is the system attendant group.

Barrier Code

A security code used with the Remote Access feature to prevent unauthorized access to the system.

Bit (Binary Digit)

One unit of information in binary notation (having two possible states or values, zero or one).

Bridge (Bridging)

The connection of one or more calls onto an existing connection without interrupting the connection.

Bridged Appearance

A call appearance on a voice terminal that matches a call appearance on another voice terminal for the duration of a call.

Buffer

A circuit or component that isolates one electrical circuit from another. Typically, a buffer holds data from one circuit or process until another circuit or process is ready to accept the data.

Bus

A multi-conductor electrical path used to transfer information over a common connection from any of several sources to any of several destinations.

Bus, Time Division Multiplex

See Time Division Multiplex Bus.

Business Communications Terminal

An advanced series of semi-intelligent terminals.

Bypass Tie Trunks

One-way, outgoing tie trunks from a Tandem switch to a Main switch in an ETN. These trunks are used as a “last-choice” route when all trunks to another Tandem switch are busy.

Byte

A sequence of bits, 8 bits long, that is usually shorter than a word. A word is 16 bits long.

Call Appearance, Attendant Console

Six buttons, labeled a through f, used to originate, receive, and hold calls. Each button has two associated lamps to show the status of the call appearance.

Call Appearance, Voice Terminal

A button labeled with an extension number used to place outgoing calls, receive incoming calls, or hold calls. Two lamps next to the button show the status of the call appearance or status of the call.

Callback Call

A call that is automatically returned to a voice terminal user who activated the Automatic Callback or Ringback Queuing feature.

Call Waiting Ringback Tone

A low-pitched tone identical to the ringback tone except the tone decreases the last 0.2 second. This tone notifies the attendant that the Attendant Call Waiting feature has been activated and that the called user is aware of the waiting call.

Central Office

The location housing telephone switching equipment that provides local telephone service and access to toll facilities for long-distance calling.

Central Office Codes

The first three digits of a 7-digit public network telephone number. These codes are numbered from 200 through 999.

Central Office Trunk

A telecommunications channel that provides access from the system to the public network through the local central office.

Channel

A communications path for transmitting voice and data.

Class of Restriction (COR)

A number (0 through 63) that specifies the restrictions assigned to voice terminals, voice terminal groups, data modules, and trunk groups.

Class of Service (COS)

A number (0 through 15) that specifies if voice terminal users can activate the Automatic Callback, Call Forwarding-All Calls, Data Privacy, or Priority Calling features.

Common Control Switching Arrangement (CCSA)

A private telecommunications network using dedicated trunks and a shared switching center for interconnecting company locations.

Confirmation Tone

Three short bursts of tone followed by silence; indicates that the feature activated, deactivated, or canceled has been accepted.

Console

See Attendant Console.

Coverage Answer Group

A group of up to eight voice terminals that ring simultaneously when a call is redirected by Call Coverage. Any one of the group can answer the call.

Coverage Call

A call that is redirected from the called party's extension number to an alternate answering position when certain criteria are met.

Coverage Path

The order in which calls are redirected to alternate answering positions.

Coverage Point

The attendant positions (as a group), Direct Department Calling group, Uniform Call Distribution group, Coverage Answer Group, a voice terminal extension, or Message Center designated as an alternate answering position in a coverage path.

Covering User

The person at an alternate answering position who answers a redirected call.

Data Channel

A communications path between two points used to transmit digital signals.

Data Communications Equipment (DCE)

The equipment on the network side of a communications link that provides all the functions required to make the binary serial data from the source or transmitter compatible with the communications channel.

Data Terminal Equipment (DTE)

Equipment comprising the source or link of data, or both, that also provides communication control functions (protocol). DTE is any piece of equipment at which a communications path begins or ends.

Delay-Dial Trunk

After a request for service (called a seizure) is detected on an incoming trunk, the system sends a momentary signal followed by a steady tone over the trunk. This informs the calling party that dialing can start. This type of trunk allows dialing directly into the system. That is, the digits are received as they are dialed.

Designated Voice Terminal

The specific voice terminal to which calls, originally directed to a certain extension number, are redirected. Commonly used to mean the “forwarded-to” terminal when Call Forwarding All Calls is active.

Dial Repeating Tie Trunk

A telecommunications channel between two private switching systems. The number dialed is repeated or dialed-in at the distant end.

