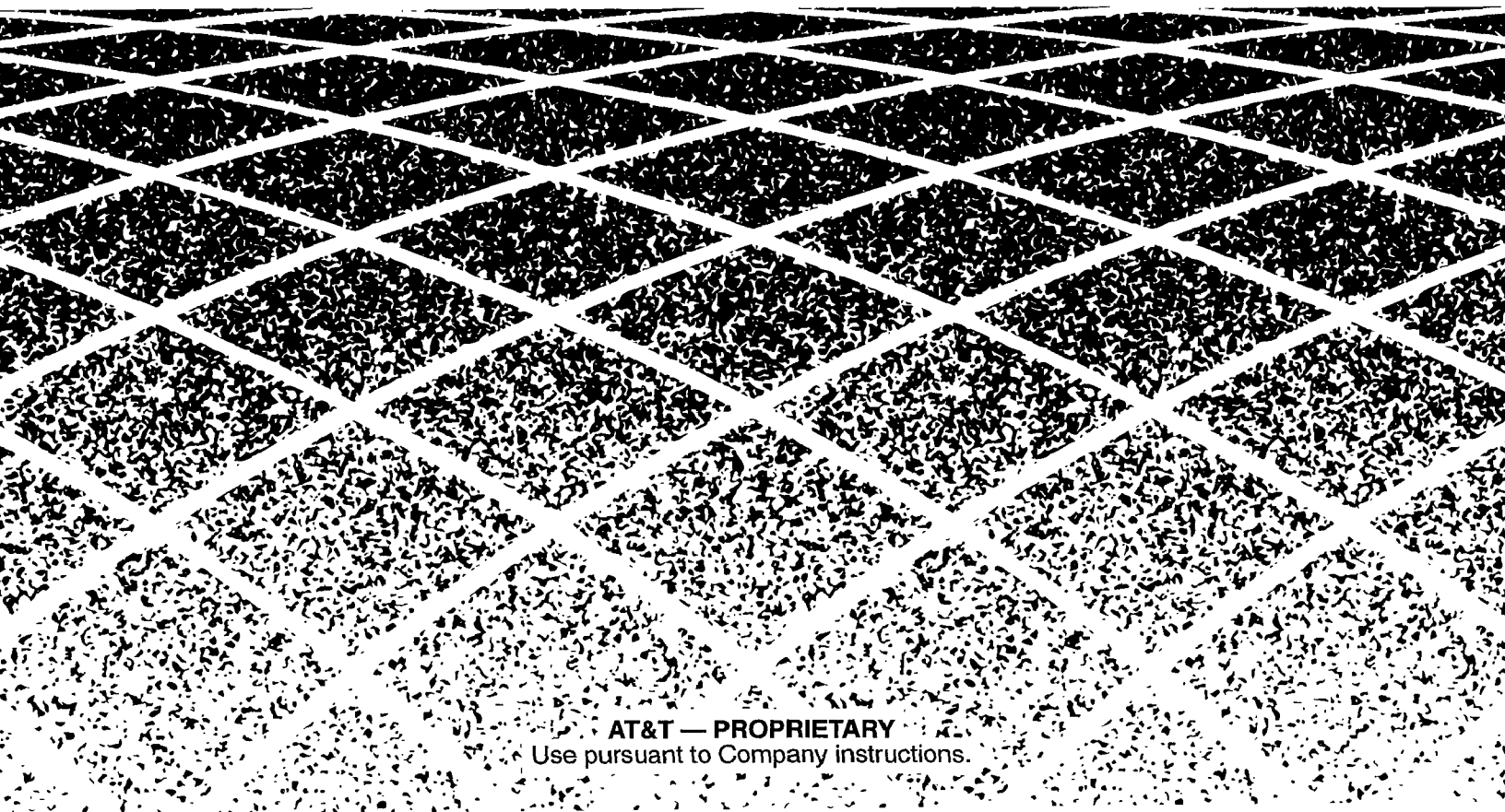
AT&T 365-353-011
Issue 2
October 1993

DACS II
Release 6.0, MML
Operation and Maintenance Manual

Volume I - Acceptance and Operation



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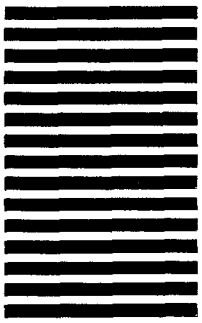

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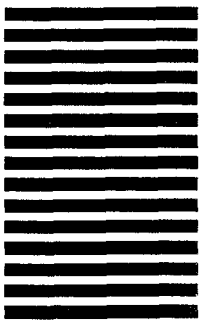

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About This Document

Purpose

This document provides procedural information required to support the craft personnel activities involved in the daily operation and maintenance of the DACS II (Digital Access and Cross-Connect System II). It also includes an overview that describes the physical and functional attributes of the DACS II. This volume contains the procedures to isolate and clear troubles.

Intended Audiences

This document is for individuals who are responsible for the acceptance, provisioning, operation, and maintenance of the DACS II system, Release 6.0.

How to Use This Document

Before you attempt to use the procedures in this document you should become familiar with its contents. The contents are described below.

The document is divided into two volumes:

Volume I - Operation and Maintenance and Reference Information
Volume II - Trouble Clearing

With the exception of the reference information contained in Volume I, each of the volumes stands on its own. The reference information applies to both volumes.

There are three ways to access the information in this document:

- The index in the back of each volume
- The tabs and the table of contents in the front of each tab
- The overall table of contents in the front of each volume.

Before you use the procedures in this document, you should have completed the DACS II Operation and Maintenance course (TR3421). If you were not able to take the training course, you should carefully study the information in Chapter 1 and the *Command Denials* section (found in each volume).

The procedures are arranged to be performed in the sequence in which they are presented. If you perform a procedure out of sequence, you may have trouble performing that procedure and the subsequent procedures.

Always start the trouble-clearing process by performing the procedures in Chapter 1 *Trouble Identification* of Volume II. The sections in Volume II are functional groupings of troubles. It is not always obvious from the message or alarm which of the trouble sections provides the procedure or procedures for clearing the trouble. If you begin with Chapter 1, you will be directed from procedure to procedure until the trouble is cleared.

Contents

Volume I

- **Chapter 1 - Introduction**

  This chapter provides an overview of the DACS II. It describes the DACS II hardware arrangements, functional operation, and command and message set. This chapter contains reference information required to operate and maintain the DACS II.

- **Chapter 2 - Acceptance**

  This chapter contains all the procedures required to accept a DACS II frame after it has been installed.

- **Chapter 3 - Provisioning**

  This chapter provides the procedures to install circuit packs and to grow and enable the common equipment (frame, synchronizer, and cross-connect network) and Units (FTU, DS3U, and DSPU).

  Included are the procedures to install circuit packs and to grow and enable the NPCs (FTU with or without *SLC*® Carrier, DS3U, and DSPU, Subrate, or DMB).

  Also included are the procedures to make the DSX connections and perform tests to establish DS1 facilities with or without *SLC* Carrier, DS3 facilities, and Subrate channels.

- **Chapter 4 - Test Access**

  This chapter contains the procedures to establish the test ports, make the DS0 and Clear-DS1 test connections, and establish and test-subrate channels.

- **Chapter 5 - Remove and Degrow Equipment**

  This chapter contains the procedures to remove and degrow NPCs, units, and cross-connect networks.

- **Chapter 6 - Cross-Connections and Disconnections**

  This chapter contains the procedures to make DS0, Clear-DS1, and Subrate cross-connections and to disconnect the cross-connections.

- **Chapter 7 - Administration**

  This chapter contains the procedures to log on or log off the DACS II; create, change, and delete alternate maps; and create, activate, and delete macros.

- **Chapter 8 - Maintenance**

  This chapter contains the procedures for routine tape and disk drive maintenance, tape and disk drive removal, and plug-in removal and replacement.

- **Chapter 9 - Performance Monitoring**

  The procedures in this chapter tell you how to schedule and retrieve reports that monitor various DS1 performance parameters.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II. You should be familiar with the contents of this chapter before you attempt any of the other procedures.

Volume II

- **Chapter 1 - Trouble Identification**

  This chapter contains the procedures for interpreting the alarms and messages that identify troubles. ***All trouble clearing starts here. You are directed from here to a procedure in one of the following chapters. That procedure may direct you to a procedure in a chapter that follows it. The process continues until you isolate the fault.***

- **Chapter 2 - Power Failures**

  This chapter contains the procedures for isolating power troubles.

- **Chapter 3 - Facility Alarms**

  This chapter contains the procedures for isolating troubles in the facilities that connect to DACS II.

- **Chapter 4 - Hardware Failures**

  This chapter contains procedures for locating internal DACS II troubles. The messages associated with these troubles usually identify one or more possible faulty plug-ins.

- **Chapter 5 - Manual Diagnostic Failures**

  This chapter contains the procedures for clearing troubles identified when you run manual diagnostics.

- **Chapter 6 - Controller and Link Troubles**

  The procedures in this chapter are used to isolate troubles in the controller or the link connecting the controller to a terminal or operating system. These troubles are usually associated with a reset.

- **Chapter 7 - Data Base Troubles**

  The procedures in this chapter are used to isolate a conditional reset or back-up memory trouble.

- **Chapter 8 - Frame Audits**

  The procedures in this chapter are used to isolate faults detected when frame audits are run.

- **Chapter 9 - Software Error**

  The procedures in this chapter are used to isolate troubles indicated by a software trouble message.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II.

Conventions Used

This manual uses special fonts in order for the user to differentiate computer input/output. The constant width font indicates message formats, keywords, letter representations of parameters, parameter values, and messages as they would appear on a DACS II terminal screen.

Related Documentation

The following documents support the DACS II system:

- DACS II Release 6.0 Installation Manual:

  Audience: Customers planning to install the equipment

  Content: Customer installation instructions.

- DACS II Release 1 through 6.0 Customer Reference Manual; document number AT&T 365-353-000

  Audience: Network planners, engineers, and others that need to know how the DACS II works and fits into the network

  Content: Features, applications, and description and other reference information.

- DACS II Release 6.0 Operation and Maintenance Manuals; document numbers AT&T 365-353: -001 (PDS), -011 (MML), -021 (PDS 2.048-Mb/s Interface) -031 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Contents: Procedures to operate and maintain the DACS II.

- DACS II Release 6.0 Command and Message Manuals; document numbers AT&T 365-353: -002 (PDS), -012 (MML), -022 (PDS 2.048-Mb/s Interface), -032 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Content: Description of each software input message and its response along with a description of each system output report.

- DACS II Releases 3.0 through 6.0 Quick Reference Guides; document numbers AT&T 365-353:-003 (PDS), -013 (MML), -023 (PDS 2.048-Mb/s Interface), -033 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Content: Abbreviated list of system commands and parameters.

- DACS II Release 6.0, Software Release Description; document number AT&T 365-352-005 (1.544 Mb/s), -105 (1.544 Mb/s BSS), -025 (2.048 Mb/s)

  Audience: End-user maintenance personnel

  Content: Upgrade procedures for the new software release, status of problems fixed in previous releases, and operating issues for the specified software release.

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Introduction

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Introduction

1

1.1 DACS II Overview

The DACS II is the current generation of equipment for access and cross-connection of DS0 (digital signal level 0) channels. DS0 channels are defined as 64-kb bandwidth channels produced by pulse code modulation (PCM). The DACS II is software-based equipment. The DACS II has both main and secondary controllers, centralized and distributed memory, and single-stage, nonblocking timeslot interchange circuitry. Small and large frame complexes and modular equipment design allow the DACS II to be economically deployed in both large and small installations.

The name Digital Access and Cross-Connect System describes the main function of DACS II. It accesses DS0 information channels in the digital signals connected to it. These digital signals can be 1.544-Mb/s DS1 signals or 44.736-Mb/s DS3 signals. This access allows cross-connecting of DS0 channels without decoding them to analog and allows channels to be brought outside the DACS II for testing. These cross-connect and test-access operations are initiated by commands entered on an administrative link.

DACS II uses a process called time slot interchange to electronically cross-connect single DS0 (64-kb/s) channels or any continuous range of up to 24 DS0 channels (1.544-Mb/s DS1 facility) within the DACS II cross-connect network. When three bays are equipped to terminate 640 DS1 facilities (original interface bays), it can connect all 15,360 DS0 channels in various cross-connect circuit configurations. If the capacity expansion frame (CEF) is equipped for 2,560 DS1 facilities, the DACS II can connect all 61,440 DS0 channels.

When equipped with the subrate feature, DACS II can cross-connect, access for testing, and multiplex subrate (2.4-kb/s, 4.8-kb/s, and 9.6-kb/s) and 56-kb/s digital data channels.

Up to four DS1 facility interfaces per frame can be reserved for DS0 test access. DACS II allows test access of any channel within a facility without interfering with any other channel. You can test with standard test equipment locally at the distributing frame or test from a remote location through the Remote Test System-5A (RTS-5A) or Remote Maintenance System-Digital 1 (RMS-D1) of Switched Access Remote Testing System (SARTS). If the frame is at the full capacity, the RMS-D1 system will have to be used because the RTS-5A is too small to handle the requirements at full capacity.

In addition, facility plug-ins can be software provisioned for clear-channel DS1 application and used for test access of other clear-channel DS1 facilities which terminate directly or terminate in DS3 signals. There is no restriction on the number of clear-DS1 network processing circuits (NPCs) that can be used for test access. There are ten possible test access configurations, including monitor and split modes with unidirectional and bidirectional connections.

DACS II also monitors the performance of connecting 1.544-Mb/s and DS3 facilities, checking for loss of signal and transmission errors. Additional facility parameters are monitored using different error-checking schemes on the DS1 signals (including those embedded in DS3). Facility performance is reported in a daily summary message and on demand by entering a command. If the errors or counted activities exceed prescribed thresholds, the DACS II initiates office and remote alarms and/or alarm messages over the administrative links.

The DACS II can be configured for gateway operation. When configured for gateway operation, the DACS II terminates both DSI (1.544 Ms/s) facilities and 2.048 Mb/s facilities. The DS0 channels in each of the facilities can be cross connected.

The DS3 feature lets the DACS II process domestic asynchronous DS3 signals. Up to six DS3 interfaces can terminate on a DS3 unit, and each DS3 interface can be grown as needed. With the modular DS3 unit equipment, the DS3 feature can be economically added for small-scale DS3 terminations, or with the flexible bay, most or all of the frame can be used to provide an alternative vehicle for substantial DS3 terminations. The cross-connections at the DACS II are done at the DS0 signal level so each incoming DS3 signal is demultiplexed to the constituent DS1s and the DS0 channels. The constituent DS1s are individually monitored for facility performance just like direct DS1 terminations. The DS0 channels can be packed or groomed into other DS1 facilities by cross-connections. A clear DS1 can also be supported on the DS3 unit, thereby providing the functionality of a true DS3/DS1/DS0 system.

The *SLC*® carrier features provide a direct interface at DACS II for T1 lines from either *SLC* 96 carrier or *SLC* Series 5 carrier remote terminals. The channels from these remote terminal lines are then connected through DACS II to office equipment to provide the *SLC* carrier services. The DACS II provides *SLC* carrier alarm handling and facility protection switching so it can be placed in the route without altering the operation of the other equipment. For *SLC* 96 carrier, the direct interface supports both Modes I and III; for *SLC* Series 5 carrier, the interface supports Feature Package B (FPB) with specials (also referred to as Enhanced Feature Package B) and Feature Package C (FPC) for special services only.

For *SLC* 96 carrier Mode I, mixed services (POTS and specials) residing on the same T1 line are brought to DACS II. Special service channels are packed and routed to the network, and the POTS channels are passed through the DACS II to the local digital switch. This interface allows integration of the Mode I systems carrying any number of both POTS and specials. DACS II also supports Mode I systems carrying special services only. DACS II terminates the *SLC* 96 carrier data link, packs the specials onto either DS1 or DS3 facilities, and routes the services to their destination. For the Mode III, the DACS II acts as a replacement for back-to-back COTs (central office terminals) and D-channel banks. The Mode III facilities terminate directly on the DACS II, and the specials are routed to their destination in the network on either DS1 or DS3 facilities.

In the *SLC* Series 5 carrier FPC configuration, the DACS II connects nonlocally switched special service channels to network equipment in the office. Provisioning of the RT (remote terminal) channel units can be done over the facility data link with the Series 5 CIU (craft interface unit) connected at the DACS II. The DACS II continuously checks for discrepancies between the provisioning stored in it and the RT. The *SLC* Series 5 carrier FPB with specials interface supports the same functionality and feature set that the Mode I interface provides.

1.2 Physical Description

The paragraphs which follow describe the various frame, bay, unit, and plug-in configurations offered by DACS II.

1.2.1 Frame Configurations

Figure 1-1 shows the DACS II frames covered in this manual and the software releases associated with each.

Table 1-1 lists the units that make up the frames. Table 1-2 lists the circuit packs in each unit.

With the exception of the single-bay frame, each frame is made up of one switch bay and one or more interface bays. The single-bay frame provides both switch and interface functions in a single frame. The switch bay contains the cross-connect network(s), synchronizer, main controller and backup memories. There are two types of interface bay. They are the original interface bay and the flexible interface bay. The original interface bay refers to interface bays that were provided before the flexible interface bay was available.

1.2.2 Multiple-Bay Frames

The two types of multiple-bay frames are the double bay (Figure 1-2) and the triple bay (Figure 1-3). Both arrangements use the original switch bay. In the double-bay arrangement, the switch bay is always on the right and the interface bay, on the left. The double-bay arrangement is grown to a triple-bay arrangement by adding an interface bay to the right of the switch bay.

1.2.3 Single-Bay Frame

The single-bay frame, Figure 1-4, contains the units listed in Table 1-1. The single-bay frame contains many of the same plug-ins that are used in multibay frames. Differences in the capacity, the cross-connect network (CCN), and location of plug-ins are accounted for in the software by the information contained in the data base configuration file.

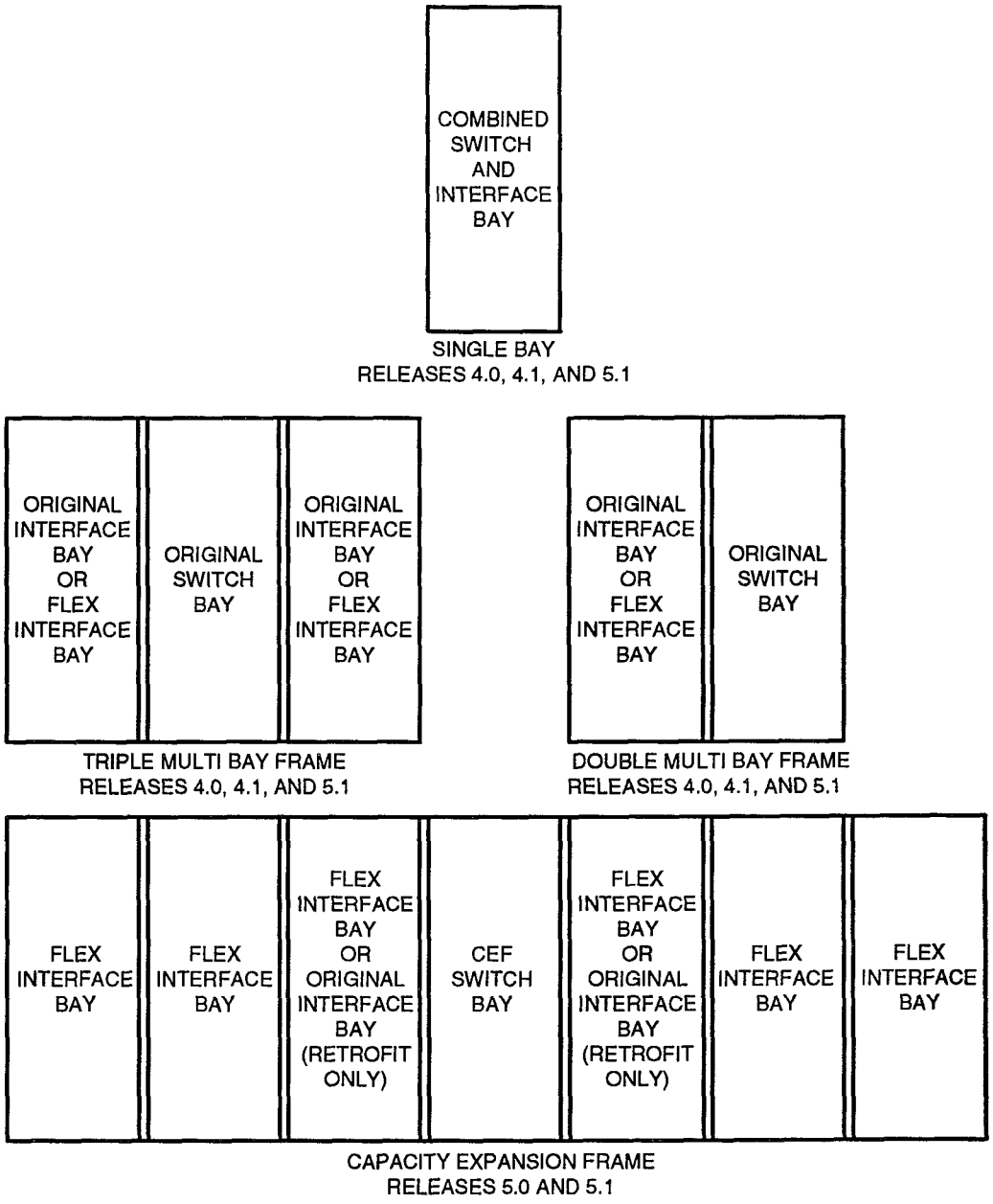


Figure 1-1. DACS II Frame Arrangements

Table 1-1. DACS II Frame/Bay/Unit Arrangements

FRAME TYPES

- Single-Bay Frame
- Multiple Bay
  - Double-Bay Frame
  - Triple-Bay Frame
- Capacity Expansion Frame (CEF)

BAY TYPES

- Switch Bays
- Interface Bays
- Single (Combination Switch and Interface Bay)

SWITCH BAYS

- Original (one in each double- and triple-bay frame)
- CEF (one in each CEF frame)

INTERFACE BAYS

- Original (one in double-bay frames, two in triple-bay frames)
- flexible (up to six in CEF frame)

SWITCH BAY UNITS

ORIGINAL SWITCH BAY

- CCN (0 and 1)
- Status Panel
- Synchronizer
- MC (main controller)
  - Disk
  - Tape
- CCN Power Unit (0 and 1)
- Fuse and Alarm

CEF SWITCH BAY

- ECCN (0 and 1)
- Status Panel
- Synchronizer
- MC (main controller)
  - Disk
  - Tape
- Fuse and Alarm

INTERFACE BAY UNITS

ORIGINAL INTERFACE BAY

- FTU (Maximum 2 per bay)
  - FTM
- Power and Control
- DSPU (Maximum 1 per bay)
- DS3U (Maximum 1 per bay)

FLEXIBLE INTERFACE BAY (FLEX BAY)

- IFTU (Maximum 3 per bay)
  - FTM
- DSPU (Maximum 3 per bay)
- DS3U (Maximum 3 per bay)

SINGLE-BAY UNITS

- Fuse and Alarm
- FTU
  - FTM
- CCN (0 and 1)
- Disk
- Tape
- Status Panel
- MC and Sync
- FTU Power and Control
- DSPU/DS3U

Table 1-2. DACS II Plug-In Equipment

FUNCTION NAME		CKT	USED	NUMBER REQUIRED PER FRAME
FULL	ABBREV	PACK	IN/WITH	OR UNIT (U)
ORIGINAL SWITCH BAY				
CCN (Cross-Connect Network)				2 sides (0 and 1)
Time Slot Interchange	TSI	TM660	CCN	Up to 36 per side
Cross-Connect Buffer	CCB	UM26B	CCN	Up to 6 per side
Cross-Connect Network Interface	CCNI	UM30	CCN	1 per side
Synchronizer				1
(Time Base Slots) TB can be installed in TLI 3				
Time Bases-Stratum 3	TBS3	TG60	SYNC	2 or 3
Time Base CEPT Local	TBCL	TG61		of 1 code
Time Base CEPT Toll	TBCT	TG62		
Stratum 2	TBS2	TG63		
(Timing Link Interface)	TLI		SYNC	Up to 8 Four 0 and 1 Pairs
Timing Extractor Function				Choose 2 of 1
Bipolar DS1	TXB1	TG64		or more codes.
Composite Clock 64 kb/s	TXCC	TG66		Selection based
Unipolar Clock	TXUC	TG67B		on the sync
BSRF	TXRF	TG68		configuration
CEPT 75-ohm Coax	TP75			
Timing Distributor Function				
Comp. Clock 64 kb/s out	TDCC	TG70		Choose 2 of 1 Code
Sine Wave 2.048 MHz out	TDS2	TG71B		as required
Digital Phase-Locked Loop	DPLL	TM590	SYNC	2 (0 and 1)
Synchronizer Power Unit	SPU	TG58 (5V)	SYNC	2 (0 and 1)

Continued on next page

Table 1-2. ***Continued***

FUNCTION NAME				NUMBER REQUIRED
FULL	ABBREV	CKT PACK	USED IN/WITH	PER FRAME OR UNIT (U)
Main Controller				1
Main Controller Power	MCP	SM565 (±12V)	MC	1 (U)
Central Processing Unit	CPU	TM657/TM657B*	MC	1
Secondary Storage Controller	SSC	TM659B/TM659C*	MC	1
High speed Enhanced Communications Interface	HECI	TM762*	MC	1
Maintenance Circuit	MTC	UM24/UM24B	MC	1
Bus Extender	BX(2)	UM27/UM72*	MC	1
Power Unit	PU	484GA PWR UNIT (12V)	Disk,Tape	1
	PU	411AA, (5V)	MC	1
20 Mbyte Disk	DISK	ED-2C876-30*	MC	1
24 Mbyte Tape	TAPE	ED-2C877-30	MC	1
40 Mbyte Disk	DISK	ED-2C876-30,G2*/	MC	1
CCN Power Unit				2 (0 and 1)
Power Unit	PU	485AB PWR UNIT (5V)	CCN Power	8
Fuse Board	DSR FUSE BD	ED-2C863-30 G3,ACCN	CCN Power	4
CEF SWITCH BAY				
ECCN				
(Cross-Connect Network)				2 (0 and 1)
Bus Terminator	BT	BBR1	ECCN	4 Two 0 and 1 Pairs
Clock Control Interface	CCI	BBS1	ECCN	2 One 0 and 1 Pairs
Expanded TSI	ETSI	BBS2	ECCN	Up to 32 Sixteen 0 and 1 Pairs

* Refer to Table 1-3, DACS II MC and UC Compatibility, for hardware compatibility

Continued on next page

Table 1-2. *Continued*

FUNCTION NAME		CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
FULL	ABBREV			
CEF SWITCH BAY (Contd)				
Synchronizer				
The synchronizer in the CEF switch bay uses the same plug-ins as the synchronizer in the original switch bay shown previously.				
Main Controller				
Main Controller Power	MCP	SM565 (±12V)	EMC	1
40 Mbyte Disk	DISK	ED-9C015-30	EMC	1
24 Mbyte Tape	TAPE	ED-9C016-30	EMC	1
Central Processing Unit*	CPU	TM657B	EMC	1
Secondary Storage Controller	SSC	TM659C	EMC	1
High-Speed Enhanced Communications Interface	HECI	TM762	EMC	1
Maintenance Circuit*	EMTC	UM75	EMC	1
Bus Extender*	EBX	UM71	EMC	1
Power Unit		484GA PWR UNIT	Disk,Tape	1
		(+12V), 411AA (+5V)	MC	1
Fuse Board				
Status Panel				
Status Plug-In	STATUS	ED-9C017-30	EMC	1 (F)

*New plug-in CEF switch bay main controller.

Continued on next page

Table 1-2. *Continued*

FUNCTION NAME		CKT	USED	NUMBER REQUIRED PER FRAME
FULL	ABBREV	PACK	IN/WITH	OR UNIT (U)
INTERFACE BAYS				
Power and Control Unit				1
Central Processing Unit	CPU	TM657/TM657B	FTU	1
Unit Bus Extender	UBX	UM28	FTU	1
Power Unit	PU	411AA (5V)	FTU	3 per FTU
Fuse Board	DSR FUSE BD	ED-2C863-30 G1,A	FTU	2 (77-type)
Fuse Board	DSR FUSE BD	ED-2C863-30 G2,A	FTU	1
FTU				1 or 2 per bay
NPC				2 in each of the following plug-ins
Dual Digroup Circuit	DDC	TG80/TG80B	FTU	Up to 80
SLC 96 Carrier Direct Interface	S96D	TG183	FTU	Up to 80
SLC Series 5 Carrier Direct Interface	SS5D	TG184	FTU	Up to 80
Special Zero Code Suppression - ZBTSI	ZDC	TG186	FTU	Up to 80
Dual Primary Circuit (120-ohm termination)	DPC	TG182	FTU	Up to 64
Dual Primary Circuit (75-ohm termination)	DPC	TG185	FTU	Up to 64
Dual Primary Circuit (Minor BER)	DPC	TG187	FTU	Up to 64
Format Converter	FC	TG79	FTU	Up to 8 Four 0 and 1 Pairs
Facility Terminating Module Interface	FTMI	TG81	FTU	Up to 4
IFTU IFTU uses the same plug-ins as the FTU (shown above) plus the following plug-ins.				Up to 3 per bay
Central Processing Unit	CPU	TM657B	IFTU	1
Unit Bus Extender	UBX	UM28	IFTU	1
Fuse Board	DSR FUSE BD	ED-9C011-30	IFTU	16 (80-type)
Fuse Board	DSR FUSE BD	ED-9C012-30	IFTU	1 (80-type)
Power Unit	PU	411AA	FTU	3

Continued on next page

Table 1-2. ***Continued***

FUNCTION NAME				NUMBER REQUIRED
FULL	ABBREV	CKT PACK	USED IN/WITH	PER FRAME OR UNIT (U)
INTERFACE BAYS (Contd)				
DSPU				2 or 3 per bay
Subrate Multiplexer	SRM	TM739	DSPU	Up to 8 pairs 0 and 1
Multipoint Junction Unit	MJU	TM740	DSPU	Up to 8 pairs 0 and 1
Digital Multipoint Bridge	DMB	TM665	DSPU	Up to 8 pairs 0 and 1
Central Processing Unit	CPU	TM657 or TM657B	DSPU	1
DSP Controller Power	DCP	SM566	DSPU	1
DSP Interface	DSPI	UM29	DSPU	1
Power Unit	PU	411AA	DSPU	2
Fuse Board	DSR FUSE BD	ED-2C863-30 G3, ACCN	DSPU	1
DS3U				2 or 3 per bay
DS3 Multiplexer	MXR	KCR1	DS3U	Up to 7
DS3 Facility Line Interface	FLI		DS3U	2
Formatter	FMT	KER1	DS3U	2
Unit Controller	UC	KER2	DS3U	1
Power Unit	PU	563A PWR UNIT	DS3U	3
Fuse Board	DSR FUSE BD	ED-2C980-30	DS3U	1
Single Bay Frame				
CCN2 [Cross-Connect Network]	Use same plug-ins as original			
Synchronizer Master Controller	switch bay units			
FTU	Use same plug-ins as			
FTU Power and Control	original Interface			
DS3U	Bay units			

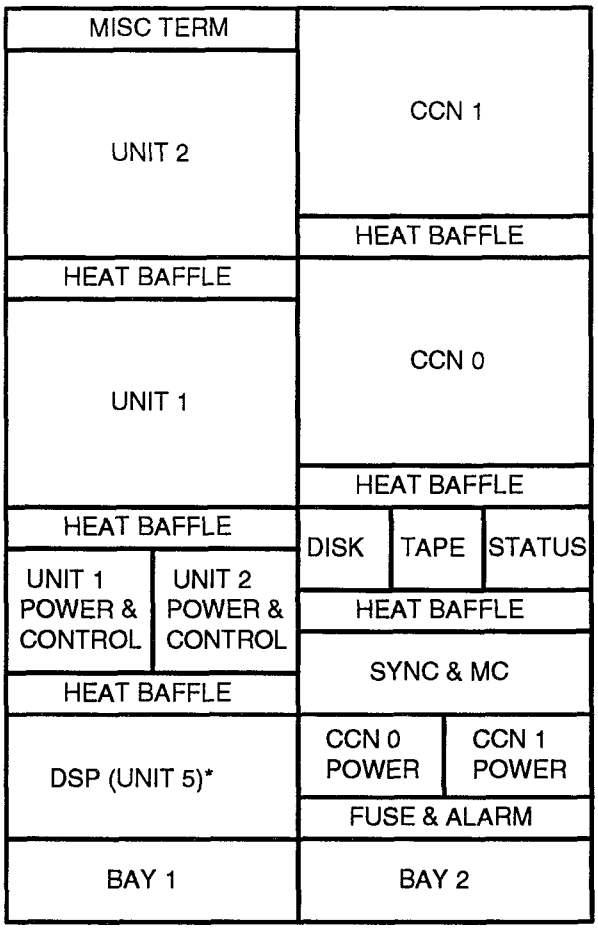


Figure 1-2. Double-Bay Frame Arrangement

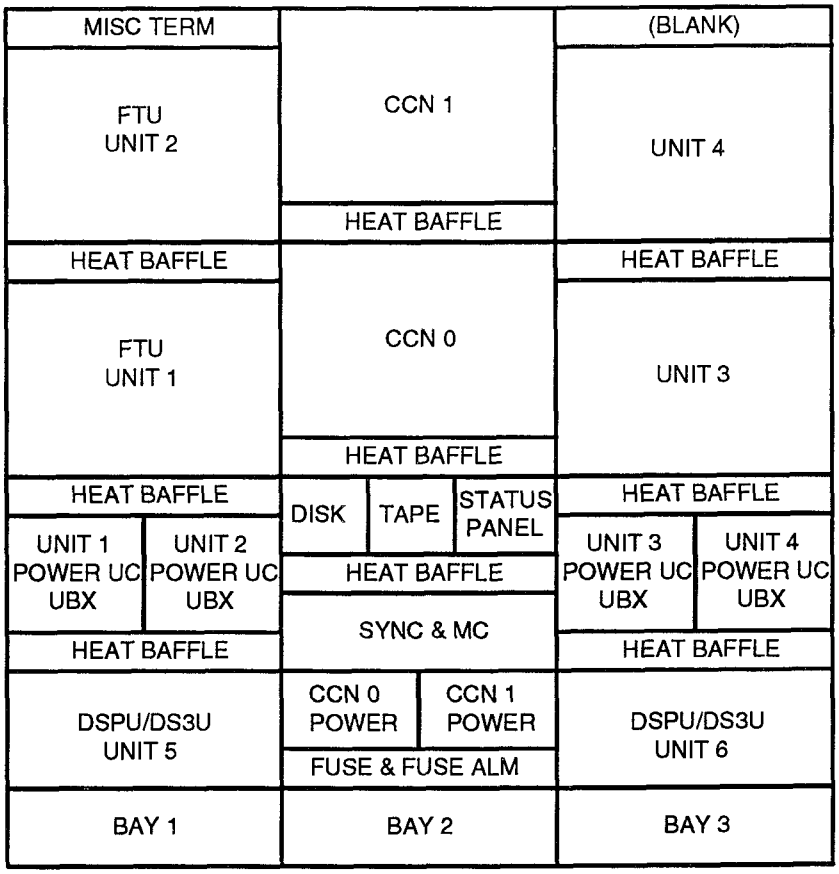


Figure 1-3. Triple-Bay Frame Arrangement

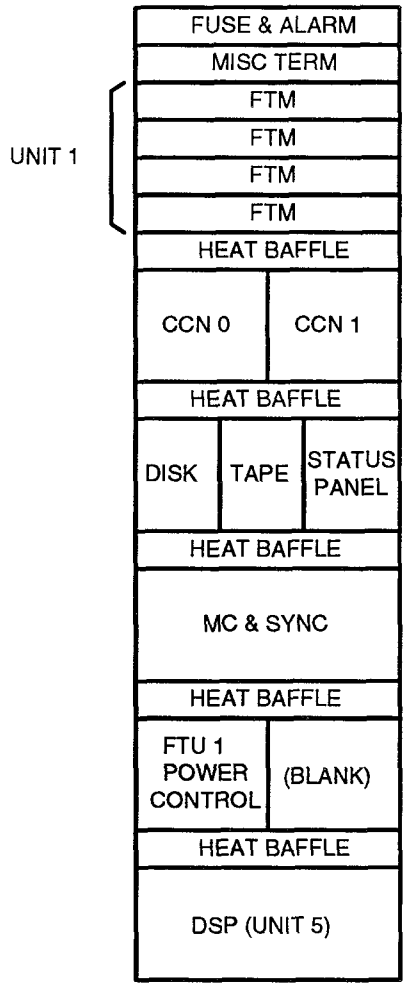


Figure 1-4. Single-Bay Frame Arrangement

1.2.4 Capacity Expansion Frame

The capacity expansion frame (CEF), Figure 1-5, consists of the CEF switch bay and up to six interface bays. The bays are always numbered as shown in Figure 1-5. The minimum starting configuration is the switch bay (bay 2) and one interface bay in the bay 1 position. It is not necessary to add the bays in numerical sequence. Bay 4 can be added before bay 3. There will never be more than 2 units (IFTU, DSPU, or DS3U) in bays 6 and 7. Only flexible interface bays are used in new installations. In retrofit configurations, bays 1 and 3 could be original interface bays.

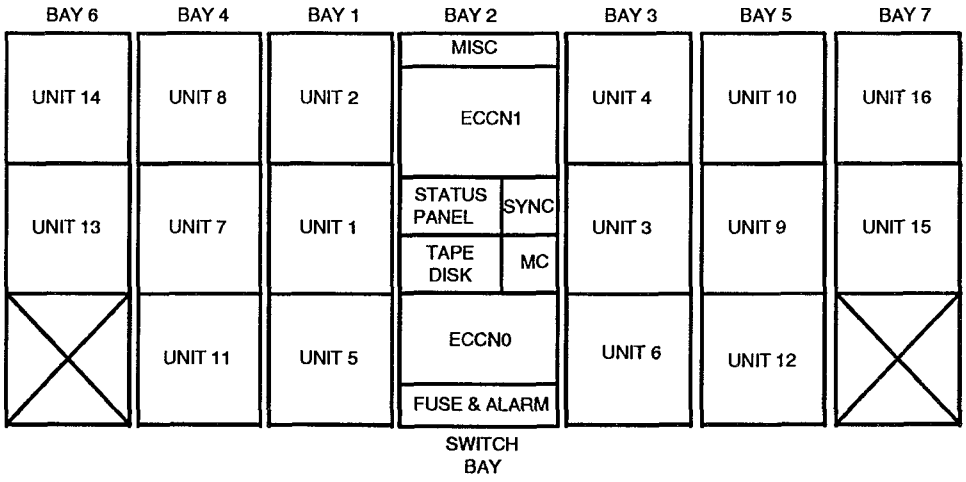


Figure 1-5. Capacity Expansion Frame

1.2.5 Original Switch Bay

The original switch bay, Figure 1-2, contains the following units:

- Cross-Connect Network (CCN) 0 and 1
- Synchronizer and Main Controller
- Hard Disk and Tape Unit
- Status Panel
- Cross-Connect Network Power Unit
- Fuse and Alarm Panel.

The following paragraphs briefly describe each of these units.

1.2.5.1 Cross-Connect Network

The cross-connect network (CCN), Figure 1-6, is duplicated (sides 0 and 1) to protect against loss of service. Both sides must be equipped exactly alike. The CCN contains the following plug-ins: time slot interchange (TSI), cross-connect buffer (CCB), and cross-connect network interface (CCNI). The actual cross-connect function is performed in the TSI. Timing from the synchronizer and the control and status signals from the main controller are connected to the CCN through the CCNI. Six TSI 0 and 1 pairs are installed for each interface unit (FTU, DSPU, or DS3) in a fully-equipped frame. One CCB 0 and 1 pair is installed for each interface unit.

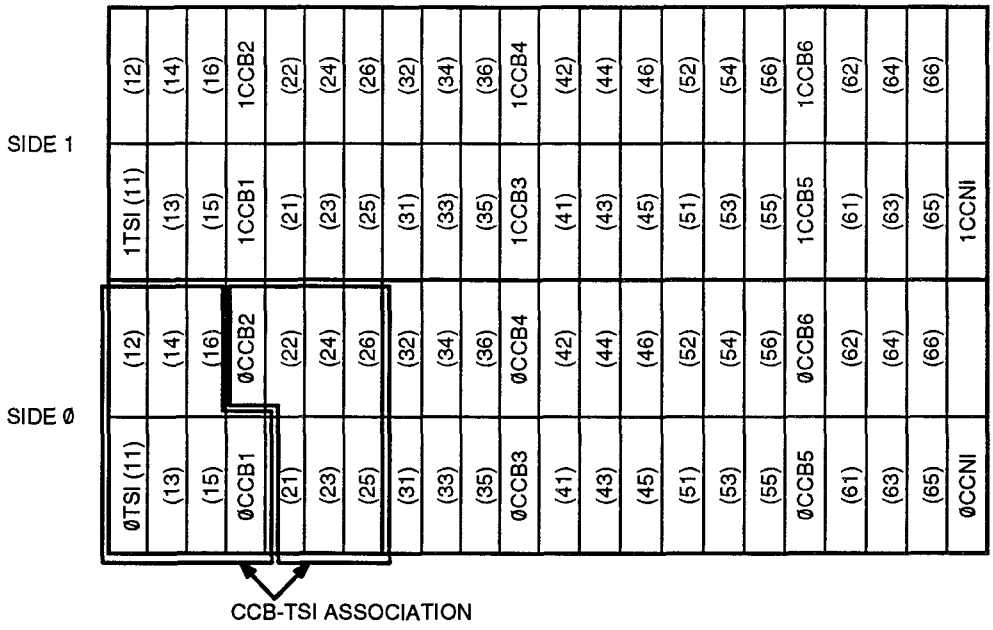


Figure 1-6. Locations of Cross-Connect Network Plug-In

1.2.5.2 Synchronizer and Main Controller

The synchronizer and main controller (Sync & MC) shelf, Figure 1-7, is mounted below the disk, tape, and status units which are functionally a part of the main controller. The sync plug-ins are located in the left of the shelf and the MC plug-ins are located in the right of the shelf as shown in Figure 1-7. The MC consists of the central processing unit (CPU), the communications interface (CI) which controls the communications between the internal and external links, the secondary storage controller (SSC) which controls the interface between the MC and the tape and disk units, the maintenance (MTC) circuit packs which control the interface between the MC and the alarm circuits and units, and the bus extender (BX). Power converters 484GA, 411AA, and MCP provide power for the MC and tape and disk units. The sync contains duplicated circuits and is equipped to configure for the mode (master or slaved) and stratum of operation. Timing source signals coming to the sync for timing extraction connect through TLI (timing link interface) plug-ins. The redundant TLI (0 and 1) plug-ins provide the interface for up to four sources (8 TLI plug-ins). There are plug-in slots for one redundant time base (TB). However, you may add two other redundant TB plug-in pairs by using TLI3 (0 and 1) and TLI4 (0 and 1) slots. You can use the TLI slots because you will not need to interface to an external source if you use the internal TB source. The redundant synchronizer power units (SPU) provide

power for the sync plug-ins. Timing from the TLI and TB plug-ins is connected to the CCN through digital phase-locked loop (DPLL) plug-ins.

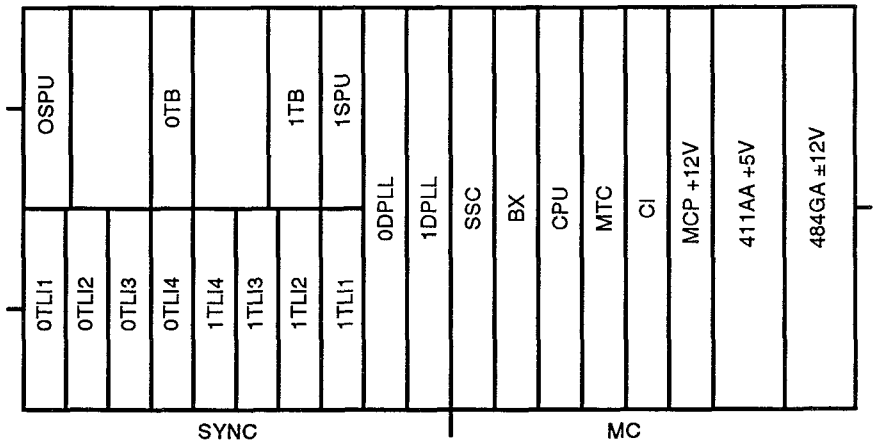


Figure 1-7. Original Switch Bay Synchronizer and Main Controller Plug-In Locations

1.2.5.3 Hard Disk and Tape Unit

The hard disk and tape units, Figure 1-8, provide the nonvolatile backup memory for the DACS II. Table 1-3 lists the units in original and CEF switch bays. The table shows the different versions of unit and plug-ins used with various software releases and switch bay types. The tape and disk units are mounted vertically in the later versions of the switch bays because there is better heat dissipation with the vertically mounted units. The hard disk and tape units are a part of the main controller.

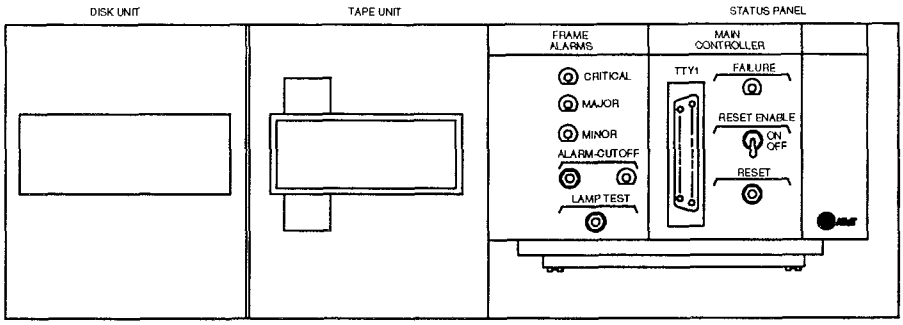


Figure 1-8. Original Switch Bay, Disk, Tape, and Status Panel Units

Table 1-3. DACS II MC and UC Hardware Compatibility

Circuit Packs		R4 + R4.1	R5.0	R5.1		R6.0	
		CCN*	ECCN	CCN*	ECCN	CCN*	ECCN
MC CPU	TM657	Yes	No	No	No	No	No
	TM657B	Yes	Yes	Yes	Yes	Yes	Yes
BX	UM27	Yes	No	No	No	No	No
	UM72	No	No	Yes	No	Yes	No
(EBX)	UM71	No	Yes	No	Yes	No	Yes
MTC	UM24	Yes	No	Yes	No	Yes	No
(EMTC)	UM75	No	Yes	No	Yes	No	Yes
HECI	TM762	Yes‡	Yes‡	Yes‡	Yes‡	Yes‡	Yes‡
SSC	TM659B	Yes	No	No	No	No	No
	TM659C	Yes	Yes	Yes	Yes	Yes	Yes
Disk	Horizontal 20 Mb	Yes	No	No	No	No	No
	Horizontal 40 Mb ED-2C876-30,G2	No	No	Yes	No	Yes	No
	Vertical 40 Mb ED-9C015-30	No	Yes	No	Yes	No	Yes
TAPE	Horizontal 24 Mb	Yes	No	Yes	No	Yes	No
	Vertical 24 Mb ED-9C016-30	No	Yes	No	Yes	No	Yes
UC CPU	TM657	Yes	Yes†	Yes	Yes†	No	No
	TM657B	Yes	Yes	Yes	Yes	Yes	Yes

* The CCN also applies to the DACS II SBF.

† Changeout is not required for retrofitted CEF. New frames will be shipped with TM657B.

‡ The HECI only supports previously engineered cable lengths of less than 400 feet.

1.2.5.4 Status Panel

The status panel, Figure 1-8, contains alarm indicators (CRITICAL, MAJOR, and MINOR) which light when there is a failure in the DACS II or one of the facilities that connects to the DACS II. The ACO Button and ACO LED, main controller FAILURE indicator, RESET ENABLE switch, and RESET button are also mounted on the alarm panel. A plug on the front of the panel is used to connect a portable TTY to link 1. This plug is in parallel with a plug on the rear of the bay.

1.2.5.5 Cross-Connect Network Power Unit

The cross-connect network power unit (Figure 1-9) has eight +5volt power converters. Four provide the power for CCN0 and the other four provide the power for CCN1. Four fuse panel plug-ins provide protection for the power converter outputs to the CCNs.

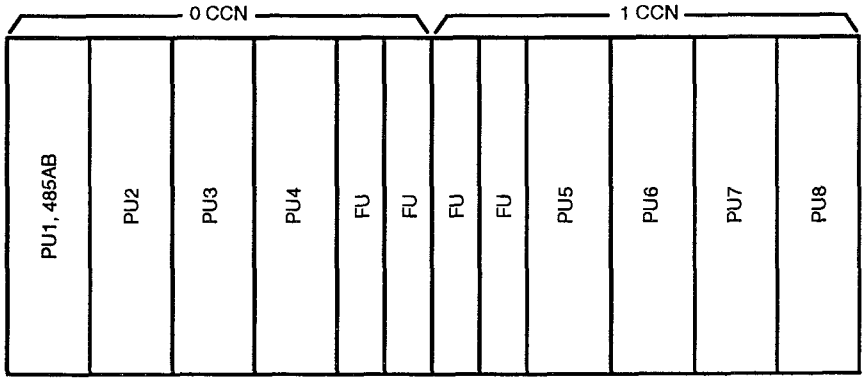


Figure 1-9. Original Switch Bay Cross-Connect Network Power Unit Plug-In Locations

1.2.5.6 Fuse and Alarm Panel

The 48-volt power is distributed to the switch bay units through the fuse and alarm panel, as shown in Figure 1-10 The 48-volt power is distributed through indicator fuses.

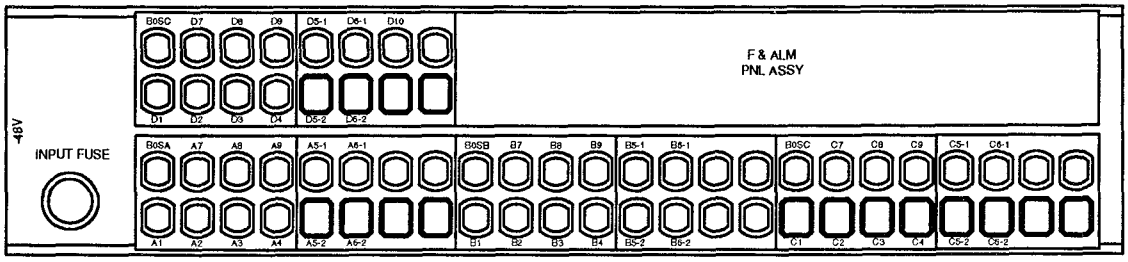


Figure 1-10. Original Switch Bay Fuse and Alarm Panel

1.2.6 CEF Switch Bay

The CEF switch bay, Figure 1-5, contains the following units:

- Extended Cross-Connect Network (ECCN)
- Extended Frame Controller
- Status Panel
- Synchronizer
- Main Controller (MC)
- Hard Disk and Tape Unit
- Fuse and Alarm Panel

The following paragraphs briefly describe each of the units.

1.2.6.1 Extended Cross-Connect Network

The extended cross-connect network (ECCN), Figure 1-11, contains the expanded time slot interface (ETSI), clock control interface (CCI), and bus terminator (BT) plug-ins. The cross-connect function is performed in the ETSI. There are two ETSI (0 and 1) plug-ins provided for each unit (IFTU, DSPU, or DS3U). The CCI is the interface between the ECCN and synchronizer and main controller.

1.2.6.2 Extended Frame Controller

The extended frame controller (EFC), Figure 1-12, contains the status panel, tape unit, hard disk, synchronizer, and main controller. These units, which are mounted in a 2-shelf assembly, perform the same function as the comparable units in the original switch bay. Table 1-4 lists the codes for the main controller plug-ins that were updated in the CEF switch bay.

1.2.6.3 Synchronizer

The synchronizer, Figure 1-12, contains duplicated circuits for protection against failure. It is equipped to configure for the mode (master or slaved) and stratum of operation. Timing source signals supplied to the synchronizer for timing extraction connect through timing link interface (TLI) plug-ins. The redundant TLI (0 and 1) plug-ins provide for up to four sources. There are plug-in slots for one redundant time base (TB). However, you may add two other redundant TB plug-in pairs by using TLI3 (0 and 1) and TLI4 (0 and 1) slots. You can use the TLI slots because you do not need to interface the external source if you use the internal TB source. The redundant synchronizer power unit (SPU) provides power for the synchronizer plug-ins. The TLI and TB plug-ins are connected to the ECCN through the digital phase-locked loop (DPLL) plug-in. The same synchronizer plug-ins are used in the original switch bay.

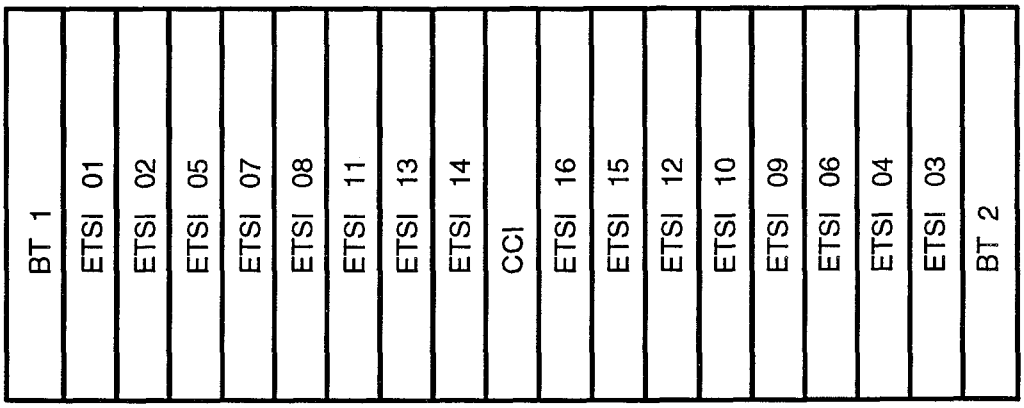


Figure 1-11. Location of Plug-Ins on ECCN Shelf

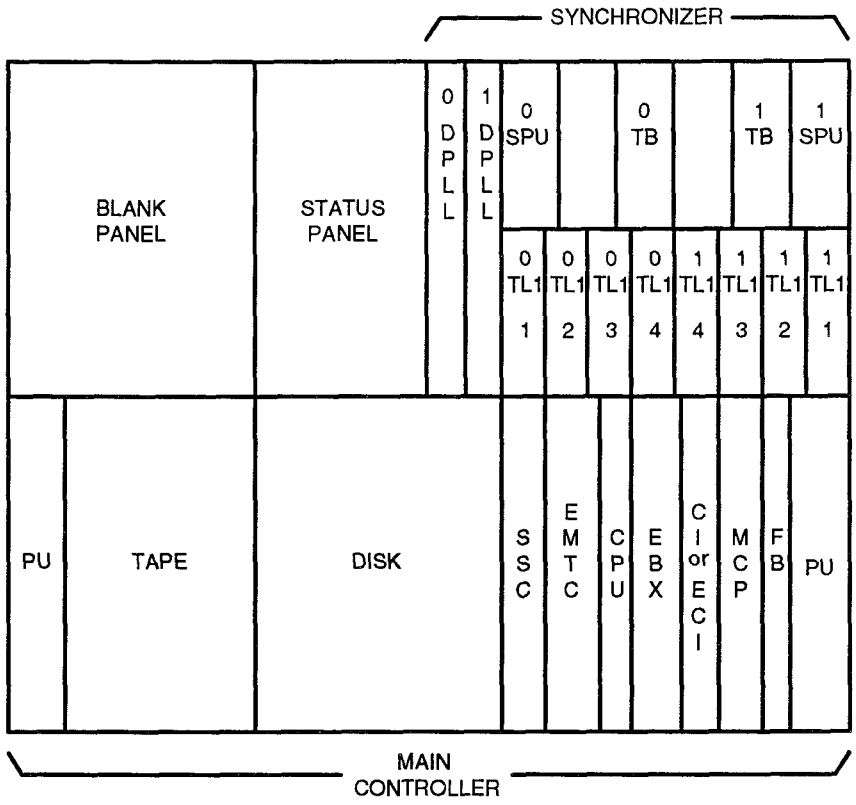


Figure 1-12. CEF Switch Bay Synchronizer and Main Controller Plug-In Locations

Table 1-4. Expanded MC Equipment

Plug-In	Equipment
4-Mbyte CPU	TM657B
8-Mbyte EBX (Expanded Bus Extender)	UM71
EMTC (Expanded MTC)	UM75
8-Mbyte CI	TM658C
8-Mbyte ECI	TM736C
8-Mbyte HECI	TM762
40-Mbyte Hard Disk	ED-9C015-30
24-Mbyte Tape	ED-9C016-30
SSC for 40-Mbyte Disk	TM659C

1.2.6.4 Main Controller

The main controller, Figure 1-12, contains the following units:

- Secondary Storage Controller (SSC)
- Extended Maintenance (EMTC)
- Central Processor Unit (CPU)
- Extended Bus Extender (EBX)
- Communications Interface (HECI)
- Main Controller Power (MCP)
- Fuse Board (FB)
- Power converters
- Hard Disk and Tape Drives.

The SSC controls the interface between the MC and the tape and disk units. The EMTC controls the interface between the MC and the alarm circuits and units. The HECI manages the communications between the internal and external links. The EBX manages the communication between the MC and the ECCN. Two power converters and the MCP provide power for the MC and the disk and tape units. The disk and tape units were described previously.

1.2.6.5 Status Panel

The status panel, Figure 1-13, contains the frame alarm (CRITICAL, MAJOR, and MINOR) indicators, the ACO (alarm cutoff) switch and indicator, and the main controller FAILURE indicator, RESET ENABLE switch, and RESET indicator. A plug on the front of this unit can be used to connect a portable TTY to Link 1.

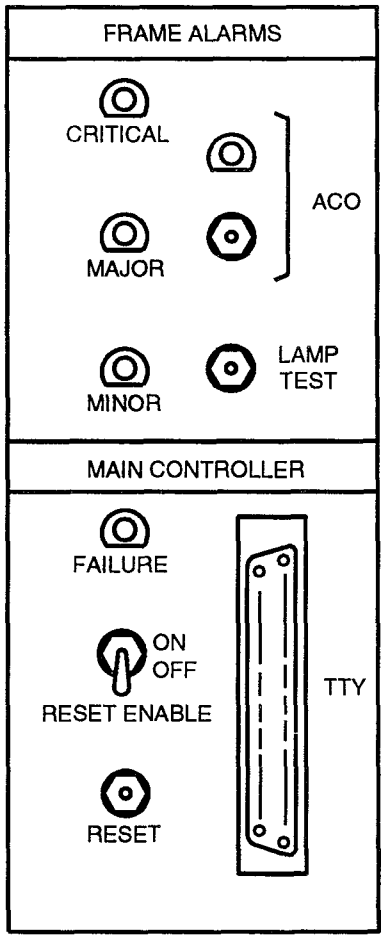


Figure 1-13. CEF Switch Bay Status Panel

1.2.6.6 Fuse and Alarm Panel

The 48-volt input power is distributed through indicator fuses in this panel, Figure 1-14, to the other assemblies in the CEF switch bay.

1.2.7 Interface Bays

As described previously, there are two types of interface bays — the original interface bay and the flexible interface bay.

In the original interface bays, unit positions 1, 2, 3, and 4 were always facility terminating units (FTUs) and Unit positions 5 and 6 were always DS3Us or DSPUs, see Figure 1-3. In the early versions of the flexible interface bay (flex bay), positions 3 and 4 could be equipped with DS3Us or DSPUs. In the latest version of the flex bay, any unit position can be equipped with an IFTU, DSPU, or DS3U (see Figure 1-15). The latest version of the flex bays uses IFTUs exclusively. The FTUs require a power and control unit.

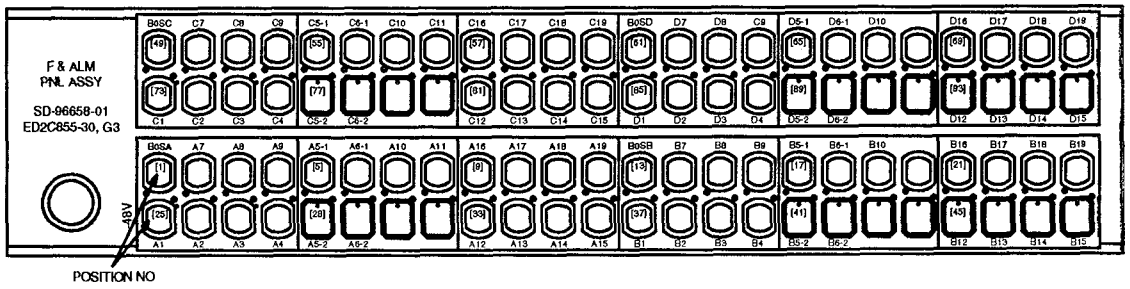


Figure 1-14. CEF Switch Bay Fuse and Alarm Panel

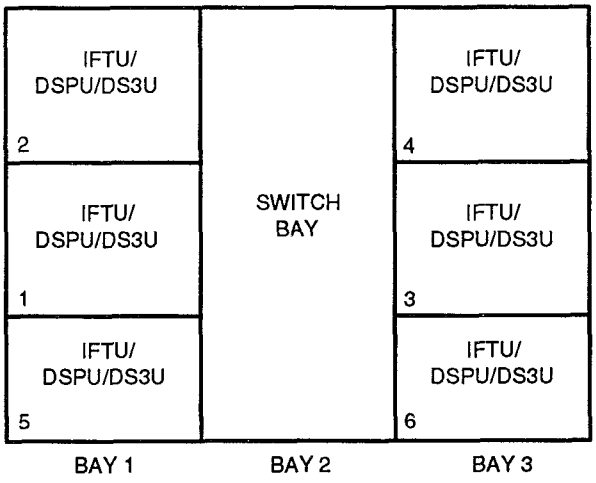


Figure 1-15. Flexible Interface Bay

1.2.7.1 Power and Control Unit

The power and control unit is mounted in the original interface bays that use FTUs. The power and control unit contains power converters, fuse board plug-ins, central processing unit (CPU) plug-ins, and unit bus extender (UBX) plug-ins (see Figure 1-16). There is a power and control unit equipped for each equipped FTU.

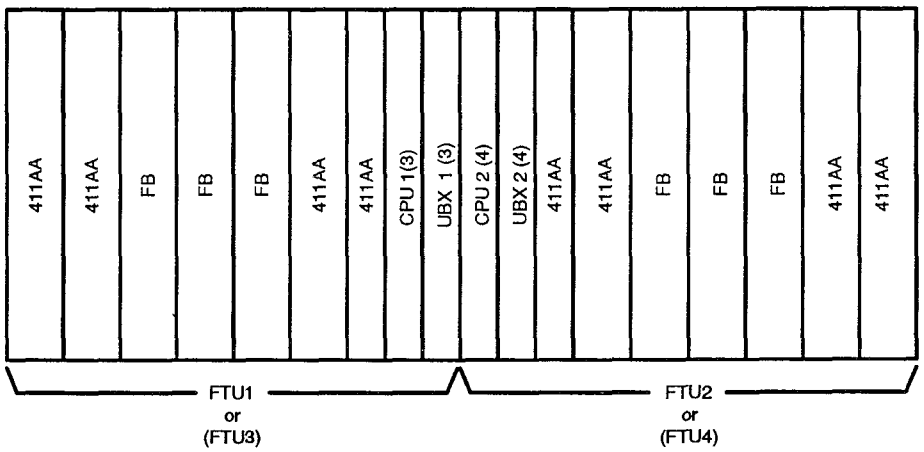


Figure 1-16. Original Interface Bay Power and Control Unit Plug-In Locations

1.2.7.2 Facility Terminating Unit and Integrated Facility Terminating Unit

The facility terminating unit (FTU) is the general name for the circuit block used to terminate digital line facilities; it is also the name for the facility hardware for the original interface bay. Within an FTU, the equipment is further divided into four FTMs (see Figures 1-17 and 1-18). Each FTM occupies one shelf and contains one facility terminating module interface (FTMI), an format converter (FC) for each duplicated side, and up to 20 dual digroup plug-ins of the family of various network processing circuit (NPC) applications. Each dual plug-in contains the circuitry for two NPC positions. Each NPC processes 24 DS0 channels. The common control plug-ins for the original FTU were mounted on the power and control unit described in the previous paragraph. These units are mounted on the FTM in the integrated facility terminating unit (IFTU). (See Figure 1-18.)

Up to four NPCs on each frame can be designated NPCTPs. Each NPCTP has 12 testports. Each testport has two channels. The NPCTPs processing 64-bit DS0 channels are called test access digroups. The NPCTPs processing DS1 clear channel signals are called facility access digroups (FAD).

1.2.7.3 Digital Signal Processing Unit

The digital signal processing unit (DSPU), Figure 1-19, occupies one DACS II shelf and is equipped as needed by the customer to provide digital channel processing functions such as channel bridging and subrate channel processing. This processing is done on internal channels; no facilities terminate on the DSPUs. Each DSPU consists of the common circuit packs, which are the digital signal processor interface (DSPI) and the unit controller, the specialized DSP circuit packs, and the power units for the DSPU. There are 8 DSP positions on the 0-side and 8 on the 1-side of the DSPU giving a total of 16 DSP positions. The DSP packs are duplicated on these two sides for redundancy to allow service switching in case a pack fails. The specialized DSP packs for the DSPU are: digital multipoint bridge (DMB) packs, and subrate multiplexer (SRM) packs, or multipoint junction unit (MJU) packs. Any combination of DMBs, SRMs, and MJUs can be used. The type (or combination of types) of signal processing depends on the customer's applications and services.

1.2.7.4 DS3 Unit

The DS3U, Figure 1-20, is the designation for the shelf of equipment that is used to terminate DS3 facilities on the frame. The plug-in circuit packs for this unit are 12 inches high (which is taller than the packs for the FTU or DSPU), but the DS3U has a smaller heat ramp so that it will fit in the unit positions in the frames. Circuit packs in the unit provide the interfaces with the DS3 coaxial lines and the ECCN or CCN and MC on the DACS II side. Each multiplexer-MIU function group (MMFG) shown in the DS3U consists of mounting positions for the multiplexer (MXR) pack and the optional MIU pack. The power units and the fuse board for the DS3U are also included in the unit. Two multicoaxial cable connectors are provided behind the unit to connect to the transmit and receive coaxial cables for up to six DS3 facilities. Connections to each CCN side are through eight separate ribbon cables, and the connection with the MC is through twisted pair cables.

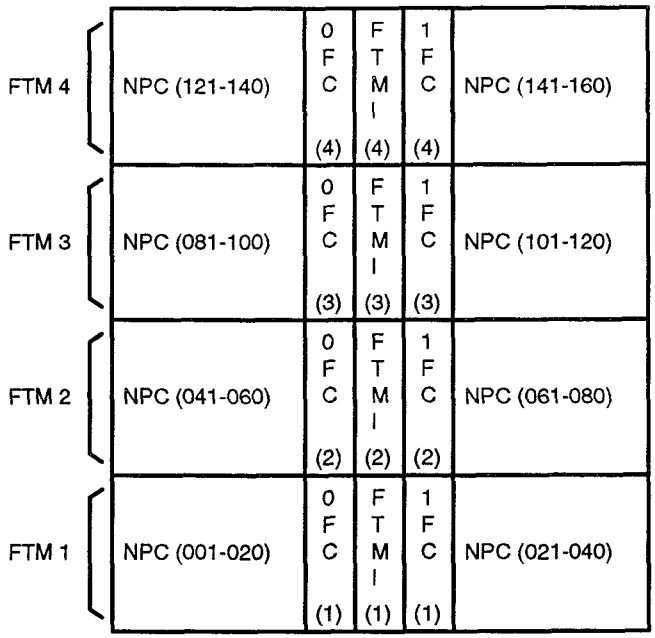


Figure 1-17. FTU Plug-In Positions

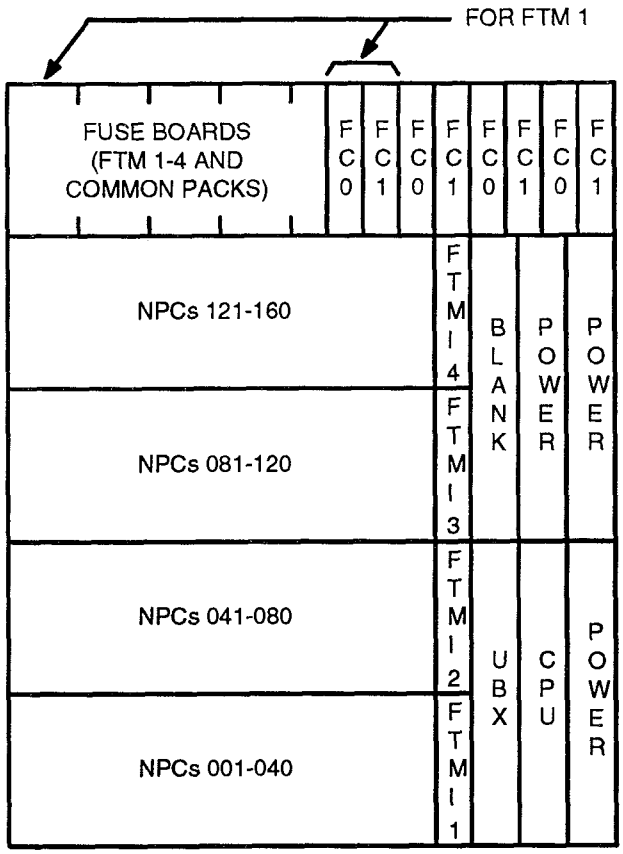


Figure 1-18. IFTU Plug-In Locations (Unit 1 Extended NPC Numbering Shown)

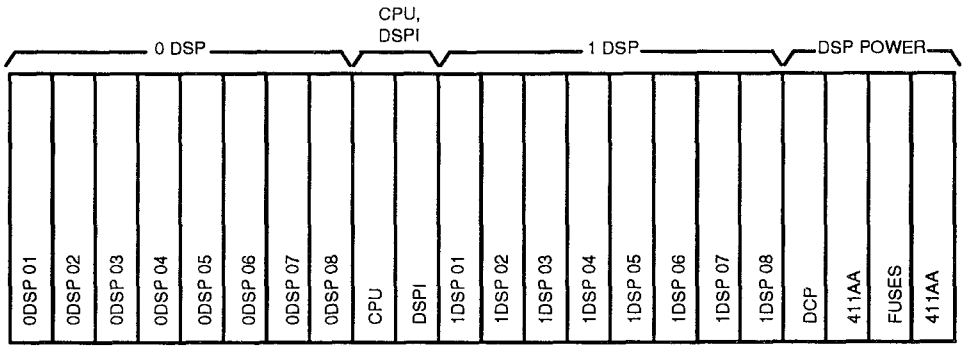
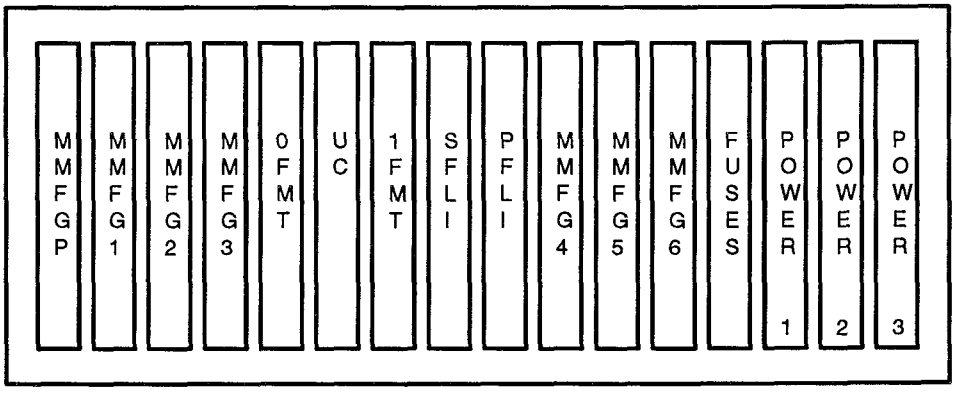


Figure 1-19. DSPU Plug-In Locations



NOTE: EACH MMFG CONSISTS OF MXR AND MIU POSITIONS

Figure 1-20. DS3U Plug-In Positions

1.2.8 Single Bay

The single bay, Figure 1-4, combines one FTU, one optional DSPU (or conditionally one DS3U), power converters, control and synchronization circuitry, a cross-connect network, and hard disk and tape storage devices all in the single bay. It has a special cross-connect network, Figure 1-21, which is slimmed down to serve only two units of NPC. The cross-connect network is designated CCN2. An operational peculiarity of the single-bay frame is that the numbering of the unit positions in it is units 1 and 5 to match the designations in the original interface bay. The disk and tape units in the single-bay frame are similar to the disk and tape units used in the switch bays described previously. The status panel, Figure 1-8; MC and Sync Unit, Figure 1-7; the FTU, Figure, 1-17; DSPU, Figure 1-19; DS3U, Figure 1-20; and power and control unit, Figure 1-16, are the same as comparable units in the original switch and interface bays. The single-bay fuse and alarm panel is shown in Figure 1-22.