Digital Communications Protocol (DCP)

Defines the capability for providing simultaneous voice and data transmission over the same channel.

Distributed Communications System (DCS)

A cluster of from 2 to 20 private communications switches, interconnected among several geographic locations. An attribute of a DCS configuration that distinguishes it from other networks is that it appears as a single switch with respect to certain features.

Digital Data Endpoints

In System 75, digital data endpoints include the following:

- 510D Terminals or 515-Type Business Communications Terminals
- 7404D Terminals
- 7407D Equipped With Optional Data Module Base
- Asynchronous Data Units
- Digital Terminal Data Modules
- (Modular) Processor Data Modules
- (Modular) Trunk Data Modules
- Internal Data Channels

Digital Multiplexed Interface (DMI)

Specifies the remote interface requirements for multiplexed data communications between a host computer and a private switching system.

Digital Terminal Data Module (DTDM)

An adjunct to Model 7403D or 7405D voice terminals. Provides the required interface between the system and a data terminal such as a 513 Business Communications Terminal.

Digital Trunk

A circuit in a telecommunications channel designed to handle digital voice and data.

Direct Extension Selection (DXS)

An option at the attendant console that allows an attendant direct access to voice terminals by pressing a Group Select button and a DXS button.

Electronic Tandem Network (ETN)

A special tandem tie trunk network that has automatic call routing capabilities based on the number dialed and most preferred route available at the time the call is placed. Each switch in the network is assigned a unique private network office code (RNX) and each voice terminal is assigned a unique extension number.

Endpoint Node

A node (switch), within a Distributed Communications System (DCS), that cannot receive information from one node and pass it on to another node.

End-to-End Signaling

The transmission of touch-tone signals generated by dialing from a voice terminal user to remote computer equipment. A connection must first be established over an outgoing trunk from the calling party to the computer equipment. Then additional digits can be dialed to transmit information to be processed by the computer equipment.

Enhanced Private Switched Communications Service (EPSCS)

A private telecommunications network that provides advanced voice and data telecommunications services to companies with many locations.

Extension Number

A 1- through 5-digit number assigned to each voice terminal, certain groups, data modules, 510 Personal Terminals, and 515 Business Communications Terminals within the system. A 1- or 5-digit number is available for Version 2 only.

External Call

A connection between a system user and a party on the public telephone network or on a tie trunk.

Facility

A general term used for the telecommunications transmission pathway and associated equipment.

Feature

A specifically defined function or service provided by the system.

Feature Button

A labeled button on a voice terminal or attendant console designating a specific feature.

Foreign Exchange (FX)

A central office other than the one providing local access to the public telephone network.

Foreign Exchange Trunk

A telecommunications channel that directly connects the system to a central office other than its local central office.

Foreign Numbering Plan Area Code

An area code other than the local area code. The foreign area code must be dialed to call outside the local geographic area. .

Ground-Start Trunk

On outgoing calls, System 75 transmits a request for services to the distant switching system by grounding the trunk ring lead. When the distant system is ready to receive the digits of the called number, that system grounds the trunk tip lead. When System 75 detects this ground, the digits are sent. (Tip and ring are common nomenclature to differentiate between ground-start trunk leads.) On incoming calls, detection of ground on the ring lead is sufficient to cause the call to route to a predetermined destination, normally the system attendant group. No digits are received.

Handshaking Logic

A format used to initiate a data connection between two data module devices.

Home Numbering Plan Area Code

The local area code. The area code does not have to be dialed to call numbers within the local geographic area.

Immediate-Start Tie Trunk

After establishing a connection with the distant switching system for an outgoing call, the system waits a nominal 65 milliseconds before sending the digits of the called number. This allows time for the distant system to prepare to receive the digits. Similarly, on an incoming call, the system has less than 65 milliseconds to prepare to receive the digits.

Information Exchange

The exchange of data between users of two different systems (System 75 and host computer) over a local area network.

In-Use Lamp

A red lamp on a multi-appearance voice terminal that lights to show which call appearance will be selected when the handset is lifted or which call appearance is active when a user is off-hook.

Intercept Tone

An alternating high and low tone; indicates a dialing error or denial of the service requested.

Interface

A common boundary between two systems or pieces of equipment.

Internal Call

A connection between two users within the system.

Link

A transmitter-receiver channel or system that connects two locations.