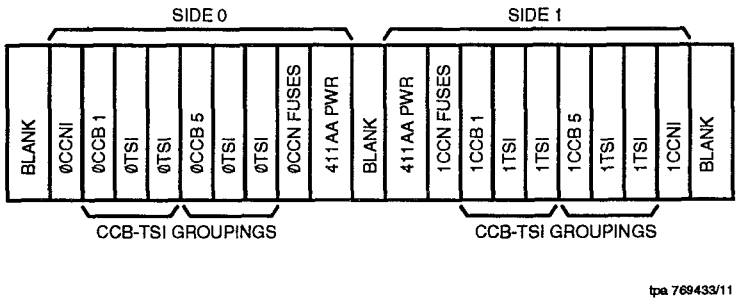


Figure 1-21. Single-Bay Cross-Connect Network 2 (CCN2) Plug-In Locations

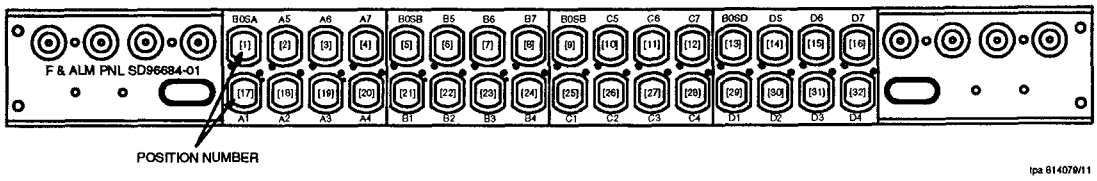


Figure 1-22. Single Bay Fuse and Alarm Panel

1.3 Functional Description

The following paragraphs are a functional description of the DACS II and are intended to provide the reader with a general knowledge of the circuit pack functions and interworkings.

1.3.1 Common Equipment Circuit Blocks

The basic function of DACS II is to provide access to incoming digital signal bit streams to interchange and interconnect (cross-connect) DS0 channels. This is done electronically within the circuitry without making any digital-to-analog conversions. Access to the channels for testing is also done by cross-connections. For test access, the time slots to be tested are cross-connected (mapped) to the time slots in the test access facility. Direct digital testing can be done by using the remote test system 5A (RTS-5A) or remote maintenance system-digital 1 (RMS-D1) test facility. When using RTS-5A, conversions to analog are required to allow testing voice channels. This conversion may be done externally to the DACS II in the channel bank equipment that terminates the test access facility.

The major circuit blocks of the DACS II are synchronization circuits that produce precise timing waveforms needed to maintain time slot alignment, the cross-connect network to accomplish the time slot connections, and microprocessors to manage internal and external operations. Since multiplexing the signal time slots to form higher capacity bit streams is inherent in the cross-connect process, circuit redundancy is needed to protect against the loss of service should a failure occur in a high-channel-capacity pack. Accordingly, all circuit packs carrying more than 120 DS0 channels are duplicated. Similarly, because of their importance, the synchronizers and power supplies are duplicated. The synchronizers also have the capability of temporarily operating in a stable, free-running mode. Nonvolatile memory is provided to protect against the loss of circuit memory if there is a power failure. Interface plug-ins are provided for communications within the DACS II, with administrative links to external systems, and with the office frame alarms system.

To support the increased capacity of the DACS II capacity expansion frame (CEF), expanded versions of two of these circuit blocks are needed. The two expanded circuit blocks include the expanded frame controller (EFC) and the expanded CCN (ECCN); the sync remains unchanged. When the functions of the plug-ins for the new blocks are the same as the corresponding plug-ins for the non-CEF frame, the plug-ins will be described together.

The DACS II circuit blocks are illustrated in the system architecture block diagram in Figure 1-23 which shows both the non-CEF and CEF alternatives. At the center of this diagram is the main controller with its connections to the other controllers and circuitry in the frame. The units of facility terminating and digital signal processing plug-ins and the duplex cross-connect network (CCN), all of which carry the customer service, are shown across the top of the figure. Figure 1-23 shows the use of any type unit in the unit positions that require the fully flexible feature.

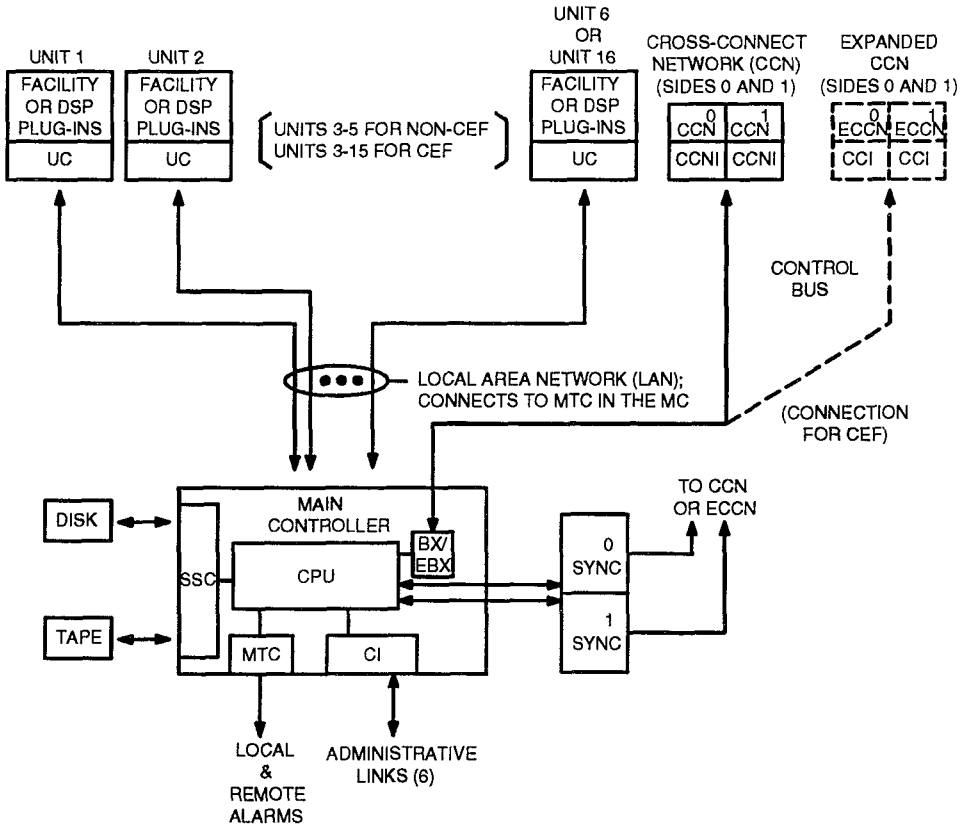


Figure 1-23. System Architecture Diagram

Communication between the unit controller (UC) for each unit and the maintenance circuit (MTC) of the main controller is by means of a local area network (LAN). Communication between the CCN or ECCN and the main controller is by means of a control bus. Connection of the syncs, nonvolatile memory devices, and the alarms and administrative ports to the main controller is as follows: the syncs connect to the main processor, the nonvolatile memory (disk and tape) connects to the secondary storage controller (SSC), the local terminal and outside links connect to the high-speed enhanced communications interface (HECI), and the alarm connections go to the maintenance pack. These major blocks are the topics of discussion in the following paragraphs.

1.3.1.1 Main and Secondary Controllers

The heart of the DACS II microprocessor control system is the main controller (MC). The MC maintains the DACS II operating system, processes input commands and internal interrupt operations, and detects and responds to internal errors and alarms. It communicates with the other controllers to execute the time slot cross-connections, and it monitors the health of the frame. One result of this monitoring is the selection of one duplicated sync to supply timing to the frame and the selection of the associated CCN to carry service. Other results are initiating recovery routines if an error is detected and reporting alarms if a failure has occurred.

The MC consists of the following circuit packs:

- central processing unit (CPU)
- secondary storage controller (SSC)
- high-speed enhanced communications interface (HECI)
- maintenance circuit pack (MTC or EMTC)
- bus extender (BX or EBX).

The CPU contains the microprocessor circuitry and the associated circuit memory. The SSC directs the information exchange with the nonvolatile, backup memory devices: the hard disk and the tape. Updating the hard disk and recovering lost information are done through the SSC. The HECI is the interface between DACS II and external administrative ports as well as a local terminal. The EMTC or MTC pack is the hub for the LAN and serves mainly as the alarm control point. The BX or EBX provides the dual bus control interface to the duplicated cross-connect network.

The unit controllers, which are the secondary controllers, manage the service provisioning information in the local unit memories. They also process commands from the main controller and send replies or requested information over the LAN to the main controller.

In the FTU/IFTUs, the facility terminating module interface (FTMI) provides communication between the UC and the network processing circuits in the modules of the unit. The unit bus extender (UBX) serves as an interface between the UC and FTMIs. In digital signal processing units, the digital signal

processing interface (DSPI) serves as the interface between the processing circuit and its UC. In the cross-connect network for the non-CEF frame, the cross-connect network interface (CCNI) is the interface between the network and the control bus going to the main controller. For the CEF frame, the clock and control interface (CCI) contains the main controller interface circuitry. HECI is the interface between DACS II and external administrative ports.

1.3.1.2 Nonvolatile Memories

The hard disk and the tape cartridge for DACS II are referred to as nonvolatile because they are magnetic devices and do not require continuous DC power as do the other memory devices in the DACS II. The hard disk contains an up-to-the-minute copy of the cross-connect map and the functional status of the frame. These records are automatically updated by transfers through the SSC and are never more than one command transaction behind. Since this record is automatically updated, it can be corrupted if a failure occurs or if errors are transferred. This is one reason the backup tape cartridge is provided.

The disk and tape for the CEF frames have expanded capacity so that only one of each is needed to provide the storage capabilities for the expanded MC and the 16 peripheral units. The capacities of these disk and tape units are 40 Mbyte and 24 Mbyte, respectively, compared to 20 Mbyte for these units for the non-CEF frame.

If troubleshooting shows that the hard disk record has been corrupted, the tape data base can be used to overwrite the disk which in turn can be used to boot the data into the frame. The tape must be manually updated; thus, the frame should be queried for out-of-service and failed packs before the data base information is copied to tape. Another use of the tape is to keep a copy of the DACS II internal operating system software. As such, it can be used to boot the frame memories from scratch if there is a catastrophic failure (a crash) and can be used to load new software (for example, maintenance releases or new generic software loads) into the machine.

1.3.1.3 Internal Synchronization

Figure 1-24 is a block diagram of the DACS II synchronizer. The synchronizer has duplicated sides (sync 0 and sync 1). Each sync contains the following plug-ins: up to four timing link interfaces (TLI), one or two time bases (TB), and one digital phase-locked loop (DPLL). The TLIs are used as timing extractors or timing distributors. The synchronizers operate in either the slaved or master timing mode. In the slaved mode, the TLIs are used as both timing extractors and timing distributors. In the master timing mode, they are used as timing distributors only. The TB is a source of stable timing for the DPLL. The DPLL is the source of the DACS II timing signals. Control of the DACS II synchronizer is accomplished through a pair of 2-way communications links to the main processor (MP). Syncs 0 and 1 are cross coupled so they run at the same frequency and phase during normal operation.

During normal operation, both sides are energized but only one side is in service (active). If the active side fails, service is automatically switched to the other sync. If both syncs fail, the synchronizer enters the "holdover" state. In the holdover state, the synchronizer retains the last good frequency. And the stability of the synchronizer is dependent on the stability of the output of the TB plug-in. There are TB plug-ins that can match the following references:

- Domestic Stratum 2
- Domestic Stratum 3
- 2.048-Mb/s Interface Toll
- 2.048-Mb/s Interface Local.

In the slave timing mode, the timing extractor develops a timing reference from an incoming timing link signal. The timing extractor reference output in conjunction with the stable timing signal from the TB adjusts the output of the DPLL to match the incoming link signal. Each timing extractor can accept two incoming timing link signals. Each incoming timing link signal is applied to the same timing extractor input terminal in syncs 0 and 1. You can use up to four TLIs as timing extractors. Therefore, there is a possibility of connecting up to eight incoming timing link signals to the synchronizer. Only one of the inputs controls the synchronizer output. The signals are prioritized so that if a signal of higher priority fails, the synchronizer switches to the signal of next highest priority. In Gateway applications, sync timing can be extracted from 2.048 Mb/s line signals. Eight NPC positions in units 1 and 2 (four NPCs per unit) can be used for the source signals. When used as timing sources, the NPCs are identified in the commands to grow the TLI ports.

Different codes of TLIs are used as timing extractors depending on the nature of the incoming links. The timing extractor selected depends on the line rate and signal format of the incoming line signal of the external clock. The available timing extractors include circuit packs to accommodate the following incoming timing links:

- 1.544-Mb/s DS1 Transmission Lines
- 2.048-MHz basic synchronization reference frequency (BSRF)
- CCITT CEPT 2.048-Mb/s transmission lines
- CCITT 2.048-Mb/s transmission lines
- Sinusoidal/square waves of various frequencies
- 64-kb/s composite clock for the digital data system (DDS).

In the slave timing mode, each TLI slot that is not used as a timing extractor can be used as a TD. The TD output signals are derived from the DPLL output. The TD distributes timing signals to equipment outside the DACS II.

In the master timing mode, the DACS II is a timing island providing its own timing and timing for external equipment as required. In the master timing mode, a third TB is installed in sync 1 TLI slot 3. The third TB provides additional redundancy

for reliability and maintenance purposes. In the master mode the TDs distribute timing signals to external equipment the same as they do in the slave mode.

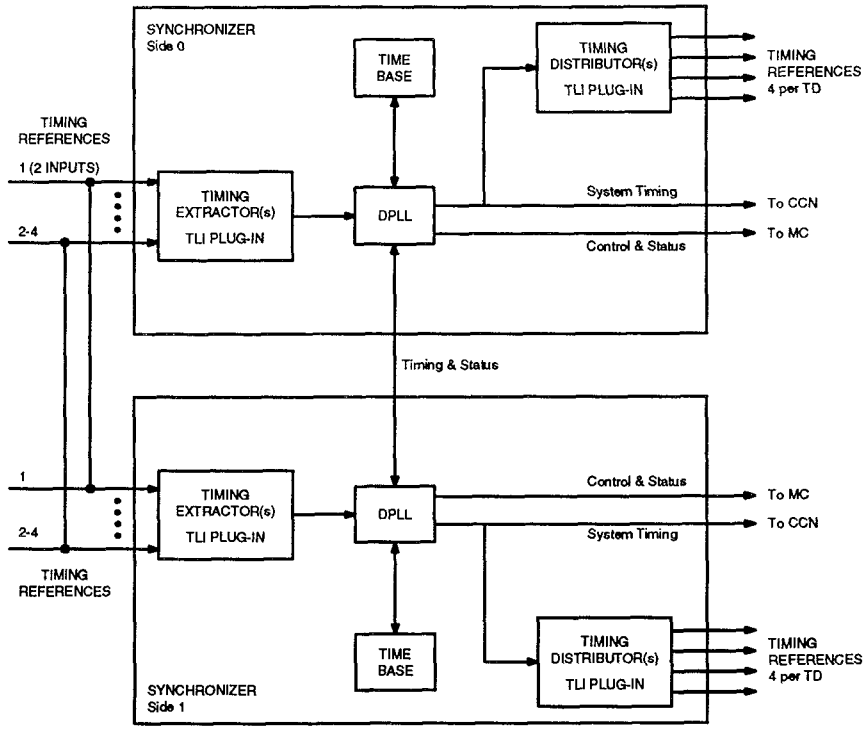


Figure 1-24. Synchronizer Block Diagram

1.3.1.4 DS1 Facility Terminating Units

The FTU/IFTU is the peripheral unit type that is grown and equipped to terminate DS1 lines. Common equipment in the FTU provide the control functions and signal processing for connection to the CCN or ECCN. The network processing circuits (NPCs) provide the line interface and signal processing. The family of NPC codes, each with its own array of software selectable line options, provides all the required line formats and zero code suppression modes for compatibility with other transmission equipment at the far end. The functions of the circuit packs in an FTU are described in the following paragraphs. A fully equipped FTU consists of four facility terminating modules (FTMs). Figure 1-25 shows the signal rates and conversions that take place in the FTM.

Communication and control circuitry for the FTU is contained in the unit controller (UC), the unit bus extender (UBX), and the FTM interface (FTMI). The UC connects to the DACS II main controller over the LAN. Within the FTU, the FTMI serves as the interface between the UC and the packs in the FTM, distributing information from the UC and sending replies from the FTM packs. Distributing information from the UC involves decoding the address data for the appropriate FTM. The UBX is needed with the UC to isolate and reclock the communications with the FTMI.

Timing and sync pulses from the synchronizer are delivered to the format converter (FC) packs in the FTM from the cross-connect buffer (CCB) or clock and control interface (CCI) packs of the cross-connect network. The FTMI is also timed from the FC packs.

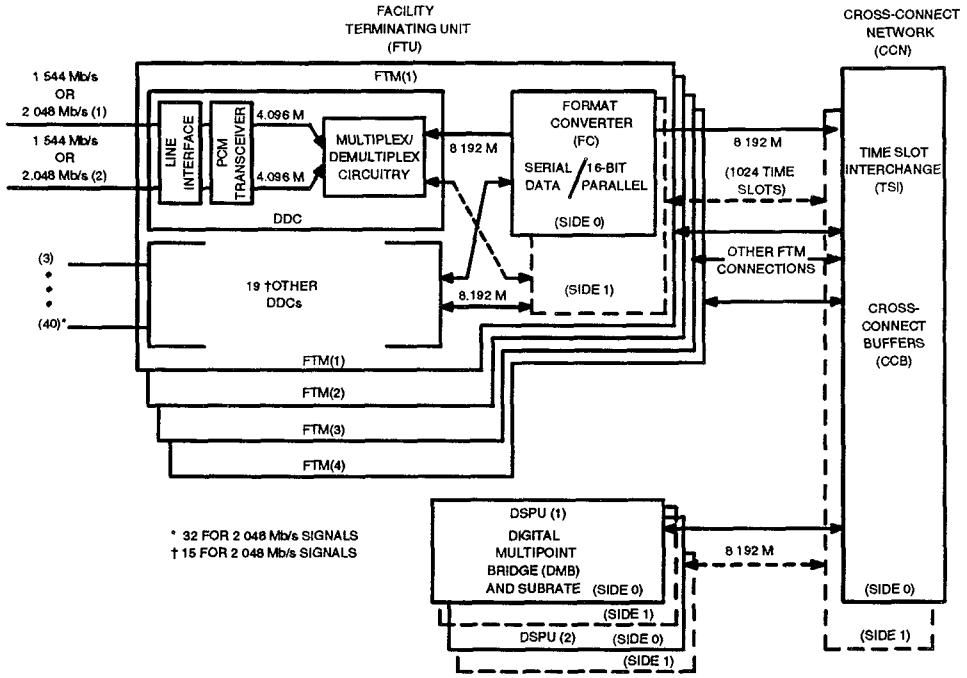


Figure 1-25. Unit and Cross-Connect Network Block Diagram

The line interface of the NPC terminates the incoming line signals and provides the compatible framing and signaling format. Among these formats (for DS1) are: superframe (Fs), extended superframe (Fe), DDS data, D4 channel bank, *SLC*® 96, and 1.544 Mb/s clear-channel lines. Circuitry for two NPC positions resides on a dual circuit plug-in installed in the FTMs. The NPC also: (1) provides facility performance monitoring, (2) sends and receives facility alarms, and (3) sends carrier trunk conditioning to the other end.

In addition to the line interface circuitry, the DDC contains processing circuitry to change the signals to standard form for multiplexing into higher rate bit streams internal to the DACS II. Pulse code modulation (PCM) transceivers convert the two digroup signals to higher rate signals, and a multiplexer combines these into a single bit stream that is twice the rate of each input. The multiplexer also produces a duplicate output signal for protection if one output (side) fails. These outputs are applied along with the same outputs from the other DDCs in the module to the respective format converters (FCs) of the module. In the FC for

each side, these signals are converted from serial to parallel data forms and read out on multiple leads to the respective CCN. The FC for a side goes to the like side of the duplicated CCN, and these same conversions and connections occur for the other (up to three) FTMs in the unit.

When the FTMI is grown in the software data base, the line interface equalizer is specified for the FTM shelf. For DS1 lines, the equalization for the left and right halves of the FTM shelf is specified; this equalization is applied to the outgoing (transmit side) path going to the DSX-1 bay.

1.3.1.5 Cross-Connect Networks

Different cross-connect networks are used for the non-CEF and CEF frames, but the overall function of the network remains the same. That overall function is to accomplish channel cross-connections by the time slot interchanging operations in the time slot interchange (TSI) packs. These packs are called expanded TSIs (ETSIs) in the ECCN for CEF frames. The TSI or ETSI operations are: connecting unit channel data to network buses, switching time slots out of the network data buses to the unit buses, and connecting the cross-connected data to the unit port. Each TSI or ETSI has access to the network data from all the peripheral units. The switching of time slots into the unit buses is enabled by buffers in the TSIs that store the data so that it can be written into the unit buses in the correct channel sequence. Each facility or digital processing unit connects to the CCN or ECCN over four network buses or ports. These ports have a 4096 time-slot capacity. Each port contains 1024 time-slot data buses, timing, status and error information.

Interconnection of information in the internal bit stream establishes a path through the DACS II that may be a 1- or 2-way cross-connection, a broadcast connection, or connections to the DSPUs for conference bridging. The type of connection is controlled by the input command. This path (or map) is determined by the main controller based on the record of used and available paths in the controller memory. The maps are autonomously transferred to the nonvolatile memory of the disk for backup protection. The CCN and ECCN are single-stage, nonblocking, time division switches.

The CCN or ECCN is duplicated so that cross-connections can be reproduced in the other network by the main controller without any loss of service should a failure occur on the active side. If the main controller is also out of service when a failure occurs in the CCN, ECCN, or duplicated peripheral unit pack, other packs in the unit will cause the switchover to the other side of the cross-connect network. The switchover can also be manually forced to allow maintenance on the inactive side.

Three CCNs are available for the different size DACS II frames: the CCN for the original multibay frames (with up to six units), the CCN for the single-bay frame (with two units), and the expanded CCN (ECCN) for the capacity expansion frame (with up to 16 units). These versions of the CCN are described in the following paragraphs.

1.3.1.5.1 CCNs for Non-CEF Frames

When fully equipped, the CCN for the original multibay frame is a 24,576 X 24,576 time-slot switch because it handles 6 times the 4096 time slots (per unit). Each side of the CCN mounts up to 36 TSIs, one CCNI, and one CCB for each peripheral unit. In a fully equipped frame, six TSIs are required per unit to interconnect each unit with itself and the five other units. The CCN interface (CCNI) communicates between the CCN and the MC and contains the error summary register for the CCN. The CCB produces the timing and sync pulses from the synchronizer circuit block. The TSI switches time slots from the network data buses from all the peripheral units to the CCB for conversion to the port going to the associated unit. Power for the duplicated network is obtained from power units in a separate shelf.

The CCN for the single-bay frame is a scaled down version of the above; it is an 8,192 X 8,192 time-slot switch because it serves up to two units. This network is distinguished in the software as the CCN2. Fully equipped, it contains four TSIs per side, one CCNI per side, and two CCBs per side. Power is obtained from power units in a separate shelf.

The ECCN for the CEF is a 65,536 X 65,536 time-slot switch because it handles 16 times the 4096 time slots (per unit). Each side of this duplicated network mounts one clock and control interface (CCI), one ETSI per unit (16 total), and two bus terminators (BT). The CCI regenerates sync clock and timing from the sync, communicates between the expanded MC and the ETSIs including master resets from the MC, and provides error detection for the ECCN. The ETSI converts the network data from the peripheral units to format required in the ECCN, connects time slots from the unit to the network receive data bus, switches time slots out of the network buses from all the ETSIs, and connects the time slots to the transmit data buses going to the associated unit. The BTs terminate both ends of the 16 network buses running between the ETSIs with a resistive termination. These packs also force desired states on these buses during inactive periods or when the CCI pack is disconnected. Figure 1-26 shows a simplified block diagram of the ECCN; this diagram is drawn with the BTs on the sides which nicely resembles the plug-in mounting in the ECCN shelf.

The CCI contains the converter circuitry to produce 5-volt power for itself and the ETSIs on the same side of the network. Additional 3-volt power required by each ETSI is produced on the ETSI itself. There are no separate power units for the ECCN.

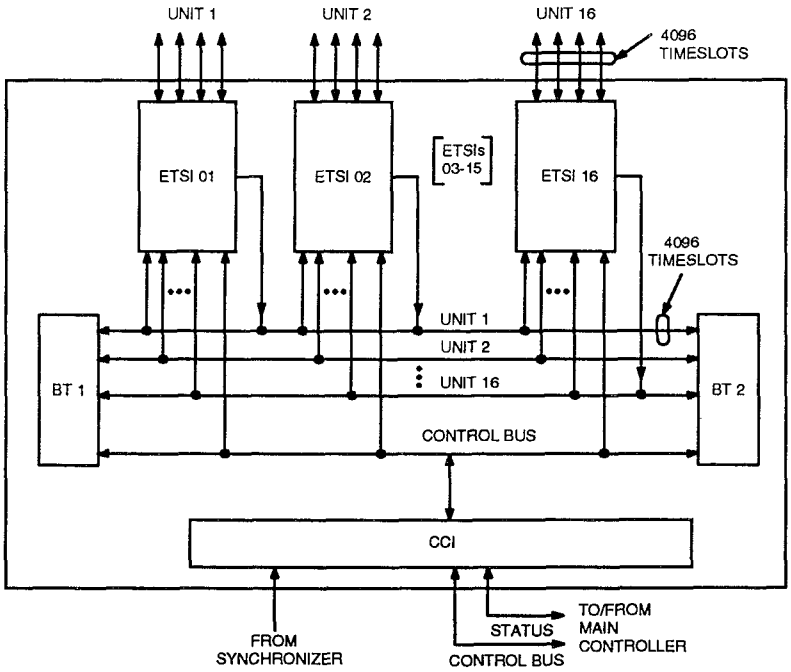


Figure 1-26. ECCN Block Diagram

1.3.1.6 Digital Signal Processing Units

These are equipped with the appropriate duplicated DSP circuit packs to produce further time slot interconnections and custom arrangements such as DS0 channel bridging or subrate data multiplexing. By being separate from the facility terminating units, the full time slot capacity of a unit is available at the DSPUs to allow almost any size or type connection without sacrificing any termination capacity in the facility units.

DS0 channel bridging is enabled by installing digital multipoint bridge (DMB) circuit packs in the DSPU. Each DMB consists of a single circuit pack that serves both the input and output functions. Channels to be bridged are cross-connected in the CCN, bridged in the DMB, and returned to the CCN to be added to the data stream. This bridging is done digitally without decoding the channel information. Each DMB contains two conferencing devices, with each conferencer supporting 256 channels. Thus, each DMB pack can support 12 channels or up to 170 separate 3-leg conferences. As additional DMB packs are added, additional conferences can be supported. Each DSPU can support up to eight duplicated DMB packs. Channel associated signaling bits are not transmitted across the DMB. The DMBs are duplicated for protection against service loss and connected to the respective sides of the CCN.

Among the bridge configurations that can be supported are the symmetrical, polling, and broadcast. The symmetrical configuration is a 2-way communications circuit between all bridge legs. The polling data network is a 2-way broadcast circuit where the broadcast direction is from the FTU NPCs through the CCN only. The return direction is summed and processed for gain, echo suppression, and noise guard through the DMBs in the DSPUs. The broadcast network is a 1-way circuit with only one return path to the backbone. Broadcast connections are actually formed outside the DMB in the CCN.

Other DSP plug-ins provide subrate channel data processing. Subrate processing includes those functions into the DACS II that are done by external DDS multijunction units and subrate multiplexers. These functions are described under the heading *Feature Functions*.

1.3.1.7 Frame Alarm Indications

Extensive error detection and handling takes place in the DACS II. For example for a hardware error, the DACS II evaluates all the error inputs including any from power units and reports the results in an ERR ANALYSIS message. These processes and those that check for software errors are not detailed in this manual. General descriptions of the following are provided here:

- Circuit pack failures
- Carrier failure alarms
- Facility performance alarms.

1.3.1.7.1 Circuit Pack Failures

Circuit pack communication and operations are continuously monitored by the main controller to check for errors. If errors are detected, the main controller institutes an error recovery routine which confirms that the error was not a transient and runs diagnostic tests on the suspect pack. The suspect pack is also removed from service, and service is switched to the other side if the circuit group is duplicated. If the tests fail, an office alarm is registered. If the tests pass, the CP (circuit pack) must be manually restored to service. In the DS3 unit, all the transmission packs are included in protection switching groups. This switching to a standby spare prevents the loss of service due to the failure of a single pack.

1.3.1.7.2 Carrier Failure Alarms

These show a loss of incoming signal, framing, or high transmission errors or receipt of a remote alarm signal from the equipment at the other end of the line. Incoming failures are reported in an output message as a red alarm, and the receipt of the signal that indicates a local alarm at the other end is reported as a yellow alarm. Either condition also generates an office alarm. Facility protection switching is provided with the *SLC* carrier feature to switch service to the protection line and thereby avert a carrier failure situation. Whenever a red alarm exists, DACS II sends a yellow alarm signal to the other end. Additional carrier failure alarm conditions that are reported in output messages are:

- Simultaneous red and yellow DS1 alarms
- AIS (alarm indication signal), also referred to as the all 1s signal
- Local and remote alarms from a digital multiplex interface frame (DMI/BOS signaling format).

The AIS (all 1s signal) is a digital signal associated with a maintenance alarm detected on a defective maintenance span. DACS II transmits the AIS signal in the direction of the failure as a substitute for the normal signal. It is intended to show other equipment (downstream) that a failure has occurred elsewhere and to inhibit local alarms so that the defective section can be identified by the local alarm indication.

The programmable AIS alarm allows the user to select how the alarm indication signal from the far end will be reported. The DACS II user can select whether a major alarm, minor alarm, or informational alarm (default) is generated.

During a carrier failure, the affected NPCs send trunk conditioning and trouble insertion words out on the channels. Trunk conditioning is used on channels with signaling to cause office switching equipment to discontinue calls and stop charges. Trouble insertion words are sent in the message part of the channel and are necessary to signal trouble on data circuits. The codes for these trunk conditioning or insertion words are entered as part of the cross-connect commands.

1.3.1.7.3 Facility Performance Alarms

Microprocessor circuits in the NPCs detect and record various line error conditions. The results of this monitoring are used to provide status information on demand and to register office alarms when prescribed thresholds are exceeded. The monitored parameters vary depending on the type of NPC, but the following list for DS1 lines serves as an example: (1) line bit errors, (2) errored seconds, (3) severely errored seconds, (4) cyclic redundancy check errors, and (5) carrier reframing activity. Current counts are available on demand by requesting the NPC status, and accumulated counts are obtained by requesting the count for a particular facility parameter or as provided in the daily (midnight) report.

The alarm thresholds for the facility parameters are set initially when the NPCs are provisioned for service. Unless specific alarm thresholds are entered, default values apply. Up to three additional values for each alarm can be loaded into the DACS II to serve as options that can be selected initially or by means of a change command.

1.3.1.8 Status Panel Functions

The status panel conveys status and alarm information regarding the DACS II and provides an administrative port (TTY1) for connection of a console terminal. This is a multiple of administrative link 1 and allows connection of a portable terminal while the regular terminal is disconnected from the back. The non-CEF and CEF status panels have the same front panel features. The CEF panel is mounted on a plug-in.

There are five LED indicators on the status panel. The classification of the alarms and the color of the LEDs vary on panels used outside the U.S.A., but the following gives the domestic stampings:

- FRAME ALARM - CRITICAL: Indicates a service-affecting failure affecting more than 120 channels (red LED)
- FRAME ALARM - MAJOR: Indicates a service-affecting failure affecting equal to or less than 120 channels (red LED)
- FRAME ALARM - MINOR: Indicates a non-service-affecting failure (yellow LED)
- MAIN CONTROLLER - FAILURE: Indicates a failure of the main controller (red LED)
- FRAME ALARM -ACO (ALARM CUTOFF): Indicator that is lighted when the alarm cutoff switch is operated (green LED).

There are four switches on the status panel that do the following functions:

- FRAME ALARM - ACO: Disables the audible alarm
- FRAME ALARM - LAMP TEST: Checks for failed lamps by lighting all lamps on the status panel
- MAIN CONTROLLER - RESET ENABLE: Switch that enables (ON position) or disables (OFF position) the main controller reset switch
- MAIN CONTROLLER - RESET: Resets the main controller provided the RESET ENABLE switch is in the ON position.

1.3.1.9 Powering

Power distribution and fusing for the frame are done on the main fuse and alarm panel and on shelf fuse blocks. Office battery is delivered over four feeders so that the loss of any input will not interrupt service. These feeders are fused at the fuse and alarm panel with 70-type fuses that provide a visual indication when blown and automatically activate office alarms.

Power units in the frame produce lower DC voltages derived from the -48 volt input. Secondary feeders distribute power to groups of converters for the major circuit blocks in the frame (controllers, syncs, CCNs, DSPUs, FTUs, and the hard disk). Each side of the sync and CCN has its own converter group. Different codes of converters are used for the various output voltages needed in each group, but each one has common protection mechanisms. These mechanisms are: a power interlock, to turn the converter off whenever the latch is opened for removal; and power shutdown circuits, to prevent overvoltage or overcurrent damage. A red LED on each converter lights when a shutdown circuit operates, when the output fails, or when the latch switch is turned off. A power converter failure causes an office alarm. The 563A converters for the DS3 unit also have a green LED that lights to show that the power is on.

The power protection philosophy for plug-in power units is based on the use of N+1 redundant power converters that supply the load in a converter group. Sufficient power reserve is available when a single converter fails. This is done by monitoring circuits and extra wiring that keeps the converter groups in a power sharing mode until a failure is detected. The number of standby power units needed in a power group is determined by the load requirements.

For the ECCN of the CEF frame, the CCI pack for each side contains the power converter circuitry to produce 5-volt power for itself and the ETSIs on the same side of the ECCN. Additional 3-volt power required by each TSI is produced on the ETSI itself.

1.3.2 Feature Functions

1.3.2.1 Gateway Feature

The DACS II gateway feature enables domestic 1.544 Mb/s and international 2.048 Mb/s facilities to coexist within a DACS II system for translation and cross-connection between the two disjointed facilities.

The DACS II performs several functions in providing the gateway feature. The DACS II does domestic μ-law and international A-law pulse code modulation (PCM) translation, provides signaling conversion between domestic robbed bit and the international abcd bit signaling, and performs point-to-point as well as point-to-multipoint DS0 cross-connections. In addition, the DACS II provides a host of performance monitoring and maintenance functions for efficient and effective facility translation and transmission.

When DACS II is used as a gateway between international and domestic facilities, the international side of the FTU/IFTU is equipped with the appropriate dual primary circuit (DPC) plug-ins and the domestic side is equipped with dual digroup circuit (DDC) plug-ins. Only 32 of the 40 NPC positions in an FTU/IFTU module can be equipped for the 2.048-Mb/s interface.

The DPC performs the conversions between the 4-bit and 2-bit signaling and the A-law and μ-law voice encoding in the two signals (Figure 1-27). Cross-connect command fields NAM, <tc>, and <sc>, are applicable for a gateway connection. The NAM field (no A-law to μ-law conversion) disables the conversion for data signals that are already in digital form (no encoding). The <tc> field identifies the type of DS1 circuit to DACS II (signaling or transparent) and specifies trunk conditioning. The <sc> field (signaling conversion) allows setting signaling bits (abcd) to 0 or 1, inverting bits, or passing bits through unchanged. This field is used in gateway to dictate how signaling bits (c and d) which are not used on both sides are to be set.

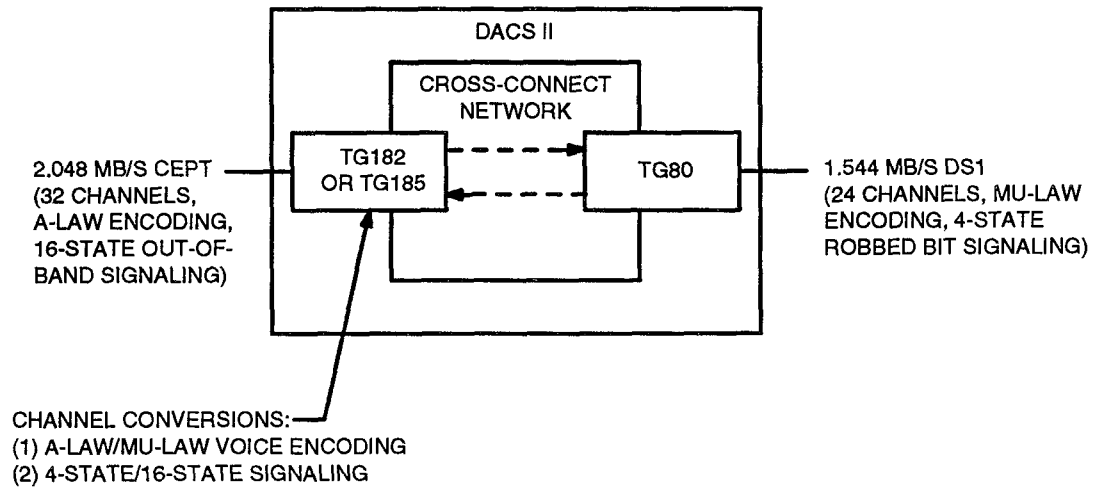


Figure 1-27. Gateway Signal Conversions

1.3.2.2 DACS II *SLC* Carrier Direct Interface

The *SLC* carrier direct interface eliminates costly external equipment required to terminate *SLC* carrier facilities and provides grooming functions for these interfaces. Special NPC plug-ins (S96D, SS5D, and TG80B) allow the DACS II to terminate lines from connecting RTs for the following: *SLC* carrier Modes I and III and *SLC* Series 5 carrier feature package B (FPB) and FPC. The *SLC* 96 carrier Mode III or *SLC* Series 5 carrier FPC configuration (Figure 1-28) multiplexes special service channels only, on up to two or four (Series 5 FPC)

bidirectional DS1 facilities. Each Mode III configuration uses a 2.2-kb/s data link derived from the Fs framing bit to carry alarm and protection switching information between the RT (remote terminal) and DACS II. The Series 5 FPC configuration uses the ESF framing format that has a 4-kb/s data link. The DACS II terminates the Mode III or Series 5 carrier lines, processes and terminates the *SLC* carrier data link, supports facility protection switching between the *SLC* carrier RT and DACS II, and routes the associated DS0 channels onto intraoffice or interoffice facilities, depending on the application.

The *SLC* 96 carrier Mode I or Series 5 FPB configuration (Figure 1-29) carries both locally switched and special service channels on up to four bidirectional DS1 facilities. The *SLC* carrier data link carries alarm, protection switching, and maintenance information between the RT, DACS II, and the digital switch. DACS II terminates the Mode I or Series 5 FPB interface, passes the switched DS0 channels and its associated data link maintenance information to a digital switch, supports facility protection switching between the *SLC* carrier RT, and grooms out the nonswitched channels onto intraoffice or interoffice facilities, depending on the application.

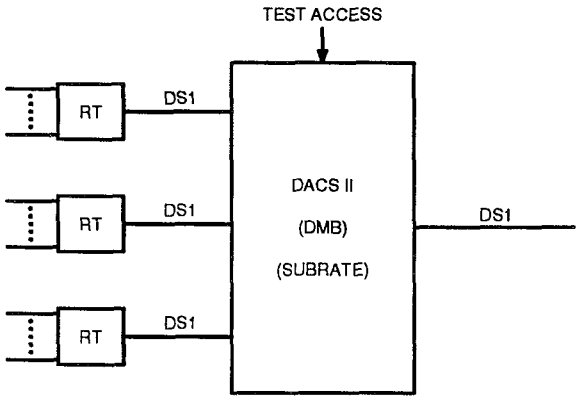


Figure 1-28. DACS II *SLC* 96 Carrier Mode III and *SLC* Series 5 Carrier FPC Interface

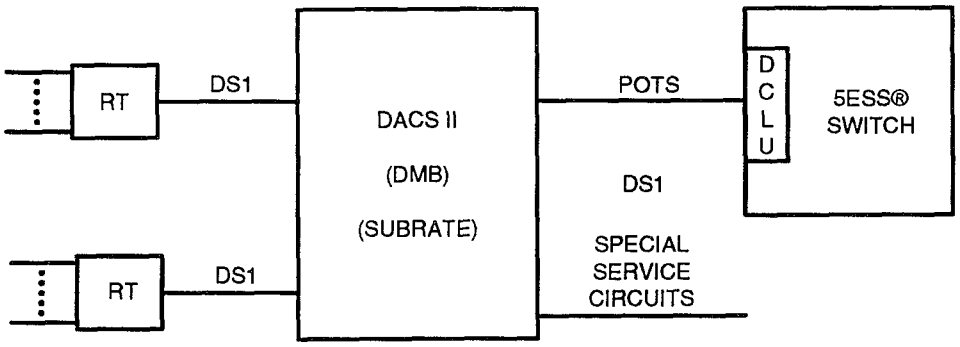


Figure 1-29. DACS II *SLC* 96 Carrier Mode I and *SLC* Series 5 Carrier FPB Interface

1.3.2.2.1 Framing Format for *SLC* 96 Carrier Interface

The *SLC* 96 carrier RT uses the derived Fs framing format to communicate with the central office equipment. he derived Fs framing format is a 4-kb/s data link (on digroup A) with 2.2kb/s carrying data and 1.8kb/s sharing the bit position with the D4 signaling frame (Fs) format.

1.3.2.2.2 *SLC* 96 Mode I 5:4 Protection Feature

A 5:4 protection arrangement for the Mode I and FPB interface feature replaced the existing 5:5 arrangement. There is no protection line between DACS II and the digital switch with the 5:4 arrangement. Every digroup (including DGA) will only be protected between DACS II and the RT; no protection switching is performed on the DL digroups.

1.3.2.2.3 Framing Format for *SLC* Series 5 Carrier FPC Interface

The *SLC* Series 5 carrier RTs communicate with the central office equipment by means of a 4-kb/s data link derived from the DS1 bit stream of digroup A. The framing format for this data link is the ESF (extended superframe format) with the D4 channel counting sequence.

1.3.2.2.4 Circuit Pack Requirements for *SLC* Carrier Interface

The DACS II hardware required to achieve the *SLC* carrier direct interface consists of the TG183 *SLC* 96 carrier dual card (S96D) and the TG184 *SLC* Series 5 carrier dual card (SS5D). The TG183 pack is also used for *SLC* Series 5 carrier FPB with Specials (FPBw/S) which is the Series 5 equivalent of *SLC* 96 carrier Mode I. These circuit packs can be used in any of the DDC (dual digroup circuit) slots of the facility terminating units. The S96D and SS5D circuit packs can be grown in DACS II as either a DS-type or a DE-type NPC. When grown as a type DS NPC, these cards provide a line interface with the following characteristics:

- Fs or ESF format DS1 signal (as required) with data link for status and protection switching communications
- 9-state signaling for coin telephone circuits
- *SLC* carrier alarm handling and data link communications
- Facility performance monitoring
- Line signal loopback capability.

The TG80B circuit pack can be used for the *SLC* 96 carrier Mode I and Mode III non-data-link-carrying digroups; it can also be used for the *SLC* Series 5 carrier FPBw/S interface for non-data-link-carrying digroups. The TG184 is required for all digroups for the *SLC* Series 5 carrier FPC interface.

When grown as a DE type, the S96D and SS5D circuit packs perform all the functions of the DDC. The DACS II software enables the line protection switching and allows all 96 channels from the different *SLC* carrier digroups to be addressed on digroup A by means of the DACS II commands. The protection switching is done by automatically cross-connecting the failed line channels to the standby protection line.

1.3.2.2.5 Alarms in *SLC* 96 Carrier Mode III Interface

The alarm field of the data link specifies framing, major, minor, power/miscellaneous, and digroup alarms as well as far-end loopback (FELP) command messages for all shelves. DACS II recognizes, detects, and declares the associated alarm condition when an alarm message is received in the alarm field of the data link from the RT.

1.3.2.2.6 Alarms in *SLC* 96 Carrier Mode I or Series 5 Carrier FPB Interface

DACS II can recognize, detect, and declare alarm conditions from either the RT end or the local switch end. DACS II will always intercept and overwrite the alarm bits of the data link, regenerate other bits, and transmit over the data link to the far end. Therefore, when a failure occurs between DACS II and the digital switch, instead of generating an alarm condition on the entire DS1, DACS II will trunk-condition each channel of the affected POTS circuits in the direction of the RT. In this way, the non-locally-switched channels between the RT and DACS II

remain unaffected and their service is not impaired. DACS II always passes major and power/misc alarms received from the RTs to the local digital switch.

1.3.2.2.7 Alarms in *SLC* Carrier Series 5 FPC Interface

Three types of alarms are available from the *SLC* Series 5 carrier system:

- The alarm indication signal (AIS) on each digroup
- Yellow alarm on each digroup
- Alarm information on the digroup A data link for all digroups.

The alarm information carried on the data link includes major, minor, power/miscellaneous, and carrier line failure alarms for the near end and the far end. DACS II recognizes, detects, and declares all alarm conditions received from the *SLC* Series 5 carrier system.

1.3.2.2.8 Maintenance in Mode III or Series 5 FPC Interface

DS1 Facility Monitoring. DACS II monitors for and detects loss of data link data, out-of-frame (OOF) conditions, loss-of-signal (LOS) conditions, and bipolar violations (BPVs) for *SLC* 96 carrier, and cyclic redundancy checking (CRC) for Series 5 on the DS1 lines.

Line Loopbacks. There are two line loopbacks supported by DACS II in the *SLC* carrier interface. The first is the line interface loopback (LILB), where the DS1 signal is internally looped back to sectionalize a failure to the DS1 line interface. DACS II can do an LILB automatically after a manual protection switch is done. DACS II does this loopback the same way it is done in the *SLC* carrier systems. The second type of loopback is the line loopback (LLB). DACS II is capable of initiating or terminating an LLB in response to a manual request entered over one of the administrative links. If the LLB is initiated by DACS II, the FELP message is used to request that the channel bank loop the incoming DS1 signal to the output bitstream. If DACS II receives an FELP message from an RT or digital carrier line unit (DCLU), DACS II performs a full DS1 loopback towards the bank it received the message from. LLBs allow craft personnel to do single-ended fault location of the looped digroup from the near end. The LILB and LLB are illustrated in Figure 1-30.

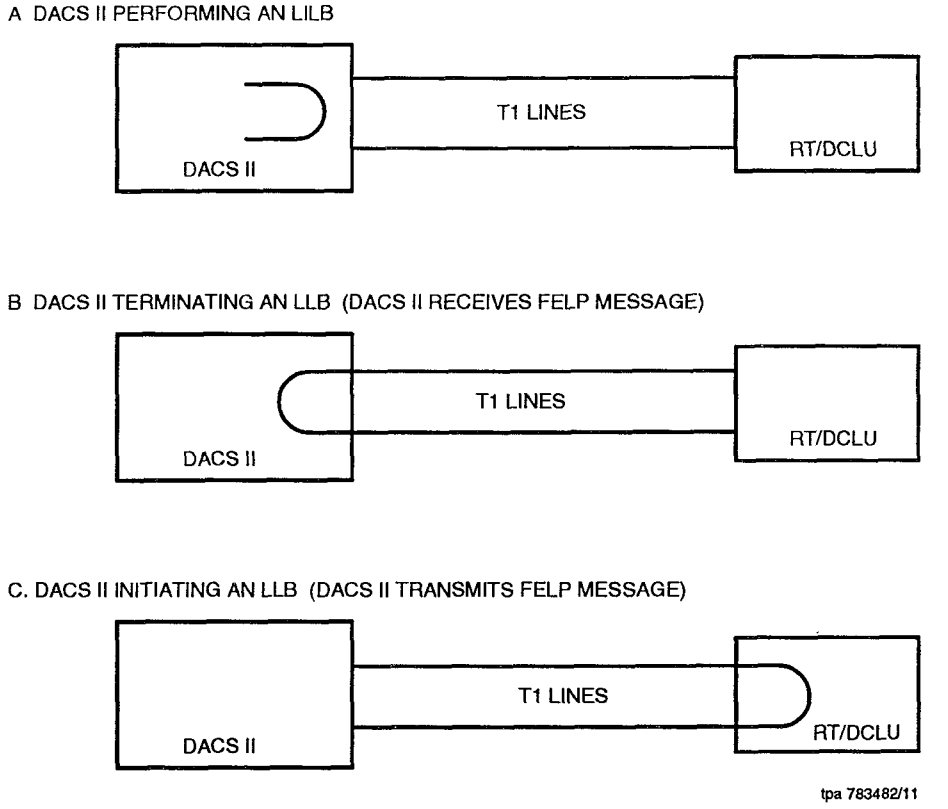


Figure 1-30. Line Interface and Line Loopbacks

Protection Line Switching. A protection line and the associated digroups at each end can be equipped to carry service if one of the primary lines fail. Switching of service onto the protection facility is accomplished by coordination of the equipment at each end of the facility over the *SLC* carrier data link. At the DACS II end, the facility switching is accomplished by automatically cross-connecting all the affected service channels to channels of the protection digroup. Protection switching can also be initiated manually by entry of a command. When not directly in use, the protection line is continuously powered and monitored and carries duplicate service for the RT A-shelf main line. Since the protection line must be able to carry DGA service, the DGP must be provisioned with a *SLC* carrier data link.

1.3.2.2.9 Maintenance in Mode I or Series 5 FPB Interface

DACS II performs the same maintenance procedures for both special service channels and POTS channels. For protection switching, there is a protection line on the RT side of DACS II. When the digroup with the data link needs to be

protected, DACS II will ensure that the data link continues to be passed through to the switch. If non-locally-switched special service channels are involved on the failed line, DACS II reconfigures its cross-connect map and switches the special service channels to the protection digroup.

1.3.2.2.10 CIU for *SLC* Carrier and Series 5 Carrier

The craft interface unit (CIU) can be plugged into the channel test unit (CTU) of a Series 5 carrier RT, or it can be connected to a DACS II administrative port. All the transmission and signaling options for the channel units are entered from the CIU by commands sent to the RT bank controller (BC). The CIU transmits the information to the BC, which stores the information in nonvolatile system memory. Since the information is stored, the provisioning can be done before the channel units are installed; then when installed in the frame, the BC writes into the channel unit registers.

1.3.2.3 DACS II Subrate Feature

The DACS II Subrate feature is implemented in DACS II by adding two new circuit packs to the existing digital signal processing unit (DSPU). The subrate multiplexer (SRM) and the multipoint junction unit (MJU) circuit packs under the control of the software provide all the functions of a DDS hub including the following:

- Subrate multiplexing
- Dataport error correction
- DS0A and DS0B cross-connect capability
- Secondary channel capability
- Multipoint bridging
- Parity channel error correction.

Figure 1-31 shows that access to the Subrate feature is provided by cross-connecting an incoming channel from a facility digroup to a DSPU equipped with SRM and MJU circuit packs. The required digital data functions are performed, and the resulting signal is sent back to the cross-connect network (CCN). Multiple circuit processing functions such as those for a circuit that requires both subrate multiplexing and multipoint bridging are performed by connecting the desired functions in tandem by means of the CCN. Functions located on the same Subrate feature card can also be connected in tandem by means of the CCN. Subrate error correction can be associated with any multiplexer or MJU circuit, or it can exist as a separate stand-alone function. Once all required processing is performed, the signal is then cross-connected by means of the CCN to the outgoing facility. The internal cross-connections are done automatically by the system.

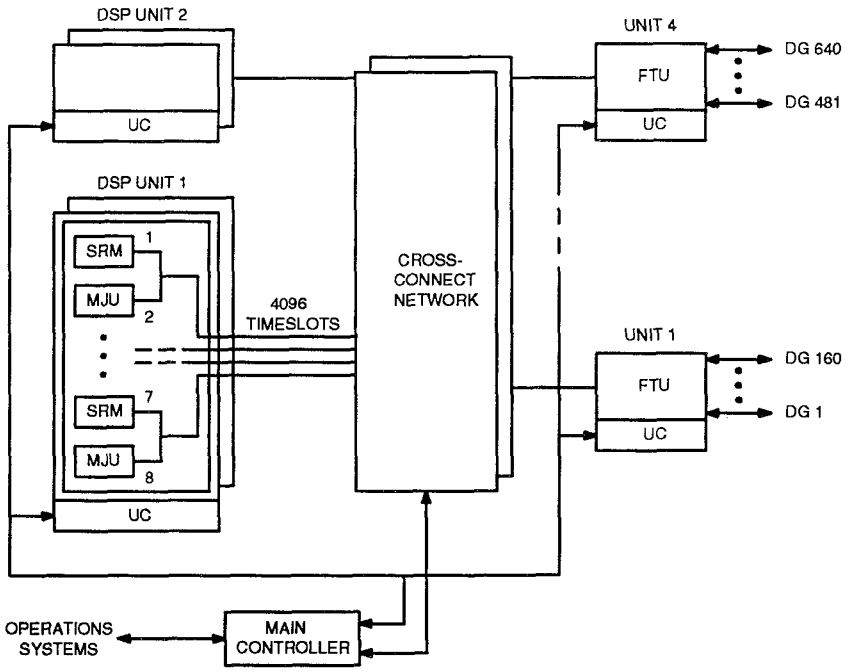


Figure 1-31. DACS II With Subrate Feature—System Architecture

1.3.2.3.1 SRM Circuit Pack

The SRM circuit pack provides standard digital data subrate multiplexing of 2.4, 4.8, and 9.6-kb/s DS0A formatted signals and dataport error correction. The SRM functions are illustrated in Figure 1-32. The SRM circuit pack provides three types of subrate multiplexers that multiplex five, ten, or twenty subrate channels. Any subrate channel interfacing the SRM circuit pack can have dataport subrate error correction performed on it as an independent function or in combination with multiplexer processing. Similarly, 56-kb/s DS0A channels can interface the circuit pack and have parity channel error correction performed as an independent function. This function can also be performed on the DS0B channel associated with any multiplexer.

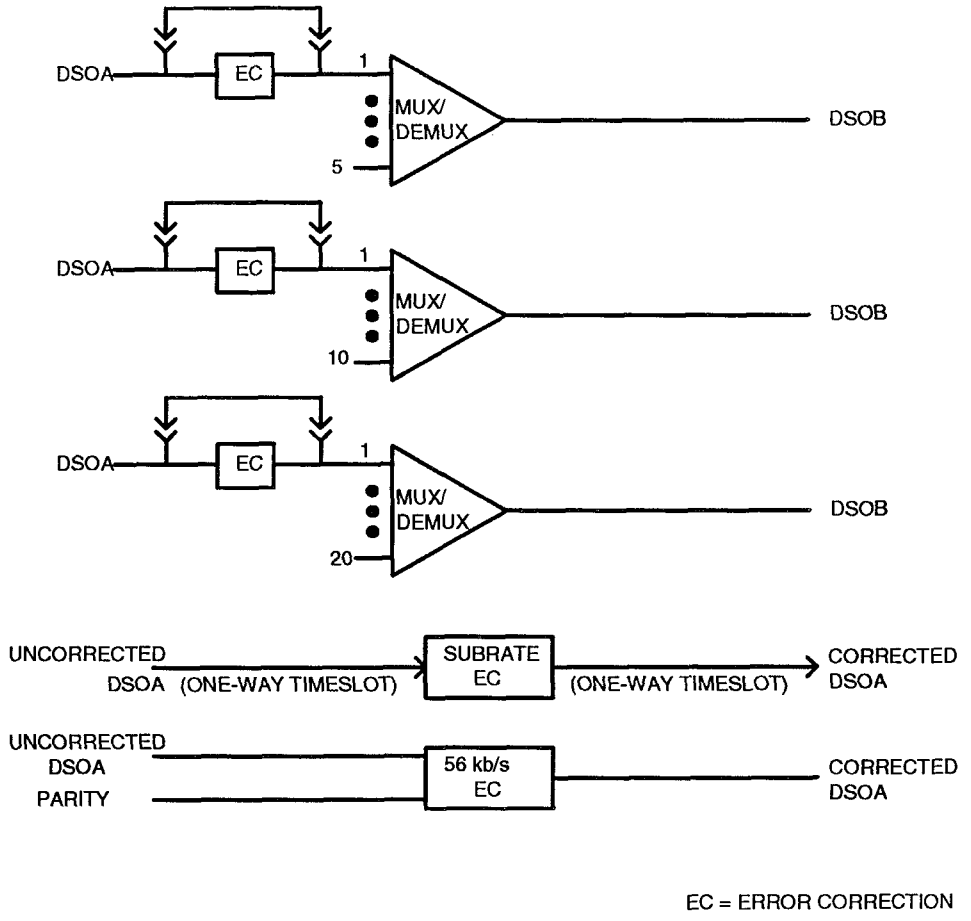


Figure 1-32. SRM Functions

1.3.2.3.2 MJU Circuit Pack

The MJU circuit pack provides multipoint bridging of subrate and 56-kb/s DS0A formatted signals and provides dataport error correction. These functions are illustrated in Figure 1-33. This bridging is equivalent to that done in external multipoint junction units. Each MJU provides one control leg and four branch circuits. Multipoint circuits requiring more than four branches are formed by cascading MJU branch circuits to the control leg of additional MJUs. The MJUs operate at 2.4, 4.8, 9.6, and 56 kb/s and do the signal processing necessary for the secondary channel capability. As with the SRM circuit pack, channels interfacing the MJU circuit pack can have subrate or parity channel dataport error correction done on them as an independent function or as part of the MJU processing. The MJU circuit pack also provides digital data system (DDS)

maintenance functions (blocking, branching, and loopback) in response to automated bit access test system (ABATS) commands. The hub identifier (HUBID) must be provisioned by software before the MJU can be grown.

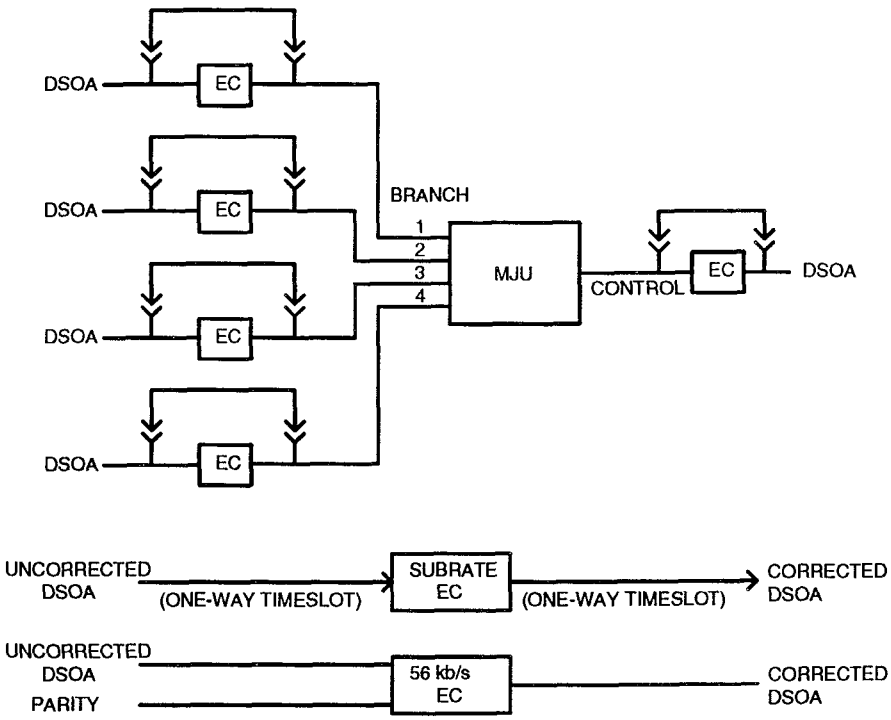


Figure 1-33. MJU Functions

1.3.2.3.3 DACS II Subrate Capacities

The DSPU supports up to eight circuit packs that are duplicated for protection. The DSPU can support any combination of SRM, MJU, and digital multipoint bridge (DMB). All are designed for use in the DSPU. Each circuit pack position has a capacity of 512 time slots.

The MJU circuit pack supports up to 102 multipoint junction units with 1 control leg and 4 branch circuits per multipoint junction unit. The number of subrate multiplexers supported on the SRM circuit pack depends on the mix of 2.4, 4.8, or 9.6-kb/s channels. The 5-channel SRM uses 6 time slots per multiplexer. The 10-channel SRM uses 11 time slots per multiplexer. The 20-channel SRM uses 21 time slots per multiplexer. These capacities do not include error correction. Three time slots are required if parity channel error correction is included on a 56-kb/s DS0A channel. Additional time slots are required to do subrate DS0A error correction only when there is no multiplexer or MJU involved. The system reserves the total number of time slots needed for each function to ensure that

access is always possible for every channel or port. This ensures that the system will be nonblocking for all cross-connections.

1.3.2.3.4 DACS II Subrate Memory Administration

The subrate data base and all operations are controlled by the main controller in the frame. The software for subrate is downloaded from tape to the DACS II hard disk when the frame software is installed or updated. All equipment status and circuit maps associated with the Subrate feature are stored on the DACS II hard disk system as a backup for the volatile memory in the frame. Data on the disk is further backed up by storage on the DACS II tape system. If there is a loss of data in the volatile memories (RAM), DACS II can be rebooted from a cold boot. Cold boot is defined as a manual reset of the DACS II that results in all controllers being reset, the data base being downloaded from the hard disk, and all hardware assignments being reestablished from disk information.

1.3.2.4 DS3 Termination Feature

Each DS3U terminates up to six DS3 coaxial lines and contains the equipment to demultiplex the DS3 asynchronous signals into component DS1 signals and to DS0 channels for connection to the existing CCN for cross-connection. DS0 channels from other facilities connected to the CCN are assembled into DS3 signals for connection to the DS3 lines in the other direction. Once derived, the DS0 channels can be cross-connected to other DS0 channels, to the DSPU, or to test access equipment for transmission and signaling tests. The DS3U equipment also offers DS3 and DS1 signal performance monitoring.

Since one DS3 signal contains 28 DS1 signals, protection switching is provided in the DS3U to prevent the loss of service owing to the failure of any single circuit pack in the DS3U. This switching is for a failure of any Multiplexer - Multiplexer Interface Unit pair; there is neither a spare DS3 facility nor DS3 facility switching.

The following subsections provide the functional description of the DS3U circuitry and the DS3U protection switching.

1.3.2.4.1 Transmission Paths

Figure 1-34 shows a simplified block diagram of the DS3U equipment. The facility line interface (FLI) pack forms the interface with the DS3 coaxial lines on the facility side of the unit, and the formatter (FMT) forms the interface with the CCN on the DACS II side. At the heart of the multiplexer-multiplexer functional group (MMFG) is the multiplexer (MXR) which contains the muldems (multiplexer-demultiplexers) to make the signal conversions between the DS1 and DS3 (M13 muldem) and between the DS1 and DS0 (M10 muldem). The functions of these packs are detailed in the following subheadings for those packs.

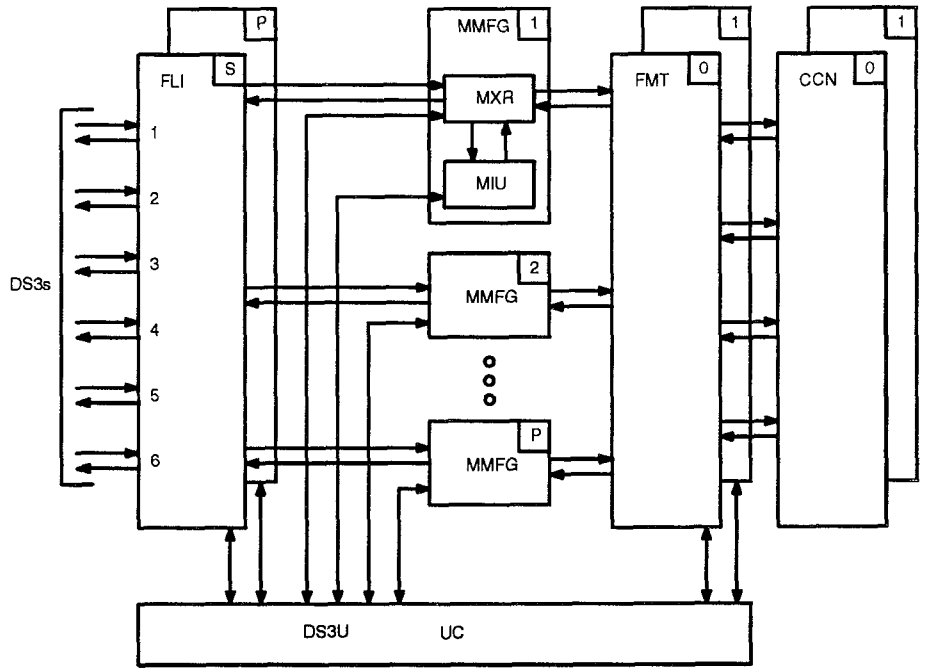


Figure 1-34. Simplified DS3U Block Diagram

FLI Pack. This pack terminates up to six DS3 coaxial lines for connection to the MXR positions in the DS3U. In addition to the signal termination that involves both impedance matching and signal level equalization, the FLI also: (1) performs bipolar/unipolar signal conversions, (2) recovers DS3 line clock signal for MXR demultiplexing functions, and (3) accomplishes DS3 signal loopback on an out-of-service MXR when the pack is diagnosed. Two FLI packs are provided in the DS3U for protection switching. The line signals pass through relay contacts for the service and protection FLI packs in the unit so that the DS3 signals can be connected around the service FLI to the protection FLI if the service pack fails. The FLIs (working with the FMT packs) also accomplish the MXR protection switching on the line side of the MMFG packs. If any of the six MMFGs fails, the FLIs and FMTs simultaneously switch DS3 data to the protection MMFG. Further details on the operation of the protection groups in the DS3U are covered under a separate heading. Circuitry in the two FLIs maintains 75-ohm line impedance whether one or both of the unit FLIs are present.

MXR Pack. Figure 1-35 shows an expanded block diagram of the data flow through the M13 and M10 muldems in the MXR pack. At the FLI interface on the pack, the MXR selects either the service or protection FLI to accomplish protection switching of the FLI on the DACS II side. In the direction of

transmission toward the CCN, the M13 muldem demultiplexes the DS3 signal into 28 DS1s which are applied to the 28 PCM transceivers in the M10 muldem. Each transceiver reformats the 24-channel data and signaling and the facility data link (FDL) into a 32-channel 4.096-Mb/s serial signal that is combined with the signal from the other transceiver for the pair in the channel controller circuit. The channel controller multiplexes the two 4.096-Mb/s signals into a single 64-channel 8.192-Mb/s serial stream. The FMT interface interleaves two pairs of these 8.192-Mb/s signals into a 16.384-Mb/s serial stream. Seven such signals are developed for the seven pairs of channel controller signals in this interface and are applied to both the 0 and 1 side FMT packs. The 28 PCM transceivers correspond to 28 NPC positions in the MXR that are provisioned by DACS II commands.

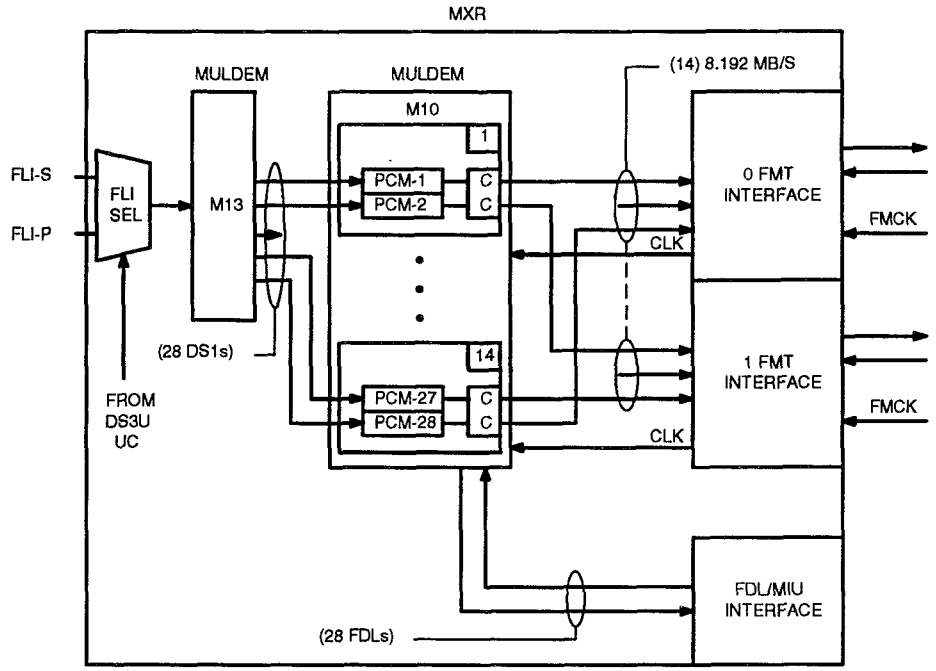


Figure 1-35. Simplified MXR Block Diagram

In the direction of transmission from the CCN, the MXR performs the reverse functions to produce one DS3 signal from the DS0 channels delivered by the CCN. The DS0 channels received from the FMT packs on the seven 16.384-Mb/s serial data streams are converted to fourteen 8.192-Mb/s signals that connect to the fourteen channel controllers. Signals are received from both FMT packs, and the channel controllers select the source based on the CCN status bus. The channel controllers further demultiplex those data signals into the 4.096-Mb/s signals and apply them to the respective PCM transceivers. The M13 muldem multiplexes the 28 DS1s from the PCM transceivers into the

44.736-Mb/s unipolar stream that is applied to both the service and protection FLI packs. This M13 muldem contains the necessary DS1 buffers for storage and the circuitry for bit stuffing to accomplish the mux/demux functions.