Loop-Start Trunk

After establishing a connection with the distant switching system for an outgoing call, System 75 waits for a signal on the loop formed by the trunk leads before sending the digits of the called number. On incoming calls, the received request for service is sufficient to cause the call to route to a predetermined destination, normally the system attendant group. No digits are received.

Main/Satellite/Tributary

A Main switch provides: interconnection, via tie trunks, with one or more subtending switches, called Satellites; all attendant positions for the Main/Satellite configuration; and access to and from the public network. To a user outside the complex, a Main/Satellite configuration appears as a single switch, with a single Listed Directory Number (LDN). A Tributary is a switch, connected to the Main via tie trunks, but which has its own attendant position(s) and its own LDN.

Message Center

An answering service for calls that might otherwise go unanswered; an agent accepts and stores messages for later retrieval. (Requires an Applications Processor.)

Message Center Agent

A person within the Message Center who takes and retrieves messages for voice terminal users.

Modular Processor Data Module

See Processor Data Module.

Modular Trunk Data Module

See Trunk Data Module.

Modem Pooling

Provides shared-use conversion resources that eliminate the need for a dedicated modem when a data module accesses, or is accessed by, an analog line or trunk.

Multi-Appearance Voice Terminal

A terminal equipped with several call appearance buttons for the same extension number. Allows the user to handle more than one call, on that same extension number, at the same time.

Multiplexer

A device for simultaneous transmission of two or more signals over a common transmission medium.

Network

An arrangement of inter and/or intra location circuits designed to perform specific functions.

Paging Trunk

A telecommunications channel used to access an amplifier for loudspeaker paging.

Pickup Group

A group of individuals authorized to answer any call directed to an extension number within the group.

Port

A designation of the location of a circuit that provides an interface between the system and lines and/or trunks.

Principal (User)

With Call Coverage, a person for whom a call was originally intended.

Private Network

A network used exclusively for handling the telecommunications needs of a particular customer.

Private Network Office Code (RNX)

The first three digits of a 7-digit private network number. These codes are numbered 220 through 999, excluding any codes that have a 0 or 1 as the second digit.

Processor Data Module (PDM)

Provides the required interface between the system and an EIA computer or data terminal.

Protocol

A set of conventions or rules governing the format and timing of message exchanges to control data movement and correction of errors.

Public Network

The network that can be openly accessed by all customers for local or long-distance calling.

Queue

An ordered sequence of calls waiting to be processed.

Queuing

The process of holding calls in order of their arrival to await connection to an attendant, to an answering group, or to an idle trunk. Calls are automatically connected in first-in, first-out sequence.

Random Access Memory (RAM)

A storage arrangement whereby information can be retrieved at a speed independent of the location of the stored information.

Read Only Memory (ROM)

A storage arrangement primarily for information retrieval applications.

Recall Dial Tone

Three short bursts of tone followed by steady dial tone; indicates the system has completed some action (such as holding a call) and is ready to accept dialing.

Redirection Criteria

The information administered for each voice terminal that determines when an incoming call is redirected to coverage.

Remote Home Numbering Plan Area Code (RHNPAC)

A foreign numbering plan area code that is treated as a home area code by the Automatic Route Selection feature. Calls can be allowed or denied based on the area code and the dialed central office code rather than just the area code. If the call is allowed, the Automatic Route Selection pattern used for the call is determined by these six digits.

Reorder Tone

A fast-busy *tone* repeated 120 times a minute; indicates that at least one of the facilities, such as a trunk or a digit transmitter, required for the call was not available at the time the call was placed.

Single-Line Voice Terminals

Voice terminals served by a single-line tip and ring circuit (Models 500, 2500, 2554, 7101 A, 7103A, and 7104A).

Software

A set of computer programs that accomplish one or more tasks.

Split

A condition whereby a caller is temporarily separated from a connection with the attendant. This split condition automatically occurs when the attendant, active on a call, presses the Start button.

Standard Serial Interface (SSI)

A communications protocol developed by AT&T Teletype Corporation for use with the 500 Business Communications Terminals and the 400-series printers.

Status Lamp

A green lamp that shows the status of a call appearance or a feature button by the state of the lamp (lighted, flashing, fluttering, broken flutter, or dark).

Switchhook

The button(s) on a voice terminal located under the receiver.

Synchronous Data Transmission

A scheme for sending and receiving data, where data elements may occur only at regular specified times. Sending and receiving devices must operate in step with each other.