FMT Pack. The formatter pack contains MXR interface circuitry, four receive formatters feeding the CCN, four transmit formatters from the CCN, a clock generator, and DS3U UC interface. In the direction of transmission toward the CCN, the interface produces fourteen 8.192-Mb/s streams from the seven 16.384-Mb/s signals from the MXR pack. Circuitry for 2:1 selection of the 16.384-Mb/s signals from the service or protection MXR packs accomplish protection switching of the MXR pack on the CCN side. Each of the four receive formatters takes signals from the MXR interface circuitry (of 1-1/2 MXR packs) and applies them to one of the four receive ports to the CCN network. Each of these CCN ports is the standard interface provided for any of the FTU or DSPU units in the frame. The four CCN ports are 1024 time-slot, 8.192-Mb/s ports. Only 1008 slots out of the 1024 slots contain DS0 channel information from the DS3 signal.

In the direction of transmission from the CCN, each of the four transmit formatters receives a 1024 time-slot, 8.192-Mb/s signal from one of the four CCN ports. Signals from these formatter circuits are split into six signals that are connected to 2:1 selection circuitry for protection switching of this direction of transmission to the MXRs. The selected signals are converted by the MXR interface circuitry that produces the seven 16.384-Mb/s signals for the MXR packs.

There are two FMTs in the DS3U, each one associated with one side of the CCN. These form a protection group to protect against the loss of service owing to the failure of a single FMT pack. The FMT is switched with the CCN side which means that its failure causes the CCN side to switch and that the FMT switching follows the CCN switching (initiated by other causes). The clock generator in the FMT produces a local frame sync and an 8.192-MHz clock. These signals are distributed from the FMT on each CCN side to the six service MXRs and one protection MXR in the unit. The MXR selects the timing signals from the active FMT and in turn produces a 44.736-MHz clock that is used for timing the MXR's DS3 output signal.

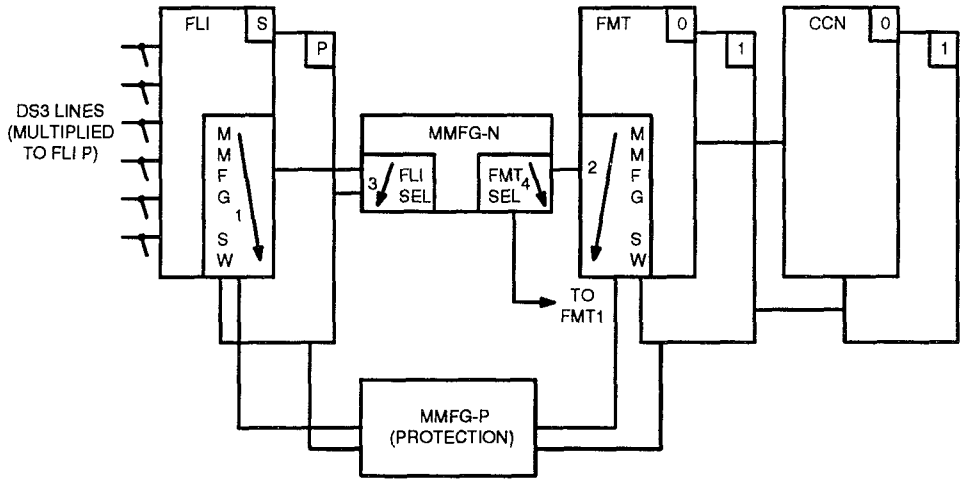
1.3.2.4.2 Protection Switching

The standby packs in the DS3U protect against the loss of service owing to a failure of any single pack. The strategy is implemented by having the following protection groups: the FLIs (1:1 protection), the MMFG (MXR) group (1:6 protection), the FMTs (1:1 protection), and the power units. Subsequent paragraphs describe the first three failure groups, and Figure 1-36 shows how the protection circuitry is placed to accomplish switch around of service. The power protection is based on the availability of reserve power. Three power units in the DS3U are diode OR'd together to supply the DS3U although only two are required for the load.

The FLI protection switching maintains service if one of the FLI packs fails in the DS3U. This switching is accomplished by relays in the FLI packs and switching circuitry in the MXR packs. The switching is so fast that the transmission may only perceive a framing error. This switching is under control of the DS3U UC, but if the UC is not present, the service FLI is automatically selected. If either FLI loses power or is physically disconnected, the select signal from the UC is overridden and the other FLI is automatically selected.

The MMFG protection switching maintains service if there is a failure of any single MMFG. There is one protection MMFG for the six service MMFGs. The MMFG includes the MXR packs and will be switched out as a group if any pack in the group fails. This switching is accomplished by circuitry on both sides of the MXR in the FLI and FMT packs. To accomplish this switching, the DS3U UC coordinates the switching operations on these packs and loads provisioning into the protection MXR to match that of the MXR to be switched out. The overall operation is managed by a fail-safe, lock-and-key mechanism administered by the DS3U UC. This mechanism is a step-by-step procedure in which the UC unlocks the involved packs and loads the provisioning information, but the switching can be locked again if any involved pack cannot be unlocked. Conversely, the UC can override locked conditions if one or more of the FLI and FMT packs are failed. However, the procedure also prevents a failed UC from falsely initiating a switch. The MXR switching is so fast that the transmission may only perceive a framing error.

The FMT protection switching maintains service if one of the FMT packs fails in the DS3U. The 0-side and 1-side FMT packs are part of the CCN failure group and are switched with the CCN side. The switching is controlled by the DACS II main controller that monitors the status of all CCN packs on both sides. If the MC is failed or out-of-service, the switching is automatically controlled by the error status of the CCN side (based on the status of all the packs on each side).



NOTE: SWITCH CONNECTIONS 1 AND 2
REQUIRED FOR MMFG SWITCHING

Figure 1-36. Protection Switching Circuitry

1.4 Commands and Messages

1.4.1 Introduction

DACS II is an interactive system controlled by software commands. There are two message languages that can be used by a user to communicate with DACS II. These are the PDS (Program Documentation Standards) and the MML (Man-Machine Language). Each language has a set of input commands and output messages that are used to communicate with DACS II. An *input command* is a communication between a user and DACS II. *Input commands* are sent from a user to DACS II. Output messages are originated by DACS II and sent to the user. This section gives an introduction to the format of the input commands and output messages.

Comprehensive discussions of input commands and output messages can be found in the PDS and MML versions of the DACS II command and message manuals. This section does not replace those documents, but it provides an overview to their information.

1.4.2 DACS II Administrative Links

The DACS II can be administered (managed, operated) from a local terminal or remotely from an OS (operations system) connected via an administrative link. Six physical links can be connected to the DACS II frame. Links 1 through 4 are asynchronous, and links 5 and 6 can be asynchronous or synchronous depending on the communications interface. Sixteen virtual circuits may be established on a synchronous link.

A level of message screening can be assigned to each link. A user may choose to always receive responses to his/her commands, to receive selected messages, or to receive all messages from the other links. Autonomous messages may be blocked for a particular link to prevent other output messages from being interspersed among the user's messages. Some examples of uses of an administrative link are:

- Common equipment and feature equipment provisioning and maintenance
- Equipment and channel status information
- Facility provisioning and maintenance
- Facility performance readings.

An output message is sent from the DACS II over one or more administrative links in response to one of the following occurrences:

- An input command

  The output message reports that the input command was either completed successfully or denied; additionally, it may contain information

requested by the input command. A *normal response* is an output message reporting a successful completion; an *error response* is an output message reporting a denial.

- An autonomous change in DACS II operation state

  The output message reports the information on DACS II system operation state changes which includes alarms and other trouble indications. This output message is referred to as an *autonomous response*.

DACS II can be administered (managed, operated) from a local terminal or remotely from an OS (Operations System) connected via an administrative link. Six administrative links (ports) can be used. Each link uses the Snider protocol when the TM658C circuit pack is installed, but only the fifth and sixth links are X.25 protocol compatible when circuit pack TM736C or TM762 is installed. A level of message screening can be assigned to each link. A user may choose to always receive an output message to his/her input commands, to receive selected messages, or to receive all messages from the other links. Autonomous messages may be blocked for a particular link to prevent other output messages from being interspersed among the user's messages. Some uses of an administrative link are as follows:

- DS0 channel and clear-DS1 signal cross-connections and test access
- Subrate data feature cross-connections
- Common equipment and feature equipment provisioning and maintenance
- Equipment and channel status information
- DS1 and DS3 facility provisioning and maintenance
- DS1 and DS3 facility performance readings
- DS3 facility alarm surveillance and control (AS&C) and DS3 performance monitoring using telemetry asynchronous block serial (TABS) protocol.

Administrative links carry output messages in response to one of the following occurrences:

- An input command

  The output message reports that the input command was either completed successfully or denied; additionally, it may contain information requested by the input command. A *normal response* is an output message reporting a successful completion; an *error response* is an output message reporting a denial.

- An autonomous change in DACS II operation state

  The output message reports a change in the DACS II system operation state which includes alarms and other trouble indications. This type of output message is referred to as an *autonomous response*.

1.4.3 Formatting Conventions

To interpret the commands presented in this document, you should be familiar with the formatting conventions presented in the following paragraphs. Each command is presented in actual input command format with accompanying explanations of keywords and variables providing sufficient information to fully understand the activity.

1.4.3.1 Uppercase and Lowercase Characters

In the command format of this manual, uppercase and lowercase letters distinguish between information that is constant (uppercase) and information that is variable (lowercase). Any character written in uppercase appears on the output device exactly as it is written.

1.4.3.2 Delimiters

Delimiters are used to enclose a field in a command.

[ ] Brackets indicate an optional field, one which may or may not be used in the input command or appear in the output message.

{ } Braces indicate a field containing alternate choices. For input commands, the user must select one of the choices. In output messages, braces indicate that only one of the fields within the braces will appear.

< > The less than and greater than symbols enclose an abbreviation representing information too lengthy to display in the manual. These delimiters are never used in actual DACS II input commands or output messages but are used only in describing the command format in this manual.

( ) Parentheses **are** part of the message text and must be entered where shown.

1.4.4 Using the Commands

1.4.4.1 Input Command Mode

The input command requests an action to be performed; this command contains necessary information for DACS II to accomplish the requested action. The user has two basic modes for inputting commands: the command mode and the menu/prompt mode.

1.4.4.1.1 Command Mode

The command mode is for the experienced user or machine-machine operation. A command must be selected along with variables and entered within a single line. The user types a single-line command with the only carriage return occurring at the end. "Single-line" refers to the input *command*, not to the display of the command. *A long single-line command may extend for several lines on a display terminal.*

DACS II accepts up to 120 characters of input per command. If an input command exceeds 80 characters (the standard width of most terminal screens), the input will continue on the next line of the display beginning with the 81st character. However, the command line can be broken at a convenient place by typing a backslash (\) followed by a carriage return. The display of the input command will continue on the next line, but the command will be interpreted as a single-line command. If 120 characters is not sufficient or if the user finds entering long commands error-prone, the single-line command can be broken up into several smaller commands.

Entering a carriage return without the backslash terminates the input and causes the line to be interrupted. A semicolon (;) also terminates the input command (i.e., DACS II interprets the carriage return and as the end of the command). If the carriage return is used, ; is echoed back to the terminal.

1.4.4.1.2 Menu/Prompt Mode

This optional on-line help mode assists the user in completing the input command. The menu/prompt mode aids the user by providing a list of alternative parameters or keywords.

The user starts the menu/prompt mode by entering a question mark (**?**) in the command line at the point in question. In response, DACS II presents a list of possible keywords. This list is presented to the user in menu or prompt form. At this point, the user may continue or return to the command line. If the user continues, he/she should refer to the detailed examples (menu form and prompt form) in the *On-Line Help Feature* section.

1.4.4.2 Aborting an Input Command or Output Message

The **ABT-CMD** command is entered to interrupt a system response or abort an input command. If **ABT-CMD** is entered for a particular link, the output from this link will be interrupted just after **ABT-CMD** is entered or after one or two output lines. At other links, the output messages may or may not be interrupted. When the **ABT-CMD** option is used, the command generating the output will be completed unless the autonomous message, **CMD ERR ABT**, appears.

For a nonabortable command, the output message will not be affected.

If a nonabortable message is being output but DACS II is executing an abortable command, **ABT-CMD** will stop the execution of the abortable command and **CMD ERR ABT** will be output on all links.

1.4.5 Input Command Format

The general format of an input command is:

```
VERB[-MODIFIER][-MODIFIER]:[xy]:[zz]:[ww]: [d][,e]...[,z];
```

Brackets [ ] enclose modifiers, parameters, and optional information. Parameters give the specific information required by the command verb in order to execute that command. All parameters are positional within the command line.

:[xy]:[zz]:[ww]:[d][,e]...[,z]; represent the input parameters and are separated by colons, but if they are logically connected (also called group, block, field), they are separated by commas. The colon (:) is used as a parameter field delimiter.

Input commands are terminated with the semicolon (;) or a carriage return. If the carriage return is used, ; is echoed back to the terminal.

Input commands must be treated on a case-by-case basis. For example:

- If a parameter field has only a single value (letter or number), it is considered a keyword-defined parameter field.
- A keyword-defined parameter is not positioned inside the parameter field and the comma (,) is omitted. A double comma (,,) in any keyword-defined parameter field will be rejected.
- A value- (letter or number) defined parameter is positional inside a parameter block.

1.4.5.1 Keywords

Input commands consist of *keywords* combined with equipment and circuit identification. A keyword is an alphanumeric string of characters representing:

- Verb (also called command or action verb)
- Entity identification
- Address specification
- Result of a command.

Command verbs are keywords that tell the system to do something.

Entity identification is a keyword that identifies a specific system or circuit pack within the system. For example, the keyword **NPC** refers to a network processing circuit pack.

Address specification is a keyword that refers to a specific address. **TP 03**, for example, refers to a specific test port (Test Port 03).

1.4.5.2 Verbs

The general format of an input command is shown below with the various command keywords described in some detail:

VERB[-MODIFIER][-MODIFIER]:[TID]:[EID]:[CTAG]:DATA PARAMETER BLOCKS;

VERB is the command verb specifying what action the system is to perform: connect, audit, diagnose, etc. A *command verb* (also called an action verb) is sometimes in mnemonic form.

A verb can be followed by no **modifier**, one **-modifier**, or two **-modifiers** (each preceded by a hyphen). These modifiers represent the equipment and circuit identification and identify the physical entity within the frame or the data base entity upon which action is taken. Table 1-5 lists verbs, keywords, and modifiers.

1.4.5.3 Parameter Addressing Rules

Two different levels of addressing occur in commands. The first level occurs within the target identification (TID), and the second level of addressing occurs within the entity identification (EID).

The TID uniquely identifies the target as DACS II. An 11-character CLLI* code is the recommended value for the TID. If the CLLI code for a DACS II is not unique, the CLLI code can be augmented with additional characters (letters, digits, and hyphens) for a total of 20 characters. The TID is used only in applications of indirect routing. If direct routing exists between the user and the DACS II frame, the TID is not necessary. If a TID is incorrectly entered, whether it is required or not, the entire command will be denied.

The EID identifies the particular entity within the DACS II frame and is composed of an equipment part and a facility part.

- Equipment

  The format of the equipment part consists of PHYSICAL-{UNIT number}-{NUMBER}. The PHYSICAL description is a DISK, TAPE, UNIT, MC, PWR, FTMI, etc., and, if necessary, a hierarchic logical address may be appended to it. Therefore, the equipment part may be a combination of the physical description and the logical address. UNIT number defines where the equipment (unit) exists. There can be up to six units in a 512 primary block circuit DACS II. NUMBER is the range or count of different entities that can exist in a unit. If the range is one for NUMBER, it will be "null" in the address.

- Facility

  In this manual, the double and triple ampersand (&&,&&&) define a sequence of consecutive simple parameter arguments. It is possible to indicate the arguments by writing the lower and upper simple parameter arguments separated by && or &&&.

1.4.5.4 Input Command Control Characters

In addition to input commands, DACS II responds to the following input command control characters or symbols:

- **CONTROL-x** or **CTRL-x**. *Abandon message.* Depressing the CONTROL and the x keys simultaneously causes DACS II to abandon the message being entered and return the system prompt.
- **CONTROL-h** or **CTRL-h**, **UNDERLINE**, **BACKSPACE**. *Erase last character.* Depressing the CONTROL and h keys simultaneously or depressing the UNDERLINE key or the BACKSPACE key causes DACS II to ignore the last character of a message and echo an underline (_). Entering *n* number of erase character symbols causes DACS II to ignore the last *n* characters of a message.

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- **BREAK**. *Interrupt output message.* The BREAK key interrupts an output message. The message continues after an allotted amount of time has passed or after the operator has finished entering an input command.

1.4.5.5 Input Command Acknowledgements

After DACS II has received the execute character of the input command, an immediate reply will appear with one of the following acknowledgements:

- **PF** (Printout Follows). DACS II received the input command and processed it. An output message will soon be returned. The output message will report the results of the work initiated by the command. If the system cannot complete the command, the reason will be printed.
- **RL** (Retry Later). DACS II cannot execute the requested command now because it does not currently have system resources available.
  - — The system could be temporarily overloaded.
  - — The command queue could be excessively long.
  - — The requested program may be busy, etc.

  Wait, and enter the command later.
- **NG** (No Good). The basic format of the command is correct, but the system is in trouble. An example is when the MP is in the MCOND state.
- **NA** (No Acknowledgement). The command has been accepted by the parser, but processing control has been lost, thus making correct acknowledgement impossible. An example is when the communication interface (CI) has detected a local area network (LAN) failure.

If either NA or RL is sent as an input acknowledgement, a normal or error output message may not be sent. Also, if the input command itself is in error, the input acknowledgement will indicate this fact and either the normal or error message will not be sent.

Acknowledgement	***Meaning***
?V<cr><lf>	Command code error
?D<cr><lf>	Parameter block error
?E<cr><lf>	Error in command, cannot be identified as either ?V or ?D
?P<cr><lf>	Parity error occurred in the input
?T<cr><lf>	The time between characters exceeded timeout threshold
?X<cr><lf>	Command aborted in response to a <cancel> or <break> from user.

1.4.6 Output Messages

There are three types of DACS II output messages. The normal or **completion message** indicates that the input command from the user has been executed and completed. An error response or **denial message** means that the input

command has been denied and gives the reason or condition code for the denial. An **autonomous message** reports a change in the operational state of the DACS II.

An output message consists of one or more segments. Each message segment is in the following format: a *header line* followed by a *primary line* which may be followed by one or more *secondary lines*.

1.4.6.1 Header Line

The header line contains the information of target identifier (TID), date, time, and link number. The target identifier is the code for a DACS II frame and consists of up to 20 ASCII characters in length. The date is the current date presented in the format of `yy-mm-dd` (that is, year-month-day), where yy is the last two digits of the year, `mm` is the month, and `dd` is the day of the month. The time is the current time of day in the format of `hh:mm:ss` (that is, hour:minute:second), where `hh` ranges from 00 to 23, and `mm` and ss range from 00 to 59. The link number is the administrative link/virtual circuit number in the format of `LINK-l[mm]` (that is, LINK-<administrative link number>[<virtual circuit number>]), where l ranges from 1 to 6 and `mm` ranges from 01 to 16. An autonomous response does not contain the link number.

1.4.6.2 Primary Line

The primary line contains the information of priority of action (PA), command code, entity identifier (EID), correlation tag (CTAG), data parameters, and termination report. The priority of action indicates the type of output message which could be either a response to an input command or an autonomous message generated by DACS II. The priority of action takes one of the following values:

Value	*Meaning*
`*C`	Immediate action, critical alarm (autonomous response)
`**`	Immediate action, major alarm (autonomous response)
`*^`	Action, minor alarm (autonomous response)
`M^`	Result of manual action (response to an input command)
`A^`	Autonomously generated message, not an alarm

Each caret (^) represents a space.

The command code consists of the action verb and one or more possible modifiers. In a normal or error response, the correlation tag is the same as that specified in the input command. The correlation tag in an autonomous response is generated by DACS II. The data parameters further specify the action performed on the entity. The termination report indicates whether the input command is successfully completed or denied, and it takes on one of the following values:

Value	*Meaning*
COMPLD	Input command completed successfully
DENY	Input command denied

1.4.6.3 Secondary Lines

The secondary lines contained in the output message are of two types: free-format and fixed-format. The free-format secondary lines provide information for the user to understand the data contained in the fixed-format lines. The free-format secondary lines are enclosed by "/*" and "*/." The fixed-format secondary lines contain data generated by DACS II and are arranged in a format so as to be parsed by a machine. The fixed-format secondary lines are enclosed by double quotes (").

1.4.6.4 Output Message Segment

The header line is the same for each message segment except for the time and possibly the date. The primary line is exactly the same for all message segments.

A multisegmented output message uses the greater-than sign (>) and the semicolon (;) to terminate the message segments. The greater-than sign is the terminating character (the last printable character) for the first and all intermediate message segments. The semicolon terminates the final message segment. A message segment should be no larger than 4096 bytes.

1.4.6.5 Normal Response

A normal response reports a successfully completed input command. The general formats of this type of output message are shown below. Each caret (^) represents a space. The brackets [ ] are not part of the actual output message, except for those surrounding the output message number.

Single-Segmented Normal Response Without Secondary Lines

```
^^^TID^yy-mm-dd^hh:mm:ss^LINK-l[mm]
M^^VERB[^MODIFIER][^MODIFIER]::[b]:[CTAG]:[d][,e]...[,z]^COMPLD
;
```

Single-Segmented Normal Response With Secondary Lines

```
^^^TID^yy-mm-dd^hh:mm:ss^LINK-l[mm]
M^^VERB[^MODIFIER][^MODIFIER]::[b]:[CTAG]:[d][,e]...[,z]^COMPLD
^^^/*^[output message number]^*/
^^^/*^free-format secondary line^*/
^^^"fixed-format secondary line"
;
```

Multisegmented Normal Response

```
^^^TID^yy-mm-dd^hh:mm:ss^LINK-l[mm]
M^^VERB[^MODIFIER][^MODIFIER]::[b]:[CTAG]:[d][,e]...[,z]^COMPLD
^^^/*^[output message number]^*/
^^^/*^free-format secondary line^*/
^^^"fixed-format secondary line"
^^^"fixed-format secondary line "
   .....   .....   .....
   .....   .....   .....
^^^"fixed-format secondary line"
>
   .....   .....   .....
   .....   .....   .....
>
^^^TID^yy-mm-dd^hh:mm:ss^LINK-l[mm]
M^^VERB[^MODIFIER][^MODIFIER]::[b]:[CTAG]:[d][,e]...[,z]\
COMPLD
^^^/*^[output message number]^*/
^^^/*^free-format secondary line^*/
^^^"fixed-format secondary line"
^^^"fixed-format secondary line"
   .....   .....   .....
   .....   .....   .....
^^^"fixed-format secondary line"
;
```

The following example shows the normal response to a cross-connect command (Message No. I.11001) for cross-connecting channel 022 of the primary block circuit terminated on unit 01, module 1, NPC 01 with channel 015 of the primary block circuit terminated on unit 03, module 2, NPC 05. The output message (Message No. O.11001) does not contain secondary lines.

```
   DACS2FRAME1 88-08-01 20:27:12 LINK-2
M  CONN CRS T0::01-1-01-022,03-2-05-015:CMDSEQ1:CUS::\
NORM,NORM COMPLD
;
```

1.4.6.6 Error Response

An error response reports a denial to an input command. The general error response formats are similar to the normal response. The header line is exactly the same, and the primary line only differs in the termination report (DENY). The termination report DENY indicates that the input command was not executed. The first secondary line begins with a 4-character error code (mmmm). This error code describes the reason for the denial of the input command. A free-format secondary line can give more details about the error code.

Error Response Without Free-Format Secondary Line

```
^^^TID^yy-mm-dd^hh:mm:ss^LINK-1[mm]
M^^VERB[-MODIFIER][-MODIFIER]::[b]:[CTAG]:[d][,e]...[,z]^DENY
^^^mmmmm
;
```

Error Response With Free-Format Secondary Line

```
^^^TID^yy-mm-dd^hh:mm:ss^LINK-1[mm]
M^^VERB[-MODIFIER][-MODIFIER]::[b]:[CTAG]:[d][,e]...[,z]^DENY
^^^mmmmm
^^^/**[output message number]^*/
^^^/**free-format secondary line^*/
;
```

1.4.6.7 Autonomous Response

An autonomous response reports a change in the DACS II system state. The header line of the autonomous response contains the information of source identifier (**SID**), date, and time. The primary line contains an alarm code (**ALMCDE**), an autonomous message tag (**ATAG**), and a verb with modifiers. The verb is always **REPT**, indicating a report.

Single-Segmented Autonomous Response

```
^^^SID^yy-mm-dd^hh:mm:ss
ALMCDE^ATAG^REPT[-MODIFIER][-MODIFIER]
^^^/**[output message number]^*/
^^^/**free-format secondary line^*/
^^^"fixed-format secondary line"
;
```

Multisegmented Autonomous Response

```
^^^SID^yy-mm-dd^hh:mm:ss
ALMCDE^ATAG^REPT[-MODIFIER][-MODIFIER]
^^^/**[output message number]^*/
^^^/**^free-format secondary line^*/
^^^"fixed-format secondary line"
^^^"fixed-format secondary line"
   .....    .....    .....
   .....    .....    .....
^^^"fixed-format secondary line"
>
   .....    .....    .....
   .....    .....    .....
>
^^^SID^yy-mm-dd^hh:mm:ss
ALMCDE^ATAG^REPT[-MODIFIER][-MODIFIER]
^^^/**[output message number]^*/
^^^/**^free-format secondary line^*/
^^^"fixed-format secondary line"
^^^"fixed-format secondary line"
  .....    .....    .....
  .....    .....    .....
^^^"fixed-format secondary line"
;
```

The alarm code indicates an alarm for a trouble condition or a nonalarm condition for a DACS II system state change which does not trigger any alarms; it identifies the severity reported by DACS II and is shown below:

Value	*Meaning*
***C**	Critical alarm message
******	Major alarm message
***^**	Minor alarm message
A^	Autonomous nonalarm message

The **ATAG** is used to check for a skipped output message and for correlation of previous autonomous messages. Some similarity exists with the correlation tag (**CTAG**) of an input command, but DACS II generates an autonomous message tag for all autonomous output messages. The form of this parameter is **xxx[.yyy]** where **xxx** is a 3-digit number and ranges from 050 to 099 (050 ≤ **xxx** ≤ 099). The **yyy** is optional; but if used, it may be used as a correlation tag with previous autonomous messages or for association with an action verb. For example, **yyy** can indicate the number of times that a particular **REPT** message has been issued (001 ≤ **yyy** ≤ 999). Value 000 is not used for **xxx** or **yyy**.

The free-format secondary line may assist the user in reading the data in the fixed-format secondary line. The message number above the line is used in referring to the manual for more detailed information.

The fixed-format secondary line contains actual message information. This information is described within the individual messages.

Table 1-5. Verb/Keyword and/or Modifier(s)

Verb/Keyword	Meaning
ABT-CMD	Abort or terminate a previous input command that has not completed its execution.
ABT-PROC	Abort or terminate a currently active process or macro.
ALW-LPBK	Allow loopback or inhibit automatic switch protection.
ALW-SW	Allow switching or automatic switch protection.
CHG-LGN	Change password and/or user identification code.
CHG-RPATH-T0	Change the return path for the digroups and ranges beginning with the initial channels given in the TOX argument list.
CHGTACC-T0	Change the modes of a test session under a specified test port.
CHG-TL-T0	Change the modes of a terminate and leave state of a circuit(s).
CONN-BDCST-T0	Connect a broadcast cross-connection (from source NPC) to a multiple number of other terminations in one direction of transmission.
CONN-CRS1-T0	Connect a one-way cross-connect circuit or a range of one-way circuits.
CONN-CRS-T0	Connect a two-way cross-connect circuit or a range of two-way circuits.
CONN-HUB-T0	Connect a hubbing mode test access via test port kk with trunk conditioning to the T0 termination.
CONN-TACC-T0	Connect a monitor connection between a digroup (designated T0) and a test port (designated TP).
CPY-MEM	Copy data from one memory to another, such as disk (PRI) to tape (SEC) or RAM (WKG).

Continued on next page

Table 1-5. *Continued*

Verb/Keyword	Meaning
CRTE-CNFGRN	Create connectivity in the system data base.
CRTE-CRS	Create cross-connections in the cross-connect network.
CRTE-EQPT	Create equipment entities in the system data base.
CRTE-LGN	Create or add a new user to the system.
DGN-EQPT	Diagnose equipment at the user's request and report details. Equipment such as cross-connect buffer (CCB), cross-connect network interface (CCNI), communications interface (CI), disk unit (DISK), link number (LINK), main controller (MC), main processor (MP), network processing circuit (NPC), secondary storage controller (SSC), synchronizer (SYNC), tape unit (TAPE), time slot interchange (TSI), and FTU, DSPC, or DS3 unit.
DISC-BDCST-T0	Disconnect a broadcast connection (from source NPC) to a multiple number of other terminations in one direction of transmission.
DISC-CRS-T0	Disconnect a two-way cross-connect circuit or a range of two-way circuits.
DISC-CRS1-T0	Disconnect a one-way cross-connect circuit or a range of one-way circuits.
DISC-EQPT	Disconnect (degrowth) equipment, multiple interface units, and/or multiplexers.
DISC-TACC-T0	Disconnect a test access session under a specified test port and restore the original cross-connection.
DLT-CRS	Delete a cross-connection from the system data base.
DLT-FPKG	Delete a feature package from the system data base.
DLT-LGN	Delete a password and user identification code. Only the superuser can invoke this command.
DLT-MACRO,MAP	Delete a macro or map.
DLT-PRMTR	Delete a parameter from the system data base.
ED-CNFGRN-EQPT	Edit the current connectivity and entity state of a specified equipment unit.

Continued on next page

Table 1-5. *Continued*

Verb/Keyword	Meaning
ED-CONN	Edit a connection.
ED-CRTE	Edit a create activity.
ED-DATE	Edit the system date and time clock.
ED-ADD-MAP	Enter NPCs into the map.
ED-DLT-MAP	Delete NPCs from the map.
ED-OPT-T1	Edit the programmable thresholds for the facility performance parameters of an NPC.
ED-PRMTR-EQPT	Modify the provisioning information associated with equipment.
ED-PRMTR-LINK	Modify the provisioning information associated with user interface links.
ED-PRMTR-MAP,MACRO	Modify the existing map or macro with new information.
ED-PRMTR-NE	Modify the provisioning information associated with the DACS II network element.
ED-PRMTR-T0	Modify the provisioning information associated with digroup.
ED-STATE-EQPT	Edit the maintenance state of equipment in ways other than via a remove or restore function.
ENT-EQPT	Manually provision equipment entities (those that are not automatically provisioned).
ENT-MACRO,MAP	Manually create the open session of an alternate map or a macro.
EXC-MACRO,MAP	Execute the existing map or macro.
INH-LPBK	Inhibit an automatic loopback switch protection.
INH-SW	Inhibit an automatic switch protection.
INIT-LOG	Initialize the ERR log file.
INIT-REG	Initialize the DACS II registers.
INIT-SYS	Initialize the DACS II processor system.
LGN-USER	Allow the user to identify himself/herself to the system with his/her <id>.
LGT-USER	Allow the user to logoff from the system.

Continued on next page

Table 1-5. *Continued*

Verb/Keyword	Meaning
OPR-ACO-ALL	Cut off the office audible alarm indications without changing the local alarm indications. This function does not clear other alarm indicators and does not disable future alarms from sounding audibles (so a release ACO function is not needed).
OPR-LPBK-T0	Request a loopback on a specified equipment unit or facility in the system.
RLS-LPBK-T1	Release the 1.544 Mb/s loopback.
REPT-ALM-EQPT	Report alarms associated with equipment failures.
REPT-ALMDET-EQPT	Supplement the information about the trouble generated by the **REPT-ALM**.
REPT-ALM-T0	Report alarms associated with DS0 facility failures.
REPT-CMPR-MEM	Report frame audit memory comparison mismatches.
REPT-DGN-EQPT	Report the results of diagnostic routines that have been initiated autonomously by the system.
REPT-EVT-EQPT	Report events which do not require alarm notifications but indicate the maintenance condition of the system.
REPT-RMV-EQPT	Report the autonomous removal of equipment from service.
REPT-RST-EQPT	Report the autonomous restoral of equipment to service.
REPT-SW-EQPT	Report the autonomous switch of an entity to protection (auto-removal) or to working (auto-restoration).
RMV-CNFGRN	Remove connectivity equipment from service.
RMV-EQPT	Remove equipment from service.
RMV-LINK	Remove a user interface link from service.
RST-CNFGRN	Restore connectivity equipment to service.
RST-EQPT	Restore equipment to service.
RST-PASSWD	Restore or recover the frame administrator password.
RST-LINK	Restore a user interface link to service.

Continued on next page

Table 1-5. *Continued*

Verb/Keyword	Meaning
RTRV-ALM-EQPT	Retrieve the current status of all automatically-reported equipment indicators (alarm or status).
RTRV-ALM-NE	Retrieve the current alarm state of the DACS II network element.
RTRV-ALM-T0	Retrieve the current status of all automatically-reported digroup indicators (alarm or status).
RTRV-BDCST-T0	Retrieve the cross-connect map for a single NPC or a range of NPCs.
RTRV-BKUP-SCHED	Retrieve the scheduled autonomous backup from a primary memory to a local nonvolatile backup memory.
RTRV-COND-EQPT	Retrieve condition types associated with equipment indicators (alarm or status).
RTRV-COND-T0	Retrieve condition types associated with NPC indicators (alarm or status).
RTRV-CNFGRN-EQPT	Retrieve the current connectivity and entity state of a specified equipment unit.
RTRV-CRS-T1	Retrieve the cross-connect map information associated with NPCs.
RTRV-HDR	Retrieve the header information associated with the DACS II network element.
RTRV-LOC-EQPT	Retrieve a physical location of a plug-in entity.
RTRV-LOG	Request to dump the contents of the log file.
RTRV-MAP-COM,EQPT	Query the map.
RTRV-MACRO-COM	Query the macro.
RTRV-OPT-T1	Retrieve the option (threshold) value for parameter.
RTRV-PRMTR-EQPT	Retrieve the provisioning information and service data associated with equipment.
RTRV-PRMTR-LINK	Retrieve provisioning information and service data associated with user interface links.
RTRV-PRMTR-MACRO,MAP	Retrieve information of the components associated with the macro or map.