System Manager

A person responsible for specifying and administering features and services for the system.

System Reload

A process that allows stored data to be written from a tape into the system memory (normally after a power outage).

Tandem Switch

A switch within an ETN that provides the logic to determine the best route for a network call, possibly modifies the digits outpulsed, and allows or denies certain calls to certain users.

Tandem Through

The switched connection of an incoming trunk to an outgoing trunk without human intervention.

Tandem Tie Trunk Network

A private network that interconnects several customer switching systems by dial repeating tie trunks. Access to the various systems is dictated by codes that must be individually dialed for each system.

Tie Trunk

A telecommunications channel that directly connects two private switching systems.

Time Division Multiplex Bus

A special bus that is time shared by preallocating short time slots to each transmitter on a regular basis. In a PBX, all port circuits are connected to the time division multiplex bus permitting any port to send a signal to any other port.

Tone Ringer

A device with a speaker, used in electronic voice terminals to alert the user.

Trunk

A telecommunications channel between two switching systems.

Trunk Data Module

Provides the required interface between the system and a data set (modem) or data service unit connected to a private or switched data line.

Trunk Group

Telecommunications channels assigned as a group for certain functions.

Voice Terminal

A single-line or multi-appearance voice instrument that replaces the telephone.

Uniform Dial Plan

A feature that allows a unique number assignment (4- or 5-digit) for each terminal in a multi-switch configuration, such as a Distributed Communications System (DCS) or Main/Satellite/Tributary configuration.

Wide Area Telecommunications Service (WATS)

A service that allows calls to a certain area or areas for a flat-rate charge based on expected usage.

Wink-Start Tie Trunk

After establishing a connection with a distant switching system for an outgoing call, the system waits for a momentary signal (wink) before sending the digits of the called number. Similarly, on an incoming call, the system sends the wink signal when ready to receive digits.

Write Operation

The process of putting information onto a storage medium such as magnetic tape.

800 Service

A service that allows incoming calls from a certain area or areas to an assigned number for a flat-rate charge based on usage.

CHAPTER 10. INDEX

A

Abbreviations 8-1
 AC-POWER
 Maintenance Object 6-7
 Acronyms 8-1
 Adjunct Processor 6-83
 Aids, Trouble-Clearing 4-1
 Alarm and Status Indicators 2-18
 Alarm Log 5-2
 Alarm Reports
 Hardware 5-2
 Alarms, System 2-18
 ANL-16-L
 Maintenance Object 6-33
 ANL-BD
 Maintenance Object 6-33
 ANL-LINE, ANL-NE-L, ANL-BD 6-13
 ANN-BD
 Maintenance Object 6-51
 Announcement Circuit Pack 6-51
 ANN-PT
 Maintenance Object 6-71
 Assumption 1-2
 Attendant Console LEDs 2-21
 Automatic Circuit Assurance (ACA) 4-36
 AUX-BD
 Maintenance Object 6-87
 AUX-CAB
 Maintenance Object 6-83
 Auxiliary Trunk
 Circuit Pack 6-67
 port 6-87
 AUX-TRK
 Maintenance Object 6-87

B

Backup
 Recorded Announcements 3-28
 Backup for a System Without Duplication Option
 Tape 3-28
 Backup Procedures
 System 3-27
 Tape 3-27
 Busy Verification of Terminals and Trunks 4-37

Busyout Trunk Group 4-6
 Busyout Data Channel 4-4
 Busyout Data Module 4-5
 Busyout Extension 4-6
 Busyout Journal-Printer 4-5
 Busyout Link 4-5
 Busyout Modem Pool (V2 and V3) 4-5
 Busyout PMS-Link 4-5
 Busyout Pooled Modem (VI) 4-5
 Busyout Port 4-6
 Busyout Trunk 4-6
 Busyout/Release Commands 4-2

C

CABINET
 Maintenance Object 6-99
 Cabinet Sensors 6-99
 Carrier Port Power Supply 6-109
 CARR-POW
 Maintenance Object 6-109
 Cassette Tape Errors 3-29
 Cassette Tape Failures 3-29
 Cassette Tapes 3-28
 Circuit Breakers 2-16
 Circuit Pack, Port Replacement 3-7
 Circuit Packs, Port Handling 3-7
 Circuit Packs, Port Unseating/Reseating 3-7
 Clear Errors Command 4-6
 CO-BD
 Maintenance Object 6-119
 Cold Start With Translations Loading 3-22
 Cold Start Without Translations Loading 3-21
 Command
 Set Options 4-25
 Command, Clear Errors 4-6
 Command, Disable Synchronization 4-25
 Command, Display 4-6
 Command, Enable Synchronization 4-25
 Command Line Details 2-70
 Command, Monitor System 4-22
 Command, Recycle Carrier 4-23
 Command, Reset Board 4-24
 Command, Reset Interface 4-25

Command, Set Synchronization 4-25
 Command, Status 4-28
 Commands
 Used to Backup Recorded Announcements 3-28
 Used to Save Recorded Announcements 3-28
 Commands, Display Communications-interface Links 4-10
 Commands, Display Communications-Interface Processor-Channels 4-11
 Commands, List Configuration 4-15
 Commands, Maintenance 4-1
 Common Control Troubles 6-1
 Common Port Board Maintenance 6-545
 CONFIG
 Maintenance 6-135
 Configuration, Hardware 2-13
 Configuration Reports, Hardware 4-15
 Configuration Reports, Software 4-18
 Configuration, Software 2-12
 CO-TRK
 Maintenance Object 6-119
 Cursor Keys 2-2

D

Data Channel, Busyout 4-4
 Data Module, Busyout 4-5
 DATA-BD
 Maintenance Object 6-137
 DATA-CHL
 Maintenance Object 6-143
 DATA-CON
 Maintenance Object 6-171
 DAT-LINE
 Maintenance Object 6-775
 DC-POWER
 Maintenance Object 6-785
 DID-BD
 Maintenance Object 6-189
 DID-TRK
 Maintenance Object 6-189
 DIG-BD
 Maintenance Object 6-203
 DIG-LINE
 Maintenance Object 6-203
 Disable Synchronization Command 4-25
 Display Command 4-6
 Display Communications-Interface Links 4-10
 Display Communications-Interface Processor Channels 4-11
 DS1

DS1 (Continued)
 Trunk Circuit Pack 6-221
 DS1-BD
 Maintenance Object 6-221
 DT-LN-BD
 Maintenance Object 6-175
 DTMR-PT
 Maintenance Object 6-243
 Dual Tone Multi-Frequency Receiver Port (TTR) 6-243

E

Editing Keys: 2-2
 Emergency Transfer 2-16, 6-249
 EMG-XFER
 Maintenance Object 6-249
 Enable Synchronization Command 4-25
 ERR-LOG
 Maintenance Object 6-253
 Error Log 5-16, 5-18, 6-253
 Error Report 5-16
 EXT-DEV
 Maintenance Object 6-255
 Extension, Busyout 4-6
 External Alarm Lead 6-255

F

Facility Test Calls 4-37
 Feature, Terminal Alarm Notification (V3) 2-22
 Features, Automatic Circuit Assurance 4-36
 Features, Busy Verification of Terminals and Trunks 4-37
 Features, Trunk Group Busy/Warning Indicators to Attendant 4-37
 Features, Trunk Identification by Attendant 4-37
 Fuses 2-77

G

General 1-1
 General Purpose Tone Detector Port (CPTR) 6-259
 Glossary 9-1
 GPTD-PT
 Maintenance Object 6-259

H

Handling Port Circuit Packs 3-7
 Hardware Alarm Reports 5-2

Hardware Configuration 2-13
 Hardware Configuration Reports 4-15
 How to
 Backup Recorded Announcements 3-28
 Save Recorded Announcements 3-28
 HYB-BD
 Maintenance Object 6-265
 HYB-LINE
 Maintenance Object 6-265

|

INADS
 Maintenance Object 6-285
 INADS Link 6-285
 INADS/CPE Alarm Origination—
 Activation/Deactivation 3-1
 Indicators, Alarm and Status 2-18
 INFC1
 Maintenance Object 6-289
 INFC2
 Maintenance Object 6-291
 INFC3-BD
 Maintenance Object 6-293
 Interface, Maintenance 2-7
 Interface Port 6-295
 INT-PT
 Maintenance Object 6-295
 Introduction 1-1

J

Journal-Printer, Busyout 4-5
 JRNL-LNK
 Maintenance Object 6-297

L

Label Backup Tapes for a System Without Duplication
 Option 3-28
 Link, Busyout 4-5
 List Configuration Commands 4-15
 Log
 Alarm 5-2
 Error 5-16
 Login Procedure 2-9
 Logoff Procedure 2-11