Continued on next page

Table 1-5. *Continued*

Verb/Keyword	Meaning
RTRV-PRMTR-NE	Retrieve provisioning information and service data associated with the network element.
RTRV-PRMTR-T0	Retrieve the provisioning information and service data associated with NPC channels.
RTRV-PRVG-USER | LINK	Retrieve privilege parameters associated with login users or link.
RTRV-RECOVY-EQPT	Retrieve information of the error source register (ESR) for a specific processor.
RTRV-REG-EQPT	Retrieve information of the error source register (ESR) for the main processor.
RTRV-STATE-COM	Retrieve the common information associated with equipment (such as TLIs and SYNCs).
RTRV-STATE-EQPT	Retrieve the state information associated with equipment.
RTRV-STATE-T0	Retrieve the state information associated with NPCs.
RTRV-TACC-T1	Retrieve information about all test access activity of the test port.
RTRV-TACC-T0	Retrieve information about all test access activity in the system.
SCHED-BKUP-MEM	Schedule an autonomous backup from a primary memory to a local nonvolatile memory.
SCHED-PMREPT-ALL	Schedule an autonomous midnight performance monitoring report.
SET-ATTR-EQPT	Set the attributes that are associated with a specified event.
SET-PRVG-USER | TERM	Assign user or link privilege for input prioritization and output screening.
STA-LOCL-RST	Transfer the database from DISK to RAM or from TAPE to RAM.
SW-DX-EQPT	Request all digroup circuits to select data and clocks from cross-connect side A.

1.5 NPC Addressing

Two addressing or numbering schemes for network processing circuits are available: the **nonhierarchical** and the **hierarchical**. These numbering methods are used to provide a means of locating network processing circuits.

1.5.1 Nonhierarchical Numbering

The **nonhierarchical** uses consecutive numbering to count through the units in the frame. Each unit has a fixed starting number (for example, 161 for unit 2; 321 for unit 3; 481 for unit 4). The starting number is the same forDS3U, FTU, or DSPU type units.

Within the nonhierarchical numbering scheme, there are 3-digit and 4-digit (extended) formats. The extended format is used for CEF frames. Therefore, NPC numbers represented by `[s]abc` in commands show both formats of the nonhierarchical numbering scheme (the `[s]` is used with a Capacity Expansion Frame).

1.5.2 Hierarchical Numbering

The **hierarchical method** uses a 3-part number: the unit number (uv), the module or group number within the unit (m), and the NPC number within the module (np) for a total of five digits (uv-m-np) with dashes separating the parts.

1.6 On-Line Help Feature

1.6.1 Description

The DACS II provides on-line assistance to the user when constructing commands at the terminal. This assistance is in the form of a menu-driven help routine. Different menus are displayed during the routine to provide the user with information on all the command fields. The menu items include:

- Verbs (Action or command)
- Applicable keywords for a command
- Possible choices or number range for a variable field
- Definitions of keywords.

An inappropriate selection will bring an error response.

The help routine can be used to the degree needed to complete the command: either through the entire command in every field or only for a particular part of the command. Using help to construct the entire command will probably not be applicable after some experience is gained at entering commands, since all the commands are documented and the direct entry of commands is so much faster.

There are two operators or keyboard controls used to invoke the different levels of the help routine. These operators are: [SHIFT] [?] and [RETURN] . The question mark is used to initiate the routine or to go into a deeper level (more explanation), and the [RETURN] is used to see the alternative choices at a given point. The dialogue can be terminated either by entering a CTRL-x or by completing the current command line when it is displayed.

1.6.2 Summary: The Help Feature

By entering [SHIFT] [?] , the user may ask DACS II for help at any time before or during the construction of an input command.

In the help mode, DACS II will offer the user menus for the selection of the message keywords and/or prompt for values of variable fields. Entering [SHIFT] [?] provides a greater detail of information on the keywords or variables. If the list is long, DACS II prompts the user to enter [RETURN] to page through it.

When looking at a menu of choices for a command field, you can select an item and then either continue the process or return to the current position on the command line. To continue the process, use the question mark and the next menu will appear. To return to the command line, use the [RETURN] key. When looking at a prompt to enter a value, you can enter a value, look at the next choice, or request more information. To look at the next choice or to repeat the choices, use the [RETURN] key. To obtain more information in order to enter a value, use the question mark. You can continue this process using the question

mark after each entry to complete and submit the command via the dialogue. Alternatively, you can use the RETURN key after an entry to obtain the current command line. Then, you can directly enter the remainder of the command line just as you would any DACS command.

1.6.3 Constructing an Entire Command Using Help

The following demonstrates how the menus in the help routine can be used for constructing a simple RTRV (retrieve) command. Only portions of the long menus are shown, but these examples serve to demonstrate how selections are made.

(1) To invoke the help routine at the start level, enter SHIFT ?. The DACS II responds with OK and the following menu:

```
Select from:

     1.  ABT
     2.  ALW
     3.  CHG
          .
          .
          .
    25.  SW

Selection?
```

(2) To obtain more of an explanation, enter SHIFT ?. The DACS II responds with OK and the following list:

```
Select from:

     1.  ABT  (perform an abort)
     2.  ALW  (perform an allow operation)
     3.  CHG  (perform a change)
     4.  CONN (perform a cross-connection)
            .
            .
            .
    21.  RTRV (perform a retrieve information)

         Selection?
```

(3) You may enter either `21` or `RTRV` followed by [SHIFT] [?] The DACS II responds with this menu:

```
Select from:

     1.  ALM
     2.  BDCST
           .
           .
           .
    21.  STATE
    22.  TACC

Selection?
```

(4) Again you select the desired verb modifier by entering either `21` or `STATE`.

(5) The DACS responds with:

```
Select from:

     1.  COM
     2.  EQPT
     3.  T3
     4.  TS
```

(6) Select `2` and enter [RETURN] to see the command line developed so far.

```
RTRV-STATE-EQPT
```

(7) Enter [SHIFT] [?] to see the next part of the command which is:

```
1-20 character Target Id (optional).
```

Since the frame target ID is optional, it can be omitted which is confirmed by entering [RETURN] . This lists the alternative

```
go to address block (YES/NO)?
```

(8) Answer `Y` and notice the double colons that are added to the end of the command line to close the target ID field. After this, enter a `?` to obtain the next selection.

```
units (YES/NO)?
specify ftu unit number (YES/NO)?
specify dspc unit number (YES/NO)?
specify ds3u unit number (YES/NO)?
timeslot interchange (YES/NO)?
```

(9) Select 4, bringing the resultant command line. Entering a question mark brings the response

```
1-10 character Correlation Tag (optional)
```

Again this is optional, and entering a [RETURN] requests that you go on to the next field `EQPD block (YES/NO)?`, which is the alternative to entering the Correlation Tag.

(10) Answer Y and after the current command line is displayed, enter [RETURN] . At this point, the DACS returns the command line as follows:

```
RTRV-STATE-EQPT::TSI::EQPD;
```

The command line is complete.

```
EXECUTE (YES/NO)?
```

(11) Now simply answer Y followed by [RETURN] and the command will be executed.

1.6.4 Obtaining Help at a Particular Point on a Command Line

DACS II's on-line help not only can be used to construct a command from scratch but it can also be used to obtain information on particular fields of a command. If the command format is not known or if the keywords or variables are not clear, the help dialogue can be initiated at any point by entering [SHIFT] [?] .

(1) Assume the following multipoint circuit CONN-CRS command was entered and denied because one of the NPCs named in the command must be an MB-type.

```
 CONN-CRS-T0::01-1-01-01,01-1-02-03::TRSP::SYM,LEG::; ?D
 xy 90-10-15  13:12:10  LINK-4
M  CMD ::::INERR,BAD_SYNTAX STOPPED
 /* [O.01131] */
 /* CONN-CRS-T0::01-1-01-01,01-1-02-03::TRSP::=SYM=,LEG::; */
;
```

(2) The equal signs around the word SYM indicate a problem because it is a multipoint bridge circuit.

(3) Start over using the help command to obtain information. For example, enter

`CONN-CRS-T0::` and `?`

The DACS II responds with

```
ds3u unit number = OK
ftu unit number =
```

Since you are working with a DMB which is in a DSPU, if you enter only [RETURN] , the next option will be displayed, which turns out to be

```
dspu unit number =
```

(4) To get more information at this point, enter [SHIFT] [?] . The DACS II responds with:

```
dspu unit number = OK
 /* decimal integer:, range 1 - 6 */
```

(5) This is where the trouble occurred; one of the NPCs in the range must be an MB-type.

(6) Enter `05` after the equal sign. The DACS II responds with:

```
CONN-CRS-T0::05
dspu module number = OK
 /* decimal integer:, range 1 - 8 */
```

(7) Enter `1` after the question mark. The DACS II responds with:

```
CONN-CRS-T0::05-1
dspu npc number = OK
 /* decimal integer:, range 1 - 2 */
```

(8) Enter `1` after the question mark. The DACS II responds with:

```
dspu npc number = 1 OK
CONN-CRS-T0::05-1-1
dmb conference number = OK
 /* decimal integer:, range 1 - 85 */
```

(9) In response to `dmb conference number =`, enter the [SHIFT] [?] to get more information. The DACS II responds with:

```
/*decimal integer, range 1 - 85 */
dmb conference number =
```

(10) Enter your conference number (2 for example), and [SHIFT] [?] .

(11) In response to `ftu npc number =`, enter a question mark to get more information. The DACS II responds with:

```
/* 3 digit decimal integer, range 01-10-1--04-4-32 */
ftu npc number =
```

(12) Now that the difference between the NPC numbers for the DSPU and FTU sides of the circuit is clear, terminate the dialogue by entering the required `ftu npc` number followed by a RETURN. This will cause the command line developed through the dialogue to be displayed. Enter the remaining information from the original command to complete the command.

1.7 Equipment Precautions

1.7.1 Electrical Discharges

The DACS II contains integrated circuits and other electronic equipment that are sensitive to static electrical discharges. Therefore, read the following caution BEFORE working on the system:

⚠ CAUTION:
Before touching any part of the frame including the tape or disk drive, any plug-in, reset switches, ACO, or LED TEST buttons, ALWAYS ground yourself to the frame with a WRIST STRAP provided with the equipment.

1.7.2 Removing and Installing Plug-ins

You can easily damage plug-ins and other hardware by improperly removing and installing them in the frame.

The following describes how to correctly remove and install **4-inch** and **8-inch** high plug-ins with a single latch:

- **To Remove a Plug-In**: Unseat the plug-in from the slot by carefully operating the latch. Then remove the plug-in with one continuous motion. DO NOT ROCK THE PLUG-IN BACK AND FORTH.
- **To Install a Plug-In**: Remove the plastic shipping protector from the contacts of new plug-ins. Insert the plug-in into the slot. DO NOT ROCK THE PLUG-IN BACK AND FORTH. Raise the latch. Push on the bottom part of the plug-in until the latch engages the slot. DO NOT push with the latch.

  After the latch engages the slot, close the latch (push in) to seat the plug-in. After closing the latch, with one thumb on the latch and the other thumb at the top of the plug-in, press firmly to ensure that the plug-in is fully seated.

The following describes how to correctly remove and install **12-inch** high DS3U and **16-inch** high ECCN plug-ins:

- **To Remove a Plug-In**: Unseat the plug-in from the slot by carefully operating both the top and bottom latch. Then remove the plug-in with one continuous motion. DO NOT ROCK THE PLUG-IN BACK AND FORTH.
- **To Install a Plug-In**: Remove the plastic shipping protector from the contacts of new plug-ins. Insert the plug-in into the slot and ensure that the latches are positioned to allow insertion. DO NOT ROCK THE PLUG-IN BACK AND FORTH. Open both latches. Push on the lower

part of the plug-in until the latches engage the slot. DO NOT push with the latches.

After the latches engage the slot, close the latches (push down top latch, push up lower latch) to seat the plug-in together. After closing the latches, with one thumb on the top latch and the other thumb on the bottom latch of the plug-in, press firmly to ensure that the plug-in is fully seated.

A suffixal number after a plug-in indicates a series version. Higher series versions can be substituted in slots labeled for a lower series version but not the reverse.

1.7.3 Magnetic Tape Unit Operating Guidelines

During normal operation of the frame, the tape unit provides secondary nonvolatile storage for the cross-connect data base and generic software. The tape has three major functions:

- Making tape backups of the generic program
- Making tape backups of the cross-connect data base
- Restoring the equipage of growable entities or the cross-connect data base.

Handle the magnetic tape cartridges for the DACS II system with the same precautions used when handling other magnetic tape cartridges. Avoid extreme temperatures, do not touch the tape itself, and do not leave the tape in the tape unit for extended periods.

CAUTION:
In procedures involving the transfer of data from the DACS II system to the tape, be sure that the tab on the back of the tape is **NOT** *set in the SAFE position.*

1.7.3.1 Approved Magnetic Tape Cartridges

The tape unit for DACS II uses specially formatted tapes for backing up the generic software and the cross-connect data base. All tape operations must be performed with approved magnetic tape cartridges.

CAUTION:
Use of unapproved tape cartridges with the tape unit can result in backups of poor quality, failure of the backup, or damage to the tape unit.

1.7.3.2 Frequency of Tape Backup

In normal operation, you make a tape backup of the cross-connect data base once daily. The tape backup procedure requires the use of the CPY-MEM command to copy from the hard disk (PRI) to the tape unit (SEL). Wait at least 4 hours before updating other backup tapes so that the tape cartridge and tape unit can return to ambient temperature. The backups can be programmed to occur once in a 24-hour period.

With the larger amount of software storage required for Release 6.0, only one copy of the data base is now stored on the original software tapes. As a precaution, it is recommended that at least 3 backup tapes be used at the frame on a alternate basis (3-day cycle). The data base on the frame backup tape must be updated once every day. The reduced recovery effort (no need to reprovision the frame) if the frame data base is lost more than offsets the investment to maintain these backup tapes. If a data base problem occurs, never use all the backup tapes to attempt the recovery. If the disk and one tape is corrupted in the process, contact technical consultant.

⚠ CAUTION:
Operation of the tape unit on the DACS II system conforms to the requirements specified in network equipment building systems (NEBS) PUB51001. Within these guidelines, tape backup functions can be performed at both room temperature and at elevated temperatures. However, performing continual tape operations at elevated temperatures without allowing any time between operations for the tape to dissipate its own generated heat can produce failures in the tape cartridge. It is important to note that these would be TAPE CARTRIDGE failures as opposed to tape unit failures.

1.7.3.3 Tape Life

The expected life of a backup tape cartridge is measured in the number of backups. The average life expectancy of the tape cartridge is 200 operations. It is advisable to have at least three backup tapes for use on an alternate basis (3-day cycle).

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Acceptance

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2.1 Perform Visual Inspection

Overview: Use this procedure to inspect the front and back of the frame for obvious structural damage.

Inspect Front of Frame

1. Check front of frame for damage (such as dents or broken mountings) resulting from transporting and mounting of equipment.
2. At front, look over shelf mountings to verify that shelves are properly aligned and securely mounted. Figure 2-1 shows the location of equipment in a fully equipped CEF (capacity expansion frame).
3. Verify that shelf designation labels are installed in front over shelf slots.

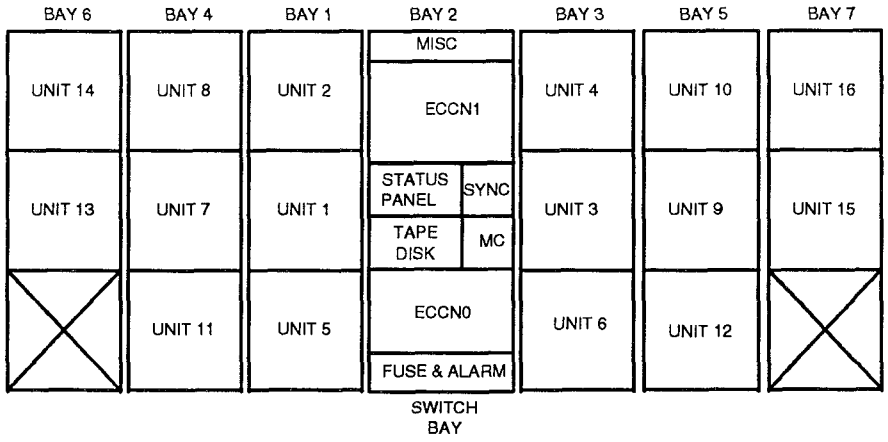


Figure 2-1. Fully Equipped CEF

Inspect Back of Frame

4. At back of frame, do Steps **5** through **12**.
5. Check back of frame for damage such as dents or broken mountings.
6. Look for broken or bent pins near the edges of each printed backplane panel; these pins can be damaged even with the covers installed.
7. Verify that the metal covers are securely mounted over the backplane panels. Ribbon cables are used for connections between the shelves, and these connections are not likely to give trouble.
8. For DSPUs (digital signal processing units), check that the wiring from these units to the main controller is neat and that no pins were damaged during wire wrapping. When these units are added to an existing frame, this wiring will be done by the installer.
9. Verify that local TTY (teletypewriter terminal) is connected to TTY connector for Link 1 behind the main controller using an ED-2C646-30, G2 adaptor.
10. If data sets (such as 202T) are required for remote connections or for equipment more than 50 feet (RS-232C specification) or 2,000 feet (RS-449 specification, 1200 baud) away, verify that data sets have been installed. Data set specifications are given with the information notes in SD-96662-01.

11. Connect data link cable (for example, M25B) to the TTY connector for the link (behind DACS II main controller). No adapter is required for RS-449 format, but ED-2C646-30 adapters are required for RS-232C format as follows:

    — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).

    — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).

    — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).

    — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

    NOTE:
    The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

12. Verify that cable adapter are securely mated at back of each facility terminating unit. Also verify that shield is grounded at DACS II frame or at DSX-1 jack bay.
13. Talk with an installation representative to verify that cabling to DSX-1 bay has been tested for continuity (buzzed and CGAs [carrier group alarms] registered when lines were opened).
14. Verify that DACS II and DSX-1 bays have been stamped with office relay rack identification per office drawings.

2.2 Check Plug-In Installation

2.2.1 Check Main Controller Installation

1. Verify that the main controller has been installed. See Figure 2-2.

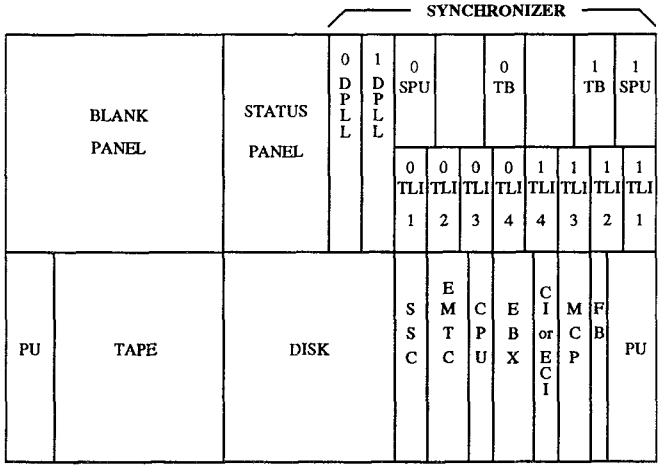


Figure 2-2. Location of Main Controller in CEF Frame

2.2.2 Check Sync Plug-In Installation

Overview: Use this procedure to verify that sync plug-ins in the frame are properly installed and to query the units to see how they are configured.

1. From system layout information and installation records, determine the following on the sync:
   - — The configuration, MASTER or SLAVED.
   - — The number and types (digital line, office clock, etc.) of incoming signals for slaved timing.
   - — Timing distribution, whether DACS II supplies timing to other equipment in the office.
2. Enter **`RTRV-STATE-EQPT::SYNC:EQPD;`** to see the TB (time base) and TLI (timing link interface) type designations.
3. Read the query output using Table 2-1 for the TLI types and read the following:
   - — The TB types are TB000 for domestic-stratum 3, TB100 for 2.048-Mb/s Interface - local office, TB200 for 2.048-Mb/s Interface - toll office, and TB300 for domestic-stratum 2.
   - — The TLI types are given by the letter codes, and the signal formats are given by the associated number codes.
   - — The SRC is the priority of TLI sources — from the highest (1) to the lowest (8).
4. Enter **`RTRV-STATE-EQPT::SYNC;`** and read the sync configuration and status using Table 2-2.
5. If CFR (sync configuration) = MASTER, verify that a TB card is installed in the designated slots. See Table 2-1 for equipment codes.
6. Verify that there are duplicate TLI cards (on sides 0 and 1) for each incoming and timing distribution link. See Table 2-1 for equipment codes.
7. If TG68 or TG75 TLIs are used, verify that the packs are installed in the TLI 2 positions of the sync where terminations are provided for connection of coaxial cable.
8. If timing signals are to be distributed from the DACS II, verify that the correct code of TLI is installed and check connection of timing cables behind shelf slots. Both the TG70 and TG71 packs provide four multipled outputs.

Table 2-1. Sync Plug-In Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Table 2-2. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

2.2.3 Check FTU Plug-In Installation

Overview: Use this procedure to verify that all FTU plug-ins in the frame are properly installed (Figures 2-3 and 2-4).

1. Determine which unit and FTMs (facility terminating modules) are to be equipped. See Table 2-3 for unit and FTMI numbering (table only shows nonhierarchical numbering).
2. Review the two versions of FTUs shown in Figures 2-3 and 2-4. Figure 2-3 shows the FTUs used in the original side bays, and Figure 2-4 shows the IFTUs (integrated FTUs) used in flexible side bays.
3. Verify the **TG81** code FTMI and the **TG79** code of FCs (format converters) are installed for the equipped FTMs; see Figure 2-3 or 2-4
4. Verify the plug-in dual digroup cards (for example, DDC) for the equipped NPCs are installed in the NPC slots.

NOTE:
Each plug-in card contains the circuitry for two NPCs.

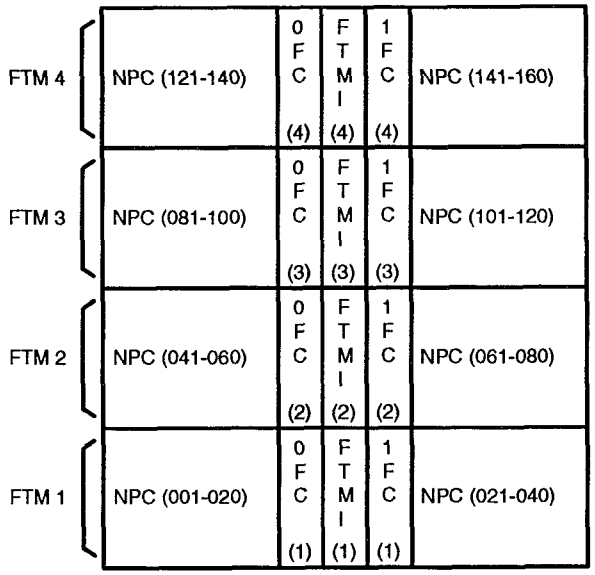


Figure 2-3. Original FTU

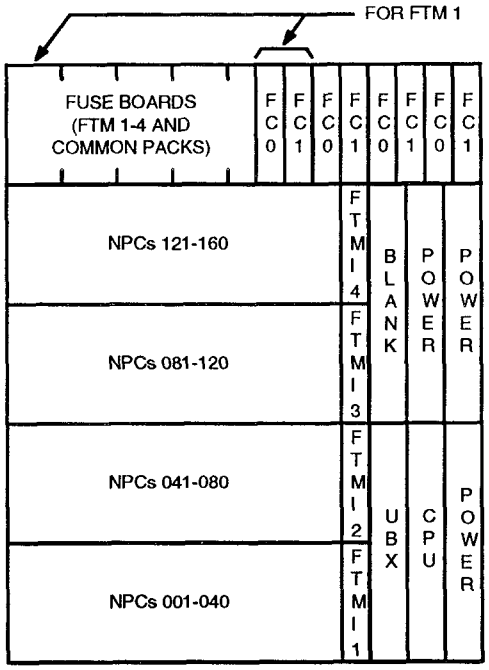


Figure 2-4. Integrated Facility Terminating Unit

Table 2-3. NPC Location in Unit

Nonhierarchical NPC Number	Unit Number	FTMI Number
001-040	1	1
041-080	1	2
081-120	1	3
121-160	1	4
161-200	2	1
201-240	2	2
241-280	2	3
281-320	2	4
321-360	3	1
361-400	3	2
401-440	3	3
441-480	3	4
481-520	4	1
521-560	4	2
561-600	4	3
601-640	4	4
641-680	5	1
681-720	5	2
721-760	5	3
761-800	5	4
801-840	6	1
841-880	6	2
881-920	6	3
921-960	6	4
961-1000	7	1
1001-1040	7	2
1041-1080	7	3
1081-1120	7	4
1121-1160	8	1
1161-1200	8	2
1201-1240	8	3
1241-1280	8	4
1281-1320	9	1
1321-1360	9	2

Continued on next page

Table 2-3. *Continued*

Nonhierarchical NPC Number	Unit Number	FTMI Number
1361-1400	9	3
1401-1440	9	4
1441-1480	10	1
1481-1520	10	2
1521-1560	10	3
1561-1600	10	4
1601-1640	11	1
1641-1680	11	2
1681-1720	11	3
1721-1760	11	4
1761-1800	12	1
1801-1840	12	2
1841-1880	12	3
1881-1920	12	4
1921-1960	13	1
1961-2000	13	2
2001-2040	13	3
2041-2080	13	4
2081-2120	14	1
2121-2160	14	2
2161-2200	14	3
2201-2240	14	4
2241-2280	15	1
2281-2320	15	2
2321-2360	15	3
2361-2400	15	4
2401-2440	16	1
2441-2480	16	2
2481-2520	16	3
2521-2560	16	4

2.2.4 Check ECCN/CCN Plug-In Installation

2.2.4.1 Check Multibay Plug-In Installation

Overview: Use this procedure to verify that all the multibay plug-ins in the frame are properly installed. Procedures to install plug-ins are included in the *Provisioning* section.

1. Locate ECCN (expanded cross-connect network) in the switch bay. See Figure 2-5.

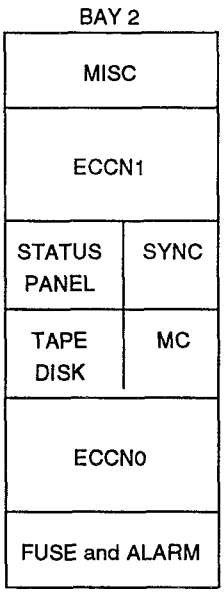


Figure 2-5. Switch Bay

2. Verify that the BT (bus terminator, BBR1 code) packs are securely installed in the designated far-left and far-right slots on each side of the network (ECCN0 and ECCN1). See Figure 2-6 for ECCN plug-ins and Figure 2-7 for CCN plug-ins.
3. Verify that the CCI (clock control interface, BBS1 code) pack is securely installed in the designated slot on each side of the network (ECCN0 and ECCN1).

4. Verify both active and inactive ETSI (expanded time slot interface) plug-ins are installed for each equipped unit.

NOTE:
The ETSI slots are assigned on each side of the common CCI pack to roughly match the associated unit positions and ordering of the units in the CEF configuration.

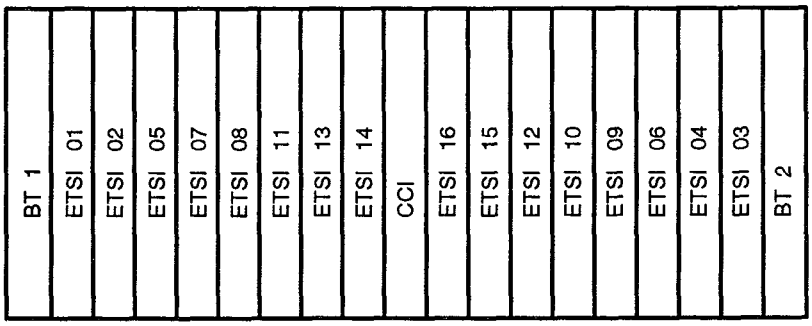


Figure 2-6. Location of Plug-Ins on ECCN Shelf

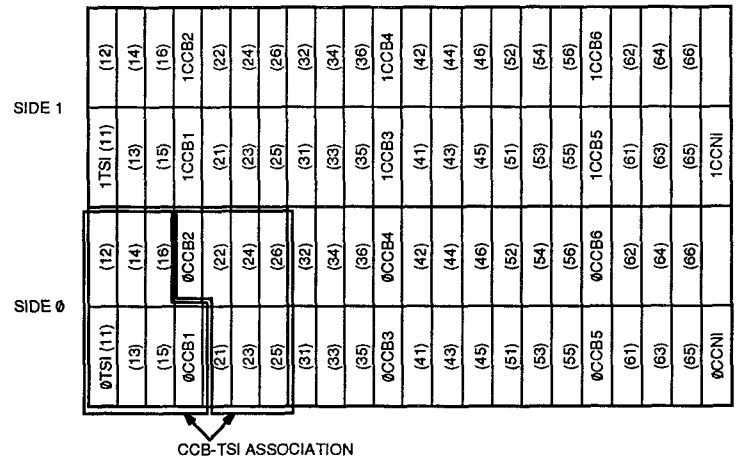


Figure 2-7. Location of Plug-Ins on CCN Shelf

2.2.4.2 Check Single-Bay Plug-In Installation

Use this procedure to verify that all single-bay plug-ins in the frame are properly installed.

1. Locate the CCN2 (cross-connect network) in the frame and notice the organization within the network; see Figure 2-8.

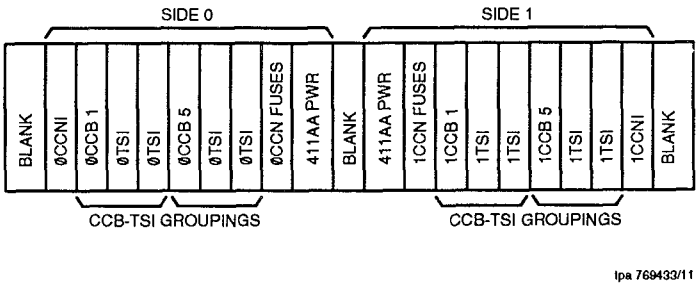


Figure 2-8. CCN2 Network

2. Verify that the CCNI (cross-connect interface) card (UM30 code) is installed in the designated slots on both sides of CCN2.
3. Verify that the plug-ins for CCB 1 and TSI 11 are installed on both sides of CCN2 to allow cross-connections within unit 1. The code of the CCB cards is UM26 and the code of the TSI cards is TM660.

   NOTE:
   The TSI designation numbers indicate how the cards are connected; for example, TSI 11 connects data from unit 1 back to unit 1.

4. If unit 5 (bottom shelf) is also to be equipped, verify that the plug-ins for slots CCB 5 and TSI 55 are installed on both sides of CCN2 to allow cross-connections within unit 5.
5. If unit 5 was install, verify that the plug-ins for slots TSI 15 and TSI 51 is installed on both sides of CCN2 to allow cross-connections between unit 1 and unit 5. The code of the TSI card is TM660.

2.2.5 Check Power Units and Fuses

Overview: Use this procedure to verify that all power units and fuses are properly installed (see Figure 2-9). Use the appropriate table from the following list to determine the required unit and fuses for the CEF or non-CEF frame.

Power Unit Summary (CEF)	Table 2-4
Power Unit Summary (Single-Bay)	Table 2-5
Power Unit Summary (non-CEF)	Table 2-6
48-Volt Power (CEF)	Table 2-7
48-Volt Power (non-CEF)	Table 2-8
48-Volt Power (Single-Bay)	Table 2-9
Sync and Main Controller (CEF)	Table 2-10
Sync and Main Controller (non-CEF)	Table 2-11
Sync and Main Controller (Single-Bay)	Table 2-12
77-Type, FTU Fuses (Original Interface Bay)	Table 2-13
IFTU Fuse Assignment	Table 2-14
DSPU5 and DSPU6 Fuses (Original Interface Bay)	Table 2-15
DSPU Fuses (Flexible Bay)	Table 2-16
Power Unit Requirements	Table 2-17

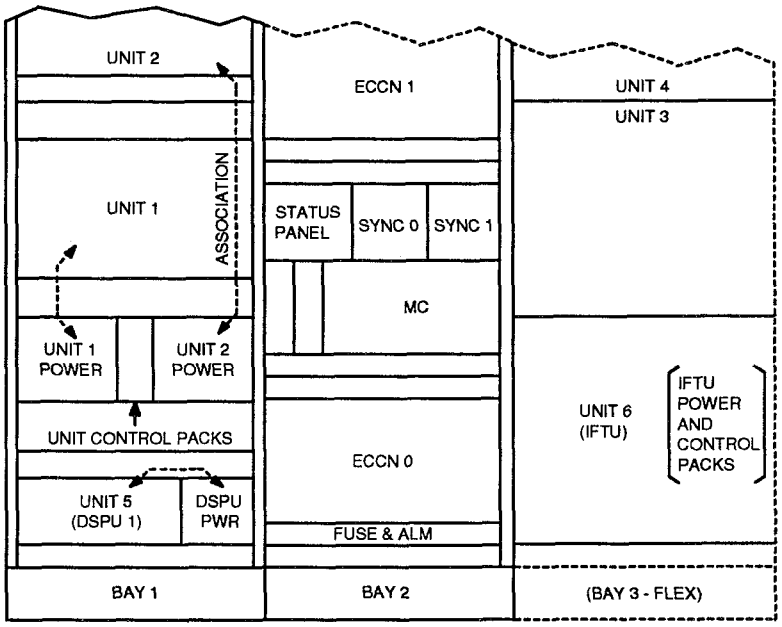


Figure 2-9. Original Interface Bay (Bay 1)

1. Locate the power unit slots for the section of the frame being equipped using shelf designation strips. Figure 2-9 shows the location of power units in an original interface bay (bay 1) for a retrofit of an existing installation.
2. Verify the required codes and quantities of power units are installed.

3. Verify the required 48-volt input fuses are installed in the fuse and alarm panel (bottom frame).
4. Verify the LED output fuses are installed in fuse boards per designation strips and appropriate tables for sync and main controller, IFTU, and units in original interface bays.

   NOTE:
   FTUs in original interface bays use two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU and multibay CCN both use GRP 3 (7.5A) DFBs.

5. Verify the required 48-volt fuses are installed.
6. Verify the required LED fuses are installed.
7. If any of the required responses did not occur, replace the power unit and confirm the operation of the faceplate LED.
8. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
9. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 2-17. The SPU (sync power unit) does not have test jacks to make this test.

   NOTE:
   The FTU power units feed a common bus, and low voltage can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

   - If the requirement of Table 2-17 is met, disconnect the meter.
   - If the requirement of Table 2-17 is not met, replace the power unit.

Table 2-4. Power Unit Summary (CEF)

Circuit Block	CP Code	Designation/ Location	Equipage
EFC	484GA SM565 411AA	PU /04-012 MCP /04-144 PU /04-160	One. One. One.
SYNC	TG58 TG58	0SPU /14-106 1SPU /14-160	One. One.
ECCN 0	—	—	The CCI and ETSI packs have built-in power converters.
ECCN 1	—	—	The CCI and ETSI packs have built-in power converters.
IFTU (Flex Bay)	411AA 411AA 411AA	PU /x06-168 PU /x14-145 PU /x14-158	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
DSPU (Flex Bay)	SM566 411AA 411AA	DCP /x04-130 1PU /x04-142 0PU /x04-150	One. One. One.
FTU1/3	411AA 411AA 411AA	PU /x28-012 PU /x28-024 PU /x28-048	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1). Location x = 1 for units 1 & 3 and x = 3 for units 2 & 4.
FTU2/4	411AA 411AA 411AA	PU /x28-124 PU /x28-148 PU /x28-160	Same as FTU 1.
DSPU5/6	SM566 411AA 411AA	DCP5/6 /X12-130 1PU /X12-142 0PU /X12-160	One. Location x = 1 for unit 5 and x = 3 for unit 6. One. One.

Table 2-5. Power Unit Summary (Single-Bay)

Circuit Block	CP Code	Designation/Location
MC	SM565	MCP/132-136
	411AA	PU/132-148
	484GA	PU/132-160
SYNC	TG58	0SPU/134-010
	TG58	1SPU/134-064
FTU1	411AA	PU/123-012
	411AA	PU/123-024
	411AA	PU/123-048
CCN0	411AA	0PU/149-078
CCN1	411AA	1PU/149-096
DSPU5	SM566	DCP5/109-130
	411AA	1PU/109-142
	411AA	0PU/109-160

Table 2-6. Power Unit Summary (non-CEF)

Circuit Block	CP Code	Designation/ Location	Equipage
MC	SM565	MCP /225-136	One
	411AA	PU /225-148	One
	484GA	PU /225-160	One
SYNC	TG58	0SPU /227-010	One
	TG58	1SPU /227-064	One
FTU1	411AA	PU /128-012	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
	411AA	PU /128-024	
	411AA	PU /128-048	
	411AA	PU /128-064*	
FTU2	411AA	PU /128-108*	Same as unit 1.
	411AA	PU /128-124	
	411AA	PU /128-148	
	411AA	PU /128-160	
FTU3	411AA	PU /328-012	Same as unit 1.
	411AA	PU /328-024	
	411AA	PU /328-048	
	411AA	PU /328-064*	
FTU4	411AA	PU /328-108*	Same as unit 1.
	411AA	PU /328-124	
	411AA	PU /328-148	
	411AA	PU /328-160	
CCN0	485AB	PU1 /215-016	PU1 for CCNI, CCBs 1, 2, TSIs 11, 12, 13, 14, 15, 16, 21, 22
	485AB	PU2 /215-032	PU2 for CCB 3, TSIs 23, 24, 25, 26, 31, 32, 33, 34, 35, 36
	485AB	PU3 /215-048	PU3 for CCB 4, TSIs 41, 42, 43, 44, 45, 46, 51, 52, 53, 54
	485AB	PU4 /215-068	PU4 for CCBs 5, 6, TSIs 55, 56, 61, 62, 63, 64, 65, 66
	485AB		
CCN1	485AB	PU5 /215-108	PU5 Same assignment as Side 0
	485AB	PU6 /215-128	PU6
	485AB	PU7 /215-144	PU7
	485AB	PU8 /215-160	PU8
	485AB		
DSPU5	SM566	DCP5 /109-130	One
	411AA	1PU /109-142	One
	411AA	0PU /109-160	One
DSPU6	SM566	DCP6 /312-130	One
	411AA	0PU /312-142	One
	411AA	1PU /312-160	One

*These PUs are not required with Series 5 (or later) TG80 and new DDC codes; three PUs per unit will supply the load plus reserve in case one fails.

Table 2-7. 48-Volt Power (CEF)

Feed A Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
A1	411A,SM566, or 563A	Unit 1	70D,5A	Green
A2	411A,SM566, or 563A	Unit 2	70D,5A	Green
A3	411A,SM566, or 563A	Unit 3	70D,5A	Green
A4	411A,SM566, or 563A	Unit 4	70D,5A	Green
A5-1	CCI,ETSIs	ECCN 0	70G,0.5A	Red
A5-2	Indicator	-	74J,7.5A	-
A6-1	-	-	-	-
A6-2	-	-	-	-
A7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A9	411AA,SM566, or 563A	Unit 6	70D,5A	Green
A12	411AA,SM566, or 563A	Unit 7 (0PU)	70D,5A	Green
A13	411AA,SM566, or 563A	Unit 8 (0PU)	70D,5A	Green
A14	411AA,SM566, or 563A	Unit 10	70D,5A	Green
A15	411AA,SM566, or 563A	Unit 11 (0PU)	70D,5A	Green
A16	411AA,SM566, or 563A	Unit 13 (0PU)	70D,5A	Green
A17	411AA,SM566, or 563A	Unit 14 (0PU)	70D,5A	Green
A18	411AA,SM566, or 563A	Unit 15	70D,5A	Green
A19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-7. *Continued*

Feed B Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
B1	411A,SM566, or 563A	Unit 1	70D,5A	Green
B2	411A,SM566, or 563A	Unit 2	70D,5A	Green
B3	411A,SM566, or 563A	Unit 3	70D,5A	Green
B4	411A,SM566, or 563A	Unit 4	70D,5A	Green
B5-1	-	-	-	-
B5-2	-	-	-	-
B6-1	-	-	-	-
B6-2	-	-	-	-
B7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
B8	-	CRO	70D,5A	Green
B9	411AA,SM566, or 563A	Unit 6	70D,5A	Green
B12	411AA,SM566, or 563A	Unit 7	70D,5A	Green
B13	411AA,SM566, or 563A	Unit 9 (0PU)	70D,5A	Green
B14	411AA,SM566, or 563A	Unit 10 (0PU)	70D,5A	Green
B15	411AA,SM566, or 563A	Unit 11	70D,5A	Green
B16	411AA,SM566, or 563A	Unit 12 (0PU)	70D,5A	Green
B17	411AA,SM566, or 563A	Unit 14	70D,5A	Green
B18	411AA,SM566, or 563A	Unit 15 (0PU)	70D,5A	Green
B19	411AA,SM566,	Unit 16 (0PU)	70D,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-7. *Continued*

Feed C Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
C1	411A,SM566, or 563A	Unit 1 (1PU)	70D,5A	Green
C2	411A,SM566, or 563A	Unit 2 (1PU)	70D,5A	Green
C3	411A,SM566, or 563A	Unit 3 (1PU)	70D,5A	Green
C4	411A,SM566, or 563A	Unit 4 (1PU)	70D,5A	Green
C5-1	CCI,ETSIs	ECCN 0	70G,0.5A	Red
C5-2	Indicator	-	74J,7.5A	-
C6-1	-	-	-	-
C6-2	-	-	-	-
C7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
C8	TG58	1SPU (SYNC 1)	70D,5A	Green
C9	411AA,SM566, or 563A	Unit 6 (1PU)	70D,5A	Green
C12	411AA,SM566, or 563A	Unit 7 (1PU)	70D,5A	Green
C13	411AA,SM566, or 563A	Unit 8 (1PU)	70D,5A	Green
C14	411AA,SM566, or 563A	Unit 9	70D,5A	Green
C15	411AA,SM566, or 563A	Unit 11 (1PU)	70D,5A	Green
C16	411AA,SM566, or 563A	Unit 12	70D,5A	Green
C17	411AA,SM566, or 563A	Unit 13 (1PU)	70D,5A	Green
C18	411AA,SM566, or 563A	Unit 16	70D,5A	Green
C19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-7. *Continued*

Feed D Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
D1	-	-	-	-
D2	-	-	-	-
D3	-	-	-	-
D4	-	-	-	-
D5-1	-	-	-	-
D5-2	-	-	-	-
D6-1	-	-	-	-
D6-2	-	-	-	-
D7	411AA,563A	+5 MC Power	70D,5A	Green
D8	484GA	+12 MC Power	70D,5A	Green
D9	SM565 (MCP)	MC Power	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red
D12	411AA,SM566, or 563A	Unit 8 (0PU)	70D,5A	Green
D13	411AA,SM566, or 563A	Unit 9 (1PU)	70D,5A	Green
D14	411AA,SM566, or 563A	Unit 10 (1PU)	70D,5A	Green
D15	411AA,SM566, or 563A	Unit 12 (1PU)	70D,5A	Green
D16	411AA,SM566, or 563A	Unit 13	70D,5A	Green
D17	411AA,SM566, or 563A	Unit 14 (1PU)	70D,5A	Green
D18	411AA,SM566, or 563A	Unit 15 (1PU)	70D,5A	Green
D19	411AA,SM566, or 563A	Unit 16 (1PU)	70d,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-8. Multibay 48-Volt Power (non-CEF)

	Power Unit/CP			
Fuse	Type	Designation/ Location	Size	Bead Color
A1	411AA	128-012	70D,5A	Green
A2	411AA	128-108	70D,5A	Green
A3	411AA	328-012	70D,5A	Green
A4	411AA	328-108	70D,5A	Green
A5-1	485AB	PU1 (CCN0)	70D,5A	Green
A5-2	-	-	-	-
A6-1	485AB	PU2 (CCN 0)	70D,5A	Green
A6-2	-	-	-	-
A7	411AA	1PU (Unit 5)	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A8	-	0TB	70D,5A	Green
A9	411AA	1 PU (UNIT 6)	70D,5A	Green
B1	411AA	128-024	70D,5A	Green
B2	411AA	128-124	70D,5A	Green
B3	411AA	328-024	70D,5A	Green
B4	411AA	328-124	70D,5A	Green
B5-1, B5-2	485AB	PU3 (CCN 0)	70D,5A	Green
B6-1, B6-2	485AB	PU4 (CCN 0)	70D,5A	Green
B7	411AA	0PU (UNIT 5)	70D,5A	Green
B8	TG58	1SPU (SYNC 1)	70D,5A	Green
B8	-	1TB	70D,5A	Green
B9	411AA	0PU (UNIT 6)	70D,5A	Green

Table 2-8. *Continued*

	Power Unit/CP			
Fuse	Type	Designation/ Location	Size	Bead Color
C1	411AA	128-048	70D,5A	Green
C2	411AA	128-148	70D,5A	Green
C3	411AA	328-048	70D,5A	Green
C4	411AA	328-148	70D,5A	Green
C5-1, C5-2	485AB	PU5 (CCN1)	70D,5A	Green
C6-1, C6-2	485AB	PU6 (CCN 1)	70D,5A	Green
C7	SM566	DCP5 (Unit 5)	70D,5A	Green
C8	-	TLIs	70D,5A	Green
C9	SM566	DCP6 (UNIT 6)	70D,5A	Green
D1	411AA	128-064	70D,5A	Green
D2	411AA	128-160	70D,5A	Green
D3	411AA	328-064	70D,5A	Green
D4	411AA	326-160	70D,5A	Green
D5-1, D5-2	485AB	PU7 (CCN 1)	70D,5A	Green
D6-1, D6-2	485AB	PU8 (CCN 1)	70D,5A	Green
D7	-	226-148	70D,5A	Green
D8	-	226-160	70D,5A	Green
D9	-	226-136 (MCP)	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red

Table 2-9. 48-Volt Power (Single-Bay)

Fuse	Power Unit	
	Type	Designation/Location
A1	411AA	FTU1-First PU
A2	TG58	0SPU (Sync Power)
A3	411AA	0PU (DSPU Side 0 Power)
A4	411AA	CCN2 Side 0 Power Unit
B1	411AA	FTU1-Second PU
B2	TG58	1SPU (Sync Power)
B3	411AA	1PU (DSPU Side 1 Power)
B4	411AA	CCN2 Side 1 Power Unit
C1	411AA	FTU1-Third PU
C2	NONE	48 Volts to TLIs 1-4, Both Sides
C3	SM566	DCP (DSPU Power)
D2	411AA	+5 Controller Power
D3	484GA	+12 Controller Power
D4	SM565	MCP (Main Controller Power)
D5	NONE	48 Volts to MTC Pack

Table 2-10. Sync and Main Controller (CEF)

Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /14-106	0TLI1 /10-104	MCP /04-144	SSC /04-104
	0TLI2 /10-112		EBX /04-128
	0TLI3 /10-120		CPU /04-120
	0TLI4 /10-128		EMTC /04-112
	0DPLL /12-084		CI /04-136
	0TB /14-128	PU /04-012	SSC /04-104
1SPU /14-160	1TLI4 /10-136		EBX /04-128
	1TLI3 /10-144		CPU /04-120
	1TLI2 /10-152		EMTC /04-112
	1TLI1 /10-160		CI /04-136
	1DPLL /12-092		DISK UNIT /04-092
	1TB /14-150		TAPE UNIT /04-048
		PU /04-160	DISK UNIT /04-092
			TAPE UNIT /04-048

Table 2-11. Sync and Main Controller (non-CEF)

Synchronizer		Main Controller	
Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /227-010	0TLI1 /223-008	MCP /225-136	SSC /225-092
	0TLI2 /223-016		BX /225-100
	0TLI3 /223-024		CPU /225-108
	0TLI4 /223-032		MTC /225-120
	0DPLL /225-076		CI /225-128
A8 FUSE	0TB /227-032	PU /225-148	SSC /225-092
1SPU /227-064	1TLI1 /223-064		BX /225-100
	1TLI2 /223-056		CPU /225-108
	1TLI3 /223-048		MTC /225-120
	1TLI4 /223-040		CI /225-128
	1DPLL /225-084		DISK UNIT /233-024
B8 FUSE	1TB /227-054		TAPE UNIT /233-064
		PU /225-160	DISK UNIT /233-024
			TAPE UNIT /233-064

Table 2-12. Sync and Main Controller (Single-Bay)

Synchronizer		Main Controller	
Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /134-010	0TLI1 /130-008	MCP /132-136	SSC /132-092
	0TLI2 /130-016		BX /132-100
	0TLI3 /130-024		CPU /132-108
	0TLI4 /130-032		MTC /132-120
	0DPLL /132-076		CI /132-128
1SPU /134-064	1TLI1 /130-064	PU /132-148	SSC /132-092
	1TLI2 /130-056		BX /132-100
	1TLI3 /130-048		CPU /132-108
	1TLI4 /130-040		MTC /132-120
	1DPLL /132-084		CI /132-128
			DISK UNIT /140-024
			TAPE UNIT /140-064
		PU /132-160	DISK UNIT /140-024
			TAPE UNIT /140-064

Table 2-13. 77-Type, FTU Fuses (Original Interface Bay)

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU, UBX	CPU, UBX	CPU, UBX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 2-14. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30	+5A1 through +5A4	
ED-9C011-30	(1-4 through 17-20)	4 plug-ins (8 NPCs) per fuse
	+5A5	(see +5A5 below)
ED-9C012-30	+5A1 through +5A4	
ED-9C011-30	(1 through 20)	1 plug-in (2 NPCs) per fuse
	+5A5, number 1	CPU
	+5A5, number 2	UBX
	+5A5, number 3	FTMI
	+5A5, number 4	0-Side FC
	+5A5, number 5	1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 2-15. DSPU5 and DSPU6 Fuses (Original Interface Bay)

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/112-160		0PU/312-160	
JBH/112-148	NPC641 /112-006	JBH/312-148	NPC801 /312-006
	NPC661 /112-012		NPC821 /312-012
JBG	NPC681 /112-018	JBG	NPC841 /312-018
	NPC701 /112-024		NPC861 /312-024
JBF	NPC721 /112-030	JBF	NPC881 /312-030
	NPC741 /112-036		NPC901 /312-036
JBE	NPC761 /112-042	JBE	NPC921 /312-042
	NPC781 /112-048		NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/112-142		1PU/312-142	
JBD/112-148	NPC641 /112-074	JBD/312-148	NPC801 /312-074
	NPC661 /112-080		NPC821 /312-080
JBC	NPC681 /112-086	JBC	NPC841 /312-086
	NPC701 /112-092		NPC861 /312-092
JBB	NPC721 /112-098	JBB	NPC881 /312-098
	NPC741 /112-104		NPC901 /312-104
JBA	NPC761 /112-110	JBA	NPC921-310
	NPC781 /112-116		NPC941 /312-116
DCP5 /112-130	CPU5 /112-056	DCP6 /312-130	CPU6 /312-056
	DSPI5 /112-062		DSPI6 /312-062

Table 2-16. DSPU Fuses (Flexible Bay)

Fuse	Side	DSP Position (Note)
(Top)	0 DSPU	(Left Panel)
No. 1		First and second
No. 2		Third and fourth
No. 3		Fifth and sixth
No. 4		Seventh and eighth
(Bottom)	1 DSPU	(Right Panel)
No. 5		First and second
No. 6		Third and fourth
No. 7		Fifth and sixth
No. 8		Seventh and eighth

Note: Each fuse supplies two DSP plug-ins.

Table 2-17. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
484GA	+11.60 to +12.60	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

2.2.6 Check DSPU Plug-In Installation

Overview: Use this procedure to verify that all the DSPU plug-ins in the frame are properly installed.

1. Familiarize yourself with the DSPU shelf. See Figure 2-10.
2. Verify that all DSPUs are properly installed. See Table 2-18.

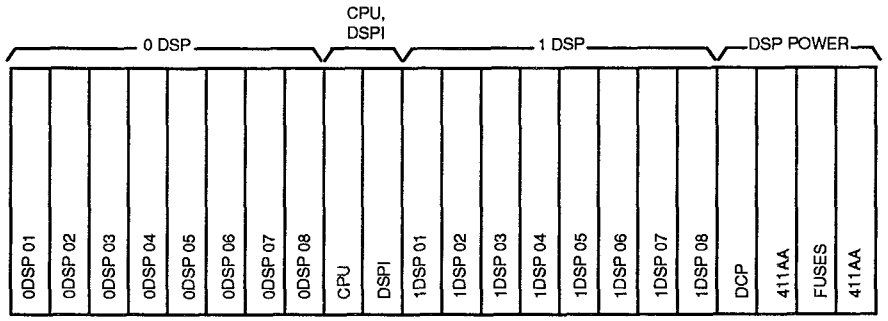


Figure 2-10. DSPU Shelf

Table 2-18. DSPU Power Units and Fuses

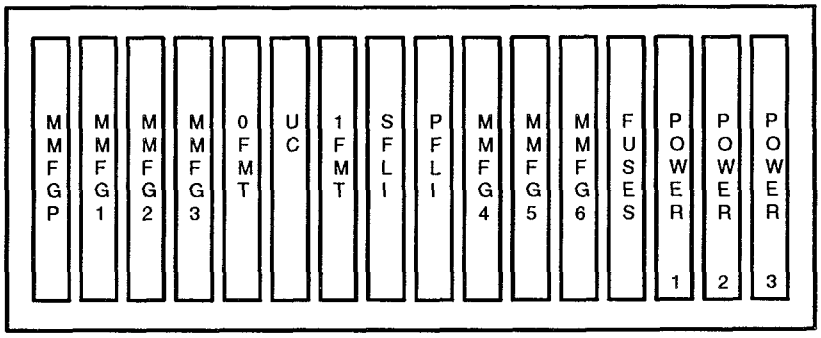
Fuse	Side	DSP Position (Note)
(Top)	0 DSPU	(Left Panel)
No. 1		First and second
No. 2		Third and fourth
No. 3		Fifth and sixth
No. 4		Seventh and eighth
(Bottom)	1 DSPU	(Right Panel)
No. 5		First and second
No. 6		Third and fourth
No. 7		Fifth and sixth
No. 8		Seventh and eighth

Note: Each fuse supplies two DSP plug-ins.

2.2.7 Check DS3U Plug-In Installation

Overview: Use this procedure to verify that all the DS3U plug-ins in the frame are properly installed.

1. Familiarize yourself with the designated positions on the DS3U shelf. Notice that an MMFG consists of MXR positions and that there is an MMFG for protection switching. See Figure 2-11 (MIU is not supported).
2. Familiarize yourself with the method of installing packs as follows:
   - Use the wrist strap and observe ESD precautions when handling the pack.
   - While holding the plug-in by the front piece, bring it up and place it into the slot. Also support the bottom edge if necessary.
   - Gently push the card in the slot to the point where the top and bottom latches can be used to pull the card evenly into the slot.



NOTE: EACH MMFG CONSISTS OF MXR AND MIU POSITIONS

Figure 2-11. Location of MMFGs on DS3U Shelf

3. If not already installed, install the 563A power units in designated slots. Verify that all the green power LEDs are lighted and that no red failure LED is lighted.

   NOTE:
   Two of the three power units will supply the load, but the third one is required for backup reserve power.

4. Verify that all the 80-type fuses are installed in the fuse board. See Table 2-19 for the fuse assignments.
5. Disconnect any one of the power units and verify that the red failure indicator on the other two power units does not light.
6. Return the power unit to operation.
7. Repeat the above test (disconnecting a different 563A unit, observing the LEDs on others, and repowering) to test all combinations in the power group.

Table 2-19. DS3U Fuse Assignment

Fuse Designation	Associated CPs
L	P MXR
K	1 MXR
J	2 MXR
I	3 MXR
H	0 FMT
G	UC
F	1 FMT
E	S FLI
D	P FLI
C	4 MXR
B	5 MXR
A	6 MXR

2.3 Reprovision the Frame

NOTE:
This procedure clears the current cross-connect database and has the potential to interrupt and/or terminate service if not performed properly. Therefore, contact your next level of technical support for details on how to reprovision the frame.

2.4 Review Frame and Link Setup

Overview: Use this procedure to review the frame and link configuration. This procedure is used to query the command prioritization and output message screening on administrative links. A user can only query these settings on his or her link or login. Prioritizing and screening are assigned by the frame coordinator who can query any or all user links; users can change their own output screening but not their input priority. Prioritization determines which commands are available to the user and the priority (0, 1, 2, or 3) for processing different command groups. Screening allows reducing or increasing the number of output messages that appear on the link. Unless changed, all autonomous outputs and only the output messages for inputs on the same user link appear at that link.

2.4.1 Check Frame, Software, and Feature Setup

1. If command has not already been entered to see the configuration, enter **RTRV-PRMTR-NE;**.
2. Read the requested information using Table 2-20.
3. To see the frame ID and the version of software, enter **RTRV-HDR-NE;**.
4. To see which features are enabled, enter **RTRV-FPKG-NE;**.

Table 2-20. Configuration Meanings

Item	Meaning
FRAME <id>	Frame number recorded in software
UNIQUE IDENTIFIER	Unique frame identifier
SOFTWARE SERIAL NUMBER	Software serial number
TOTAL BAYS (aa)	Number of bays in frame configuration
BAY TYPE (f-fffff)	Bay type: 1 for original interface 2 for flexible, or dash for bay 2 and unequipped
TOTAL EQUIPPED (bb)	Total equipped units
CCN <id>	Type of cross-connect network: 1 for CCN- multibay, non-CEF, 2 for single bay, or E for ECCN
HEIGHT <id>	Height of bay: 0 for 7 feet (2133 mm) 1 for 11 feet 6 inches (3505 mm) 2 for 7 feet 2.6 inches (2200 mm)
UNIT:a,...	Unit designations: 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for IFTU, or dash for not designated
NPCAD	NPC addressing: E for extended, H for hierarchical, or X for 4-digit extended

2.4.2 Check Link Setup

1. Enter `RTRV-PRVG-{USER|TERM}::::{<user id>|<link No.>|ALL};`

   Where:

   USER\|TERM = Selects whether user or link identification will be used in the command.

   user id = Particular user ID

   <link No.> = Identification of user link(s)to be queried; either given physical link (1 through 6) and virtual circuit (for synchronous, 01 through 16).

   ALL = All users (frame administrator command).

2. Familiarize yourself with the following link setup options.

   — To read the priority level (LEV) for different commands, relate the level — 0 (excluded group), 1 (lowest), 2, and 3 (highest), given after LEV word in the output message to the command groups per Table 2-21.

   — To read the screening, find the SCR number (1 through 5) in the output corresponding to the position under the SCR category heading in the explanation line and refer to Table 2-22. For numbers 3 and 4, use Table 2-21 to determine the command groups indicated by 1s and 0s in the GR field of the output.

   — The restricted maintenance option (RMON/RMOFF) determines whether the user has permission to use commands in that category.

   — The link language (LANG) is given as either P (Program Documentation Standards), M (Man-Machine Language), or F (Facility Data Link Communication Protocol Language).

   NOTE:
   The FDL language may only be provisioned for a single virtual circuit on an x.25 link. Once the X.25 link is set up, provisioning this function only requires the user to specify the language "F" for the virtual circuit; no other I/O parameters affect this channel, except the NPC addressing option.

   — The NPC addressing (NPCAD) scheme for messages is given as either E for extended (for example, 001), X for 4-digit extended (for example, 0001), or H for hierarchical (for example, 01101).

   — The MCON/MCOFF option determines if macro component completion messages are output.

   — The RLK option removes link privilege, output will be either RLK A (allowed) or RLK I (inhibited).

Table 2-21. Command Grouping

a Circuit Provisioning	b Equip Provisioning	c Maintenance
ALW-SW-T1	CRTE-CNFGRN-EQPT	DGN-EQPT
CONN-BDCST-T0	CRTE-EQPT	ED-PRMTR-EQPT
CONN-CRS-T0	CRTE-LGN	ENT-EQPT
CONN-CRS-TS	DLT-LGN	INIT-SYS
CONN-CRS1-T0	DLT-MACRO	RMV-CNFGRN-EQPT
CRTE-CRS-TS	DLT-MAP	RMV-EQPT
DLT-CRS-TS	DLT-PRMTR-EQPT	RST-CNFGRN-EQPT
DISC-BDCST-T0	ED-PRMTR-EQPT	RST-EQPT
DISC-CRS-T0	ED-PRMTR-LINK	SW-DX-EQPT
DISC-CRS-TS	ED-PRMTR-NE	-
DISC-CRS1-T0	DISC-EQPT	-
INH-SW-T1	SET-PRVG-TERM	
SW-TOPROTN-T1	SET-PRVG-USER	
SW-TOWKG-T1		
d **Test Access**	**e** **Monitoring**	**f** **Common**
ALW-LPBK-T1	CPY-MEM	CHG-LGN
CHG-TL-T0	ED-DATE	CHG-RPATH-T0
CHG-TL-TS	INIT-LOG	ED-CNFGRN-EQPT
CONN-HUB-T0	INIT-REG	ED-CONN-TS
CONN-TACC-T0	OPR-ACO-ALL	ED-CRTE-TS
CONN-TACC-TS	RST-PASSWD	ED-OPT-T1
DISC-TACC-T0	SCHED-BKUP-MEM	ED-PRMTR-EQPT
DISC-TACC-TS	SCHED-PMREPT-ALL	ED-PRMTR-MACRO/MAP
INH-LPBK-T1	SET-ATTR-EQPT	ED-PRMTR-NE
OPR-LPBK-T0	STA-LOCL-RST	ED-PRMTR-T0
OPR-LPBK-T1	RTRV	ED-PRMTR-TS
RLS-LPBK-T1		ENT-MACRO/MAP
-	-	EXC-MACRO/MAP
-	-	SET-PRVG-TERM/USER
Restricted Maintenance (RMON Option)		
Restore MC (with TAPE Option) Restore DISK/TAPE (with CLR Option) CPY-MEM Commands **STA-LOCL-RST** **SCHED-BKUP** (00-HR)		

Table 2-22. Screening Options

Screening Option (n)	Definition
1	Only the responses to inputs entered on that particular link and by that user are output.
2	The responses to inputs entered on that particular link and by that user are output as well as all autonomous messages (default).
3	Responses to input messages on that particular link and by that user are output as well as responses from specified groups of action verbs from other links. The selection of message groups is made using the GR (a, b, c, d, e, f) field in the screening command.
4	Responses to input messages on that particular link and by that user, responses from specified groups of action verbs from other links (see above), and autonomous messages are output.
5	All responses to all input messages on all links are output as well as all autonomous messages.

2.4.3 Check Status Register

1. Enter `RTRV-PRMTR-LINK::j[mm];` to familiarize yourself with the output.

   Where:
   j = Link number
   mm = Synchronous link virtual.

2. Refer to Figure 2-12 to see the bit definition (meaning of 1s) of the raw data field.

```
/*Protocol*/
"{S/X}"
/*Baud:Backspace:Alarm:Enq/Ack:Xon/Xoff:Mode,Software,Hardware status*/
"bb:e:k:q:x:m,p,hh"
```

Protocol = S for Snider (Async) or X for X.25 (Synchronous)
bb = <baud> = 03,06,12,24,48,96
e = <backspace> = 0 for true backspace, 1 for underscore backspace, or dash (—) for synchronous link.
k = <alarm> = 1 (link alarm defined as minor) or 2 (defined as major)
q = ENQ/ACK protocol 0 disabled, 1 enabled (default)
x = Xon/Xoff protocol 0 disabled (default), 1 enabled.
m = <mode> = 0 (idle), 1 (input message), or 2 (output message)
p = <software> = 0 (protocol exchanges in-service) or 1 (protocol exchanges out-of-service, which slows down DACS II response time)
hh = <hardware> = 03 (hardware in-service) or 04 (hardware out-of-service)

```
ADDITIONAL LINES FOR X.25:
/*Data Link Layer parameters:  Frame address*/
"K-b,T1-eee,T3-ggg,N2-aa:{A/B}"
/*Packet Layer parameters*/
"W-c,P-ddd,T20-iii,T22-jjj,T23-kkk,T25-lll,T26-mmm,R20-nn,R22-p,R23-q,R25-r"
/*PVC and SVC range:  PVC and SVC group number*/
"ppss:gghh"
```

Figure 2-12. Link Status Register

2.5 Initialize and Test Alarms

2.5.1 Initialize Alarms

Overview: Use this procedure to verify alarms have been set up to match your frame configuration.

1. Enter **SET-ATTR-EQPT:[xy]::[ww]:ALM-a;**

   Where:
   xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   a = 3 for both local and remote alarm indications, or 2 for remote alarm indications alarms.

   - If the command is denied and the input message was entered correctly, refer trouble to the installer.

2.5.2 Test Alarm Operation

Overview: Use this procedure to test the alarm(s) operation.

1. In the first facility terminating unit (bay 1), locate the FTMI pack for one of the four modules of NPCs.
2. Disengage that FTMI pack.
3. If the **MINOR** (or **DMA MINOR** for 2.048-Mb/s line) LED is lighted on the status panel and the office alarm is operating, press the **ACO** button on the status panel.

   - If LED does not light and the alarm is operating, proceed to Step **11**.

4. Push the FTMI back into the slot and enter
   RST-EQPT::UNIT-[q]q::FTMI-d;

   Where:
   [q]q = Unit number (1 through 16)
   d = FTMI number (1 through 4).

5. Disengage one of the DDC (or DPC) packs (two NPCs) in the same module.

6. If the **MAJOR** (or **PMA MAJOR** for 2.048-Mb/s line) LED is lighted on the status panel and the office alarm is operating, press the **ACO** button on the status panel.
   - If LED does not light and the alarm is operating, proceed to Step **11**.
7. Disengage two more DDCs (or DPCs).
8. If the **CRITICAL** (or **PMA CRITICAL** for 2.048-Mb/s line) LED is lighted on the status panel, continue with Step **9**.
   - If LED does not light and the alarm is operating, proceed to Step **11**.
9. Push the DDCs (or DPCs) back into the slots and enter **RST-EQPT::NPC-<npc No.>[[&]&&-<range>];** to restore each NPC (two per each card) to service.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Last NPC in a continuous range. Extra ampersand [&] needed for hierarchical.
10. Verify that all the alarms clear.
    - If the alarms are clear, proceed to *Check and Set Time-Clock, Facility Report Utilities, and Auto Backup Memory* to check and set the time-clock and facility report utilities.
    - If the alarms are not clear, replace the EMTC pack in the main controller as outlined in subsequent steps for the ECI.
11. If office alarm operates but LED does not light, press the **LAMP TEST** button on the status panel to determine if the LED is burned out.
    - If the LED is burned out, replace it and start again with Step **3**.
    - If the LED is not burned out, enter **RMV-EQPT::MC;** to remove the MC from service.
12. Replace the ECI pack.
13. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If the office alarm still does not operate after the reset completes, refer trouble to installation group or clear trouble in office alarm wiring.

2.6 Check and Set Time-Clock, Facility Report Utilities, and Auto Backup Memory

2.6.1 Check and Set Time-Clock Utilities

Overview: Use this procedure to review and, if required, to set the time-clock utilities.

1. If current time needs to be set in DACS II, enter correct time using
   ED-DATE:[xy]::[ww]:,hr-mn-sc;.
   - If time does not need to be set, continue with Step **2.**

   Where:
   hr = Hour (00 through 23)
   mn = Minutes (00 through 59)
   sc = Seconds (00 through 59).

2. Enter correct date using
   ED-DATE:[xy]::[ww]:mo-da-[ce]yr:[INT-bb];

   Where:
   yr = Last 2 digits of year (00 through 99)
   mo = Month (01 through 12)
   [ce] = Century
   da = Day (01 through 31)
   INT-bb = Optional, to set period (bb=01,02,04,06,08,12, or 24 hours).

2.6.2 Check and Set Facility Report Utilities and Auto Backup Memory

Overview: Use this procedure to review and, if required, to set the facility report utilities. The facility report utilities are used to specify the items included in the daily report message, to set the time the daily report message will be issued, and to set up the backup memory report. (Refer to *Performance Monitoring* for detailed information regarding facility reports.)

1. Which of the following facility parameters do you want to be included in the daily report message?
   - If **CGAs** and **Errored Seconds**, continue with Step **2**.
   - If **selected parameters**, proceed to Step **3**.
   - If **only CGAs** (no entry required), proceed to Step **6**.

   ⇒ NOTE:
   To see what facility reports are scheduled to occur enter **`RTRV-PMREPT-SCHED:::CFA`**.

2. To set the time for the facility report enter **`SCHED-PMREPT-ALL:[xy]::[ww]:hr-mn-sc,CFA;`**. Proceed to Step **6**.
3. Familiarize yourself with the command (shown below) to set the time for facility report and select parameters. For Gateway, both FAC and PRIM parameters must be entered, and common bits (for example, ERS) must be set the same in both.
   `SCHED-PMREPT-ALL:[xy]:[ww]:hr-mn-sc,FAC-X-abcdef[,PRIM-X-abcd];`

   Where:
   FAC-X-abcdef = Field to select DS1 facility reports; "abcdef" is hexadecimal word for 24 bits that specify parameters
   PRIM-X-abcd = Field to select 2.048 Mb/s facility reports; "abcd" is hexadecimal word for 16 bits that specify parameters.

4. Study hexadecimal word construction per Figure 2-13 for FAC and Figure 2-14 for PRIM and the following examples. Whatever parameters are selected will show up in the AUD CGA command and the midnight report. Construct the hexadecimal word as follows:

   — Decide which parameters are needed using Figures 2-13 and 2-14. Each parameter is represented by a digit in the hexadecimal word.

   — Work with each part of the hexadecimal word (a, b, c, d or a, b, c, d, f) individually.

   — Construct a 4-digit binary number for each part by placing a 0 in each position representing an unwanted parameter and a 1 in each position representing a wanted parameter.

     Remember that the bit positions read right-to-left, low-to-high (i.e., the bit positions for b in PRIM are: 10 9 8; the bit positions for b in FAC are: 18 17 16).

     For example, to select MER and FRER in PRIM, the 4-digit binary number for part b is 0011.

     Repeat this step for each part.

   — Convert each 4-digit binary number to a hexadecimal character using the following chart:

0000 = 0	0100 = 4	1000 = 8	1100 = C
0001 = 1	0101 = 5	1001 = 9	1101 = D
0010 = 2	0110 = 6	1010 = A	1110 = E
0011 = 3	0111 = 7	1011 = B	1111 = F

   — Put the 4 (PRIM) or 6 (FAC) hexadecimal charaters together in the proper order (a b c d or a b c d e f) to create a 4- or 6-digit hexadecimal number.

   EXAMPLE 1: For FAC, to select CGA and ERS, the 4-digit binary numbers would be: a = 0000; b = 0000; c = 0000; d = 0000; e = 0001; f = 0001. The resulting FAC hexword is 000011. (HEX A=10, B=11, C=12, D=13, E=14, F=15).