M

MAINT
 Maintenance Object 6-303
 Maintenance Commands 4- I
 Maintenance Interface 2- I
 Maintenance Object
 AC-POWER 6-7
 ANL-16-L 6-33
 ANL-BD 6-33
 ANN-BD 6-51
 ANN-PT 6-71
 AUX-BD 6-87
 AUX-CAB 6-83
 AUX-TRK 6-87
 CABINET 6-99
 CARR-POW 6-109
 CO-BD 6-179
 CONFIG 6-135
 CO-TRK 6-119
 DATA-ED 6-137
 DATA-CHL 6-143
 DATA-CON 6-171
 DAT-LINE 6-175
 DC-POWER 6-185
 DID-BD 6-189
 DID-TRK 6-189
 DIG-BD 6-203
 DIG-LINE 6-203
 DS1-BD 6-221
 DT-LN-BD 6-175
 DTMR-PT 6-243
 EMG-XFER 6-249
 ERROR-LOG 6-253
 EXT-DEV 6-255
 GPTD-PT 6-259
 HYB-BD 6-265
 HYB-LINE 6-265
 INADS 6-285
 INFC1 6-289
 INFC2 6-291
 INFC3-BD 6-293
 INT-PT 6-295
 JRNL-LNK 6-297
 MAINT 6-303
 MEM-BD 6-317
 MET-LINE 6-321
 MIS 6-339
 MODEM-BD 6-341
 MODEM-PT 6-341
 PDMODULE 6-357
 P-INT-BD 6-355
 P4NT-PT 6-355
 PMS-LINK 6-373
 POWER 6-381
 PROCR 6-391

Maintenance Object (Continued)

- PROC-SAN 6-389
- SC-INTF 6-397
- SC-LINK 6-417
- S-SYN-BD 6-431
- S-SYN-PT 6-431
- SW-CTL 6-449
- TAPE 6-459
- TDM-BUS 6-479
- TDM-CLK 6-485
- TDMODULE 6-357
- TIE-BD 6-507
- TIE-DS1 6-497
- TIE-TRK 6-507
- TIME-DAY 6-523
- TONE-BD 6-525
- TONE-PT 6-533
- TTR-LEV 6-541
- XXX-BD 6-545

- Maintenance Parameters System 3-1

- MEM-BD Maintenance Object 6-317

- MET-LINE Maintenance Object 6-321

- MIS Maintenance Object 6-339

- Modem Pool
 - Circuit Pack 6-341
 - Port 6-341

- MODEM-BD Maintenance Object 6-341

- MODEM-PT Maintenance Object 6-347

- Monitor System Command 4-22

N

- Network Control Circuit Pack 6-137
- Network Control Data Channel 6-143
- Network Control Data Channel Control 6-771
- NMI Test Failure 3-24

O

- Organization 1-3

P

- PDMODULE
 - Maintenance Object 6-357
- Perform Tape Backup for a System Without Duplication Option 3-28

- P-INT-BD
 - Maintenance Object 6-355
- P4NT-PT
 - Maintenance Object 6-355
- PMS-LINK
 - Maintenance Object 6-373
- PMS-Link, Busyout 4-5
- Pooled Modem, Busyout (V1) 4-5
- Pooled Modem, Busyout (V2 and V3) 4-5
- Port, Busyout 4-6
- Port Circuit Pack, Busyout 4-6
- Port Circuit Pack Replacement 3-7
- Port Circuit Pack Unseating/Reseating 3-7
- Port Circuit Packs, Handling 3-7
- Port Troubles 6-1

- POWER
 - Maintenance Object 6-381
- Power, Removing and Restoring 3-9
- Power Supply LED 2-22
- Precautions 1-2
- Precautions, Safety 1-2
- Procedures, Support 3-1
- Processor Circuit Pack LEDs 2-20
- Processor Data Module
 - Trunk Data Module 6-357
- Processor Interface
 - Circuit Pack 6-355
 - port 6-355

- PROCR
 - Maintenance Object 6-397

- PROC-SAN
 - Maintenance Object 6-389
- Purpose 1-1

R

- Reboot and Run All 24-Hour Tests 3-23
- Recorded Announcements
 - Backup 3-28
 - Command 3-28
- Recycle Carrier Command 4-23
- References 7-1
- Remove
 - and Replace Tapes for System Backup for a System Without Duplication Option 3-28
- Removing and Restoring Power 3-9
- Removing Power 3-10
- Reports
 - Hardware Alarm 5-2
- Reports, Hardware Configuration 4-15

Reports, Software Configuration 4-18
 Reseating/Unseating Port Circuit Packs 3-7
 Reset and Reboot Indications, System 3-14, 3-17
 Reset Board Command 4-24
 Reset Command 4-23
 Reset Interface Command 4-25
 Reset System 3-15
 Reset System Command 4-23
 Restoring Power, Control Cabinet 3-13
 Restoring Power on System 75 3-12

S

Safety 1 - 2
 SAT 2-1
 SAT Keyboard 2-2
 S a v e
 Announcements 3-28
 Changes, Additions 3-27
 Data in Memory 3-27
 Information in Memory 3-27
 Recorded Announcements 3-28
 Recorded Announcements Command 3-28
 Translation 3-27
 Translation Command 3-27
 Translations 3-27
 Translations in Memory 3-27
 When to Save Translation 3-27
 SC-INTF
 Maintenance Object 6-397
 SC-LINK
 Maintenance Object 6-411
 Screen Forms 2-11
 Set Options Command 4-25
 Set Synchronization Command 4-25
 Software Configuration 2-12
 Software Configuration Reports 4-18
 Speech Synthesis
 Circuit Pack 6-431
 Port 6-431
 S-SYN-BD
 Maintenance Object 6-431
 S-SYN-PT
 Maintenance Object 6-431
 Status Commands 4-28
 Status Indicators 2-18
 Support Procedures 3-1
 SW-CTL
 Maintenance Object 6-449
 Switches 2-16
 S y s t e m

System (*Continued*)
 Backup Procedures 3-27
 System 75 XE Reset 3-21
 System Access Terminal 2-1
 System Alarms 2-18
 System Cold Start With Translations Loading 3-14, 3-17
 System Cold Start Without Translations Loading 3-14, 3-17
 System Configuration 6-135
 System Features 4-36
 System Reboot 3-16, 3-18, 3-22
 System Reboot and Run All 24-Hour Tests 3-23
 System Reset and Reboot Indications 3-14, 3-17
 System Tone Test Call 4-40
 System Warm Start 3-14, 3-17
 System Warm Start: 3-21

T

Tape
 Errors 3-29
 TAPE
 Maintenance Object 6-459
 Tape Backup for a System Without Duplication Option 3-28
 Tape Failures 3-29
 TDM-BUS
 Maintenance Object 6-479
 TDM-CLK
 Maintenance Object 6-485
 TDMODULE
 Maintenance Object 6-357
 Terminal Alarm Notification (V3) 2-22
 Terminal, System Access 2-1
 Test Call, System Tone 4-40
 Test Call, Time Slot 4-39
 Test Call, Touch-Tone Receiver 4-38
 Test Call, Trunk 4-38
 Test Commands 6-3
 Test, Facility Calls 4-37
 Test Points 2-16
 TIE-BD
 Maintenance Object 6-507
 TIE-DS1
 Maintenance Object 6-497
 TIE-TRK
 Maintenance Object 6-507
 Time Required to do a Backup on Recorded Announcements 3-28

Time Slot Test Call 4-39
TIME-DAY
 Maintenance Object 6-523
TONE-BD
 Maintenance Object 6-525
TONE-PT
 Maintenance Object 6-533
Touch-Tone Receiver Teat Call 4-38
Transaction Keys: 2-2
Transfer, Emergency 2-16
Trouble-Clearing Aids 4-1
Troubles
 Common Control 6-1
 Port 6-1
 Trunk 6-2
 Voice Terminal 6-2
Trunk, Busyout 4-6
Trunk Data Module
 Processor Data Module 6-357
Trunk Group, Busyout 4-6
Trunk Group Busy/Warning Indicators to Attendant -
 4-37
Trunk Identification by Attendant 4-37
Trunk Test Call 4-38
Trunk Troubles 6-2
TTR-LEV
 Maintenance Object 6-541

U

Unseating/Reseating Port Circuit Packs 3-7

V

Voice Terminal Troubles 6-2

W

Warm Start, System 3-14, 3-17, 3-21
When to Save Recorded Announcements 3-28

X

XE Power 6-185
XXX-BD
 Maintenance Object 6-545