   EXAMPLE 2: For PRIM, to select PBA, ERS and DM, the 4-digit binary numbers would be: a = 0000; b = 0000; c = 0101; d = 0001. The resulting PRIM hexword is 0051. (HEX A=10, B=11, C=12, D=13, E=14, F=15).

Hex Digit	Bit	Parameter
f	0	CGA
	1	OOF
	2	SLIPS
	3	BER (Bit Errors)
e	4	ERS (Errored Second)
	5	SERS (Severe Errored Second)
	6	COFA (Change Of Frame Alignment)
	7	CRC6
d	8	BPV (Bipolar Violation)
	9	FRER (Frame Bit Error)
	10	Not Used
	11	Not Used
c	12	Not Used
	13	Not Used
	14	Not Used
	15	Not Used
b	16	SANE (Shelf Alarm)
	17	SAFE (Shelf Alarm)
	18	DS3 Alarm
	19	Not Used
a	20	Not Used
	21	Not Used
	22	Not Used
	23	Not Used

Figure 2-13. FAC Hex-Word Construction

5. Enter required command for facility reporting. The selected parameters will show up in the AUD CGA command and the midnight report.
6. To see if BMTR (backup memory transfer) is scheduled to occur automatically, enter
   RTRV-BKUPSCHED-MEM::SEC::DATA;
   and look for 24-HR followed by the scheduled time. If the 24-HR is not set, the output will have dashes instead of 24 HR.
7. If you want to schedule/change the time for the automatic update (of database on tape), enter **SCHED-BKUP-MEM:[xy]:SEC:[ww]:DATA:24-HR:hr-mn-sc;**. To clear any scheduling, enter **SCHED-BKUP-MEM::SEC::DATA:00-HR;**.

   NOTE:
   To use use the clear scheduling command the user must have RMON capability.

Hex Digit	Bit	Parameter
d	0	PBA
	1	LOFA
	2	SLIPS
	3	US (Unavailable Seconds)
c	4	ERS (Errored Seconds)
	5	SERS (Severely Errored Seconds)
	6	DM (Degraded Minute)
	7	CRC4
b	8	MER (Multiframe Error)
	9	FRER (Frame Bit Error)
	10	MBER (Minor Bit Error)
	11	Not Used
a	12	Not Used
	13	Not Used
	14	Not Used
	15	Not Used

Figure 2-14. PRIM Hex-Word Construction

2.7 Check and Change Line Buildout, Equalizers and Impedance

2.7.1 Check and Change DS3 Line Buildout

2.7.1.1 Check DS3 Line Buildout

Overview: Use this procedure to check the DS3 LBO (line buildout).

1. Enter `RTRV-PRMTR-T3:[<xy>]::[ww]:LBO;`.
2. For each equipped DS3U, read the LBO value (ON/OFF) for each DS3 position from the output message. Unequipped DS3 positions will have dashes for the LBOs. If there are no DS3s positions in the frame, the output will say LBO NONE.
3. Compare the settings with the required values per Table 2-23.
   - If Table 2-23 indicates an incorrect setting, proceed to *Change DS3 Line Buildout* to change the LBO setting.

Table 2-23. DS3 Line Buildout

LBO SETTING	TO DSX-3		TO NETWORK ELEMENT	
	KS-19224, L2 CABLE	734A CABLE	KS-19224, L2 CABLE	734A CABLE
ON	0 to 75 feet	0 to 225 feet	0 to 150 feet	0 to 450 feet
OFF	75 to 150 feet	225 to 450 feet	150 to 300 feet	450 to 900 feet

2.7.1.2 Change DS3 Line Buildout

Overview: Use this procedure to change incorrect values of DS3 line buildout.

1. Enter `ED-PRMTR-T3::UNIT-[q]q::DS3-c[&&-d]:,LBO-{ON|OFF};`

   Where:

   c = DS3 number associated with MXR (1 through 6).

   d = Optional, last DS3 number of range of DS3s in same unit.

   ONIOFF = To change the line buildout on or off, OFF is default.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check output message to verify command entries.

2.7.2 Check/Change DS1 Equalizer

2.7.2.1 Check DS1 Equalizer

Overview: Use this procedure to check the DS1 equalizer setting.

1. For each equipped FTU/IFTU and FTM shelf, enter the following command: `RTRV-STATE-EQPT::UNIT-[q]q::FTMI-b;`

   Where:

   [q]q = Unit number (1 through 16).

   b = FTMI (and shelf) number (1 through 4) in unit.

2. For DS1 shelf, compare the left and right shelf values (1 through 5) to the required settings for the length of office cabling per Table 2-24.

   - If the value per Table 2-24 indicates an incorrect setting, proceed to *Change DS1 Equalizer* to change the DS1 equalizer setting.

Table 2-24. DS1 Equalizer Settings

Setting	Cable Length (22 Gauge)	Cable Length (26 Gauge)
1	0 through 133 feet	0 through 90 feet
2	133 through 267 feet	90 through 180 feet
3	267 through 400 feet	180 through 270 feet
4	400 through 533 feet	270 through 360 feet
5	533 through 655 feet	360 through 450 feet

2.7.2.2 Change DS1 Equalizer

1. Enter the command with the value of equalization (or a dash for unchanged) for each half of the shelf (see Table 2-24):
   ED-PRMTR-EQPT::UNIT-[q]q::FTMI-b:EQL-l,r;

   Where:
   b = FTMI (and shelf) number (1 through 4)
   l = Equalizer setting (1 through 5) for left half of shelf (20 NPC positions).
   r = Equalizer setting (1 through 5) for right half of shelf (20 NPC positions).

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check output message to verify command entries.

2.7.3 Check and Change Impedance Setting

2.7.3.1 Check Impedance Setting

Overview: Use this procedure to check the impedance setting.

1. For each equipped FTU/IFTU and FTM shelf, enter
   `RTRV-STATE-EQPT::UNIT-[q]q::FTMI-b;`
   Where:
   [q]q = Unit number (1 through 16)
   b = FTMI (and shelf) number (1 through 4) in unit

2. For 2.048 Mb/s-shelf, check the impedance setting with the type of facility as follows: 075 ohms for coaxial cable, and 120 ohms for twisted wire cable.
   - If any settings need to be changed, continue with Step **3** (see Note.)

   NOTE:
   This procedure must be repeated to check all other units (including different type units that have not been checked) in the frame.

3. If you want to enter commands to change settings instead of referring the trouble to the installation group, proceed to *Change 2.048-Mb/s Impedance Setting.*
   - If you do not want to change the settings yourself, refer all incorrect settings to the installation group.

2.7.3.2 Change 2.048-Mb/s Impedance Setting

1. Enter `RMV-EQPT::UNIT-[q]q::FTMI-b;` for the unit and FTMI shelf to be changed.

   Where:
   [q]q = Unit number (1 through 16)
   b = FTMI (and shelf) number (1 through 4).

2. Enter `DISC-EQPT::UNIT-[q]q::FTMI-b;` for the same unit and shelf.

   NOTE:
   The FCs will be autonomously removed when the FTMI is degrown.

3. Enter command to grow the FTMI with the required impedance setting:
   `CRTE-EQPT::UNIT-[q]q::FTMI-b:IMP-zzz;`

   Where: zzz = For 2.048-Mb/s line; use 075 for 75-ohm coaxial or 120 for 120-ohm twisted pair.

4. Enter `RST-EQPT::UNIT-[q]q::FTMI-b;` for the unit and FTMI.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

5. Enter `RST-EQPT::UNIT-[q]q::FC-sb;` to restore the FCs that were removed from service when the FTMI was degrown.

   Where:
   s = Side number (0 or 1)
   b = Format converter number (1 through 4).

6. Check output message to verify command entries.

2.8 Test DS3U Protection Switching

2.8.1 Check Multiplexer Protection Switching

Overview: Use this procedure to verify that the multiplexer units have the ability to switch from the service unit to the protection unit and back.

1. Enter command to initiate the MMFG protection switch as follows: **SW-TOPROTN-EQPT::UNIT-[q]q::MMFG-c[:FRC];**. Option FRC forces the switch even if it means releasing protection connected to another service MMFG.

   Where:
   [q]q = Unit number (1 through 16)
   c = MMFG number (1 through 6) to be switched.
   FRC = Optional, to force removal without accompanying protection switching (required when protection switching is not available).

   NOTE:
   The switch can also be initiated by pulling a service MXR pack or entering the MMFG remove command, **RMV-EQPT::UNIT-[q]q::MMFG-c;**.

2. Notice SW ...COMPLD message and verify that ALM message is not received on a line which has been switched onto protection.
3. Enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** to see the overall protection state for the unit.
4. Observe the following in the query output message:
   — The message is divided into the top half for the FLI status and the bottom half for the MMFG status.
   — In the FLI portion, the maintenance status and then the protection are listed for both the service and protection FLIs.
   — In the MMFG portion, there are 7 MMFG groupings; the leftmost is for the protection MMFG and the others are for MMFGs 1 through 6. In each grouping, the first item is the MXR/EMXR maintenance status, followed by the MIU maintenance status (MIU is not supported but EMIU is supported), followed by the protection status, followed by the availability of switching (if MMFG switching was requested).
5. Refer to Table 2-25 to interpret the maintenance and protection status keywords. The codes are consolidated; you will never see some of the keywords under the heading in the table for the pack.

Table 2-25. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

6. Enter **RTRV-STATE-T3::UNIT-[q]q::DS3-c;** for same unit and MMFG (c = MMFG No.) to obtain PSTATE summary.
7. Enter command for manual switchback as follows: **SW-TOWKG-EQPT::UNIT-[q]q::MMFG-c;** for the MMFG that was switched.

   NOTE:
   If switch was initiated by pulling a pack or removing the MMFG, do the reverse operation (install, restore) here to cause switchback.

8. If you want to compare the status to the switched status, enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** and read status as before.
   - If this procedure has been completed, continue to *Check Facility Line Interface Switching* to check facility line interface protection switching.

2.8.2 Check Facility Line Interface Switching

Overview: Use this procedure to verify that the FLI (facility line interface) units have the ability to switch from the service unit to the protection unit and back.

1. If you want to test the FLI switching, enter `SW-TOPROTN-EQPT::UNIT-[q]q::FLI;` and after the completion, enter `RTRV-STATE-EQPT::UNIT-[q]q::PROTN;` to read the status as before.
2. To switch back the FLI, enter `SW-TOWKG-EQPT::UNIT-[q]q::FLI;`.

2.9 Check Sync Switchover

Overview: Use this procedure to verify that sync units have the ability to switch from the active to the inactive side and back.

1. Enter **RTRV-STATE-EQPT::SYNC;** to determine the active sync side which is given by SOURCE field (inactive side will show MATE). See Table 2-26 for message field output and meanings.

Table 2-26. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

2. Enter **RMV-EQPT::SYNC-a;** for active side to cause switchover.
3. Obtain STATE SYNC again and check SOURCE.
4. Enter **RST-EQPT::SYNC-a;** to restore SYNC side.

2.10 Check Cross-Connect Operation

2.10.1 Make Random Cross-Connect Tests Using A Digital Access Test Set

Overview: Use this procedure to check the operation of the cross-connect network. The cross-connect operation is checked by sending a signal through randomly chosen cross-connect circuits. The preferred method of testing the cross-connect operation uses a J1C140A Digital Access Test Set (DATS). The DATS is used in this procedure to send tone over cross-connected channels and to detect the returned tone, thereby verifying the cross-connection. To enable this test, the DATS is connected to the DSX-1 bay jacks of one NPC and the other NPC named in the command is looped at the DSX-1 bay jacks. These NPCs must be ones that have been grown and restored, or NPCs can be moved to various slots in equipped units and grown as TYPE DE100 and restored to service for the test. Additional cross-connections involving different units are entered at random to ensure that the frame is operational.

1. Enter commands as follows to grow two NPCs, one which will have signal looped at DSX-1 bay and one to terminal DATS:

   CRTE-EQPT::NPC-<npc No.>::DE100;

2. Verify that TG80(B) plug-ins are installed in the test NPC positions.

3. Enter **RST-EQPT:[xy]:NPC-<npc No.>:[ww];** to restore the test NPCs.

   Where:

   xy = Unique ID (target ID); up to 20 characters

   ww = Command correlation tag; up to 10 characters

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

NOTE:
The restore operation causes diagnostics to be run and places the NPC in an in-service state. The NPCs must either have the line signal connected or be looped at the DSX-1 bay jacks.

4 At DSX-1, do Steps **5** through **9**. (See Figure 2-15.)

5. Get J1C140A DATS and connect to 120 V AC outlet.
6. Turn power on and enter C-C-F-O-D on DATS keypad.
7. At back of DATS, connect 474A plug end of P6AA cord to DS1 IN/OUT jack.
8. Connect other end of cord to first NPC to be tested with red 310 plug to OUT jack (plug orientation is not critical).
9. Verify that other NPC to be entered in cross-connect command has cord between IN and OUT jacks to loop the NPC signal.
10. Compare the list of settings (E1,FE,E5,EC,F2,C2, and A01 for test channel 01) to what is lighted on the DATS. Select any that are not already set by entering the command letter followed by "D" (for do it).

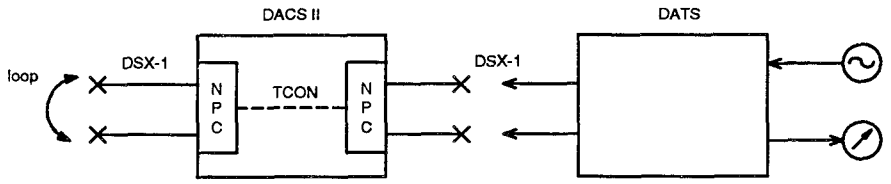


Figure 2-15. Cross-Connection Using DATS

11. Enter **CONN-CRS-T0::<npc No.1>-ddd,<npc No.2>-jjj:TRSP;** at DACS II to cross-connect channel of one NPC to channel of other NPC.

    Where:

    <npc No.1> = One test NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). Channel 1 of NPC is selected for test.

    <npc No.2> = Other (different) test NPC number; channel 1 of NPC is selected.

    - If tone is heard at DATS (note tone level adjustment) and completion message is received, proceed to Step **12**.
    - If tone is not heard at DATS, verify test connections and DATS settings.
    - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain completion.

12. Remove cross-connection as follows:
    DISC-CRS-T0::<npc No.1>-ddd,<npc No.2>-jjj;.

    - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain completion.

13. Repeat test as necessary to include different DACS II units by moving connections to different NPCs (grown and restored). Enter the CONN CRS T0 command to make the cross-connection.

14. When tests are finished, remove the test connections. Remove service from and degrow any NPCs that were added for the tests. (Refer to *Test Access*.)

2.10.2 Make Random Cross-Connect Tests Using Unassigned Voice Terminal

Overview: Use this procedure to check the operation of the cross-connect network using an unassigned voice terminal. The cross-connect operation is checked by sending a signal through randomly chosen cross-connect circuits. These NPCs must be ones that have been grown and restored, or NPCs can be moved to various slots in equipped units and grown as TYPE DE100 and restored to service for the test. Additional cross-connections involving different units are entered at random to ensure that the frame is operational.

1. Enter commands as follows to grow two NPCs, one which will have signal looped at DSX-1 bay and one to an unassigned voice terminal:
   `CRTE-EQPT::NPC-<npc No.>::DE100;`.
2. Verify that TG80(B) plug-ins are installed in the test NPC positions.
3. Enter `RST-EQPT:[xy]:NPC-<npc No.>:[ww];` to restore the test NPCs.

   Where:

   xy = Unique ID (target ID); up to 20 characters

   ww = Command correlation tag; up to 10 characters

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   NOTE:
   The restore operation causes diagnostics to be run and places the NPC in an in-service state. The NPCs must either have line signal connected or be looped at the DSX-1 bay jacks.

4. At DSX-1, do the following (see Figure 2-16):
   - Patch unassigned channel bank (for example, D4 channel bank which is equipped with the proper plug-in units) to one of the NPCs to be used for cross-connect tests.
   - Verify that other NPC for tests has the signal looped with looping cord between IN and OUT jacks.
5. At unassigned voice terminal, connect transmission test set to transmit signal on selected channel for test and to receive signal on same channel.

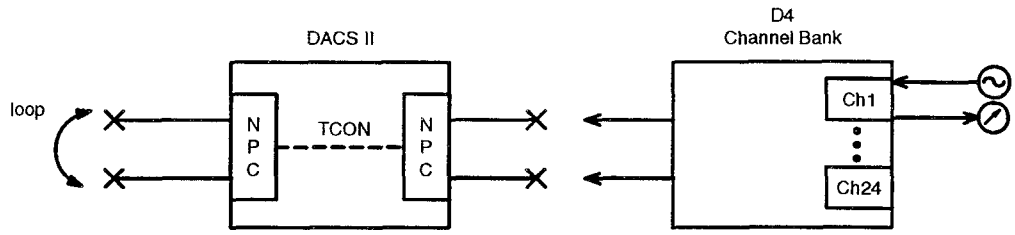


Figure 2-16. Cross-Connection Using Unassigned Voice Terminal

6. Enter `CONN-CRS-T0::<npc No.1>-ddd,<npc No.2>-jjj:TRSP;` at DACS II to cross-connect any channel from one test NPC to the other looped NPC.

   Where:
   ddd = Any channel (1 through 24) on first NPC for test
   jjj = Any channel (1 through 24) on second NPC for test.

   - If tone is detected at transmission test set and a completion message is received, continue with Step **7**.
   - If tone is not detected, verify test connections and signal settings on the unassigned voice terminal.
   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

7. To remove cross-connection, enter
   `DISC-CRS-T0::<npc No.1>-ddd,<npc No.2>-jjj;`

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

8. Repeat test as necessary to include different DACS II units by moving connections to different NPCs (grown and restored). Enter the CONN CRS T0 command to make the cross-connection.
9. When tests are finished, remove the test connections. Remove service from and degrow any NPCs that were added for the tests. (Refer to *Test Access*.)

2.11 Check for Equipped, Out-Of-Service, or Cross-Connected Circuits

Overview: Use this procedure to check for equipped circuit packs, out-of-service circuits packs, and cross-connected circuits. When acceptance is complete, there should not be any equipped Unit plug-ins.

Check for Equipped Plug-Ins

1. Enter `RTRV-STATE-EQPT::[{UNIT-[q]q|UNIT|ETSI|TSI|NPC|MXR}]::EQPD;`

   Where:

   UNIT-[q]q, UNITs, ETSIs, TSIs, NPCs, MXRs = Optional, to request the equipage in specific unit or of specific entity instead of entire frame.

   See Figure 2-17 for link and CCN/ECCN plug-ins if entire frame is checked.

   NOTE:
   Equipped CPs are indicated by a "1" alongside the CP or by the CP number in the sequence. For duplicated entities (FC, ETSIs/TSIs), there will be listings for both the zero and one sides for each duplicated plug-ins.

M RTRV STATE EQPT ... COMPLD
"<subject>:g,h,i,j,k,l,m,n,o,p"

g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-Connect Side 0
n = Cross-Connect Side 1
o = CCI 0 / CCNI 0
p = CCI 1 / CCNI 1

Figure 2-17. Common Equipment Readout

Check for Out-of-Service Plug-Ins

2. Check for out-of-service plug-ins by entering
   `RTRV-STATE-EQPT::[UNIT-[q]q]::OOS;`

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   Enter OOS if you do not expect any out of service circuits during acceptance. However, ALL is used most frequently to show all (OOS, FAIL,PEST) conditions. If XON was used when the link was provisioned, CTRL-s or CTRL-q can be used to temporarily stop or start long output messages.

   NOTE:
   The conditions are indicated by the presence of a "1" after the entity in the printout. For duplicated entities (FC, CCN/ECCN), there will be listings for both the zero and one sides for the duplicated plug-in. Unequipped NPCs are indicated by dashes.

3. If any plug-ins are equipped but out-of-service, enter:
   - — the RST-EQPT (restore) command for the pack if it should be in-service, or
   - — the DISC-EQPT (degrow) command for the pack if acceptance testing is complete.

   Refer to Figure 2-18.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 2-18. Maintenance Command Construction

Check for Cross-Connect Circuits

4. If you need information on what cross-connect circuits are up on the frame, continue with Step **5**.

   - If you do not need information on what cross-connect circuits are up on the frame, proceed to Step **6**.

5. Use the following commands as needed to see any cross-connections:

   - **RTRV-CRS-T1::<npc No.>[&&[&-]<range>]::MAP;** shows the connections on a single NPC or range of NPCs.

     Where: <range> = Optional, last NPC of a continuous range. Extra ampersand and dash [&-] is needed if hierarchical.

   - **RTRV-CRS-T1::NPC::MAP;** gives a long listing of connections on all NPCs. To abort listing while in progress, enter CTRL x and carriage return to gain access to the link; then enter ABT. If XON was used when the link was provisioned, CTRL-s or CTRL-q can be used to temporarily stop or start long output messages.

   NOTE:
   If any cross-connections remain, remove any test connections and remove service from and degrow any NPCs that were added for the cross-connections.

6. When acceptance is complete, there should not be any equipped Unit plug-ins. If all procedures in this chapter have been successfully completed, acceptance testing is completed.

Provisioning

3

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Provisioning

3

3.1 Frame

Before performing any provisioning procedure, familiarize yourself with the method of installing circuit packs as follows:

- Unpack the circuit packs at the frame location where they will be used.
- Use the wrist strap and observe ESD (electrostatic discharge) precautions when handling the pack.
- While holding the plug-in by the front piece, bring it up and place it into the slot. Also support the bottom edge if necessary.
- Gently push the card in the slot to the point where the top and bottom latches can be used to pull the card evenly into the slot.

3.1.1 Configure Frame

Overview: This procedure deals with the menu driven INIT SYS FRAME routine used to enter bay configuration information into the data base. The frame number and unique frame ID can be protected against change using this procedure, or existing protected numbers can be changed using this routine. The bay assignments are made by specifying the HT (height), the type of bay (original or flexible), the cross-connect network designation, and the unit types [FTU (facility terminating unit), IFTU (integrated facility terminating unit), DSPU (digital signal processing unit), DS3U (DS3 unit), NONE] in each bay. Separate growth commands must still be entered to equip units. The unit designations in the configuration define the use of the units and establish the location of circuit packs.

NOTE:
A timeout can occur if entries are delayed during any part of the session; so you may want to read through the procedure first to help prevent a timeout and the need to reenter the information.

NOTE:
The configure session is started from the Main Menu and is concluded from the Main Menu, but you can abort the session and return to this menu (all entries discarded) by entering CTRL D and carriage return.

1. Log in on link 1 as user DAX (refer to Administration).

   NOTE:
   Configuring the frame must be performed by user DAX on link 1, any attempt to configure the frame by any other user or on any other link will be denied.

2. If you are using the configure routine to expand the CEF bay configuration beyond three bays, enter **`RTRV-PRVG-{USER|TERM}::::ALL;`**
   to verify that all users and in-service links have the NPCAD (network processing circuit addressing) option set for either 4-digit extended (X) or hierarchical (H).

   NOTE:
   If any users or links are provisioned with NPCAD = E, enter **`SET-PRVG-TERM::::ALL::NPCAD-H;`** to temporarily change all users and links to the hierarchical addressing scheme.

3. Enter `CPY-MEM:::WKG,PRI;` to ensure that any recent frame activities are recorded on the disk.
4. At link 1, enter `RST-EQPT::MC::MCOND;` to place the frame in the maintenance condition which limits the frame activity to maintenance commands.
5. To initiate the routine, enter `INIT-SYS::FRAME;`.
6. Notice the Main Menu selections and consider the following:
   - — The initialize/reset configuration file includes the entries for the software serial number, protected frame numbers, the number of bays in the frame, the height of the bays, the allowable non-hierarchical NPCAD scheme, and the types of units to be equipped. These entries must be made and the configuration must be initialized in the data base before any of the other options on the menu can be performed.
   - — The add new bay(s) and unit(s) option will be denied if all bays have already been configured.
   - — The add unit(s) to existing bay(s) will be denied if no units were previously designated as unit type NONE.
   - — The change unit(s) type will be denied if selected unit(s) have already been grown via commands.
   - — The remove unit(s) or bay(s) and unit(s) option will be denied if all units were previously designated as NONE or if selected unit(s) have already been grown via commands.
   - — The recall option displays what has been entered or what currently exists in the data base configuration.
   - — The exit option executes the configure command and records what was entered on the hard disk.
7. Consider the following items that have to do with making selections within any of the Main Menu routines:
   - — To make a selection from a submenu listing, enter the item number for the selection and enter RETURN. To select the default item, simply enter RETURN.
   - — If entered information is incompatible with the rest of the configuration, an error explanation will appear and the previous question will be displayed again.

8. Select the Main Menu item followed by RETURN for the part of the configure routine you want to do.
   - If initialize/reset was selected, continue with Step **9**.
   - If initialize/reset was not selected, proceed through the session making the choices to all submenus and after all parts have been completed, proceed to Step **17**.

9. If you do not want to enter a unique software serial number, simply press RETURN. This is how existing or default values are maintained; the system responds with OK, NO CHANGE, or DEFAULT ACCEPTED.

   NOTE:
   The software serial number identifies the frame so that the data bases transferred to tape are restricted for use in that frame.

10. If a unique software serial number is to be entered or the number is to be changed to accommodate a tape from another frame, enter the number and RETURN.

11. Enter information on bay height, the CCN (cross-connect network) type (type is fixed as ECCN), and the option for the number of digits needed for extended NPC numbering.

    NOTE:
    Four digits will be needed for extended NPC (network processing circuit) numbers starting in unit 7 (NPC 1000). The 3- or 4-digit option only applies when there are three bays or less.

    NOTE:
    Even if hierarchical numbering is to be used, the extended NPC option must be selected correctly in order to continue without an error message. An error message will also occur if the selected option conflicts with what was previously entered by the SET-PRVG-{USER/TERM} command.

12. Answer the question about the number of bays and answer the question about bay 1.

    NOTE:
    An original interface bay has a fixed assignment of units (units 5 and 6 can only be DSPU or DS3U types), and the flexible interface bay allows varied assignment of unit types.

    NOTE:
    Original interface bays will only be found in bays 1 and 3 of an older non-CEF frame, and only when the frame is a retrofit installation.

13. Continue with the questions to number all the bays in the frame.

    NOTE:
    The bay numbering portion of the initialize/reset option commences with the lowest numbered bay which has not already been entered.

    NOTE:
    The default order of numbering the bays is in consecutive order, but you can make selections to configure the bays in a different order.

14. Continue with the questions to select the unit types in the bays. The possible unit types are {FTU/IFTU}, DSPU, DS3U, or NONE; however, the bay type (original/flexible) for bays 1 and 3 determines which unit types are allowed.
15. When asked whether the frame number and unique identifier are to be unprotected, answer accordingly. If they are not to be protected, which means they can be subsequently changed using ED-PRMTR-NE, answer YES and enter the numbers when requested. Otherwise, answer NO.
16. After you have completed the menu portion, examine the configuration that is displayed. If not displayed, enter the recall configuration data.
    - To keep the entries and go to the Main Menu to exit, enter RETURN.
    - To discard the entries, enter CTRL D and return.
17. When back at the Main Menu, either select another menu item to make changes or select Exit to incorporate the entries in the data base and update the hard disk.

18. If CFR COMPLD message is received, enter `RST-EQPT::MC;` to exit the MCOND state. (See Note.) The procedure to configure the frame has been completed.
    - If denial message is received, continue with Step **19**.

NOTE 1:
When you exit, there will be a delay before getting the completion message and the disk LED will flash while changes are being written to the disk.

NOTE 2:
The user can now re-establish specific users and links to the 4 digit extended addressing scheme by entering the following command `SET-PRVG-{USER|TERM}::::{<user id>|j[mm]}:NPCAD-X;`.

19. Which denial explanation is received?
    - If **disk error** or **cannot mount disk**, proceed to Step **21.**
    - If **cannot lock/unlock database**, proceed to Step **22.**
    - If **entity cannot be addressed**, continue with Step **20.**
    - If **checksum verification**, proceed to Step **23.**

20. The configuration routine was aborted before the entire routine was completed. Enter `RTRV-PRMTR-NE;`.
    - If pertinent information was not included, repeat the procedure from Step **5**.
    - If pertinent information has been entered, enter `RST-EQPT::MC;` to exit the MCOND state. The procedure to configure the frame has been completed.

21. Enter `RST-EQPT::DISK;` to clear the buffers and ensure that the disk is powered.
    - If you are now able to repeat the configure frame routine and write to the disk, enter `RST-EQPT::MC;` to exit the MCOND state. The procedure to configure the frame has been completed.
    - If trouble persists, continue with Step **22**.

22. Enter `DGN-EQPT::DISK;`.
    - If DGN ...STF message is received, refer to *Manual Diagnostic Failures* in Volume II.
    - If message was not received and trouble persists, do not continue with this procedure. Contact a technical consultant.
23. At the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no COND) is received, repeat the procedure to configure the frame.
    - If RESET ...COMPLD (with COND) is received, refer to *Data Base Troubles* in Volume II to clear reset trouble.

3.1.2 Grow Frame ID

Overview: This frame growth command: (1) places a nonzero frame number and optional unique identifier into the data base, (2) enables the use of a 3-character frame field (if developed), and (3) grows virtual NPCs [9]961 (and others) as TYPE VI100 for network broadcast connections. If the frame number and any UID (unique identifier) were protected against change using the INIT-SYS routine, these numbers are fixed, and the same numbers must be entered in the command. If the frame numbers were not protected, different frame and UID numbers can be entered in this procedure. The UID allows distinguishing the frame from others having the same frame number; frequently, the COMMON LANGUAGE* code is used as the identifier.

1. Enter the frame growth command as follows:
   `ED-PRMTR-NE::::abc123...[,FRAME-fg]:[CHAR-n];`

   Where:
   abc123... = Unique Frame ID (UID); up to 20 alphanumeric characters.
   fg = Two-digit, alphanumeric frame number (00 through ZZ). This number is not used in MML, but it can be entered for alternative PDS use.
   n = Optional, 3 for 3-character frame field in command (n = 2 is default).

   - If command COMPLD message is received, the procedure to grow the frame ID has been completed.
   - If "frame number is protected" explanation is received, you must grow the frame with the same numbers contained in the software configuration file; the numbers can only be changed using the **`INIT-SYS::FRAME;`** command per *Configure Frame*.
   - If other denial code is received, find the explanation for the denial in *Command Denials*.

* COMMON LANGUAGE is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

3.2 Synchronizers

3.2.1 Install Synchronizer Plug-Ins

NOTE:
The only way to switch SYNC sides is to issue a RMV-EQPT::SYNC command followed by a RST-EQPT::SYNC command. When the SYNC switches sides, the (E)CCN also switches. Switching SYNC sides is not necessary for normal operation.

1. Familiarize yourself with the layout of the equipment in the frame. The sync is always mounted with the main controller in bay 2 (switch bay) in an original interface frame. Figure 3-1 shows the location in the CEF (capacity expansion frame).

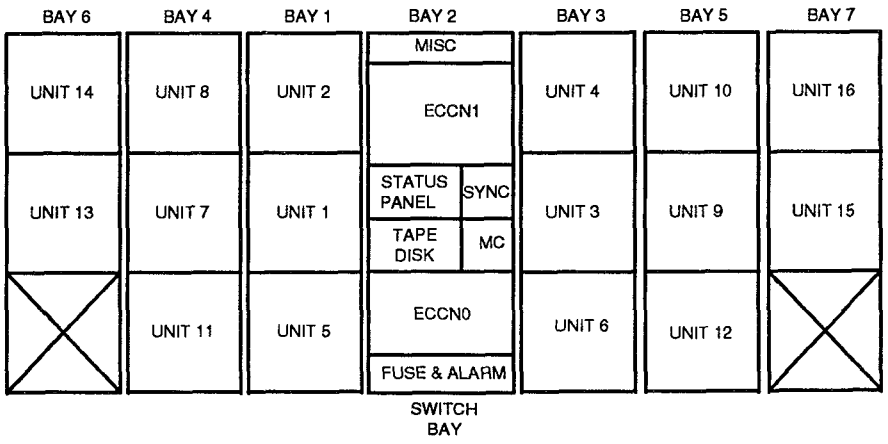


Figure 3-1. Fully-Equipped CEF

2. From system layout information and installation records, determine the following on the sync:
   - — The configuration, MASTER or SLAVED.
   - — The number and types (digital line, office clock, etc.) of incoming links for slaved timing.

— Timing distribution, whether DACS II supplies timing to other equipment in the office.

3. Check and install the TB (time base) using the TB portion of Table 3-1.
4. Install the 0SPU and SPU (synchronizer power unit) (TG58).
5. Check and install TLI (timing link interface) type designations per TLI part of Table 3-1.
6. Verify that there are duplicate TLI cards (on sides 0 and 1) for each incoming and timing distribution link. See Table 3-1 for equipment codes.
7. If TG68 or TG75 TLIs are used, verify that the packs are installed in the TLI 2 positions of the sync; four inputs for coaxial cable are provided at the top of the frame.
8. If timing signals are to be distributed from the DACS II, verify that the correct code of TLI is installed and check connection of timing cables. Both the TG70 and TG71 packs provide 4 multipled outputs.

NOTE:
Unused ports do not need terminations.

Table 3-1. Sync Plug-In Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

3.2.2 Check NPC Timing Option Wiring

Use this procedure to check the NPC timing option wiring.

1. Refer to the following lists to find the NPC positions in the first two modules of units 1 and 2 that can be used as sources for the 2.048-Mb/s sync clocks.

Hierarchical numbering	Extended numbering
01-1-30	030
01-1-32	032
01-2-30	070
01-2-32	072
02-1-30	190
02-1-32	192
02-2-30	230
02-2-32	232

NOTE:
Only the last NPC position on each of these DPCs is used to prevent losing two sources if the DPC fails.

2. Locate miscellaneous terminal strip A at the top rear of bay 2.
3. Verify that the two twisted pair leads (sync clock and ground) of the NPCs that are used go to the top-bay miscellaneous terminal strip A.
4. Verify that the 0SYNC TP and TN (ground) leads (SD-96699-01 or SD-96648-01) from those NPCs at TSA are wired to the corresponding leads at TSB going to sync port 0 of a TLI. Verify that the same is true for the 1SYNC TP and TN leads and sync port 1.

3.2.3 Grow Sync Timebase, Configure Sync Mode, and Restore Sync

NOTE:
Since one TLI must be grown for timing distribution in the MASTER Sync Mode; it is covered in this procedure.
Additional TLIs are grown in *Grow and Restore Sync TLIs.*

1. Enter `CRTE-EQPT:[xy]:SYNC:[ww]:TBpqr;` to grow the sync time base.

   Where: pqr = 000 for North American Stratum 3
   100 for CEPT, local office
   200 for CEPT, toll office
   300 for North American Stratum 2.

2. Verify that plug-in cards for the TBs and TLIs are installed to enable restoring sync and to enable hardware matchup when TLIs are grown. Always wait 30 minutes for TB oven to reach temperature before attempting to restore sync to service. The TG68 and TG75 cards can only be installed in TLI 2 position because of the 75-ohm coaxial connections.

3. Which sync configuration is required?
   - If **MASTER**, continue with Step **4.**
   - If **SLAVED**, proceed to Step **10.**

4. Enter `ED-PRMTR-EQPT:[xy]:SYNC:[ww]:MASTER;`.

5. Enter `RST-EQPT::SYNC-0;` and then `RST-EQPT::SYNC-1;`.

6. Enter `CRTE-EQPT::SYNC::TLI-1:TDpqr;` to grow TLI 1 for timing distribution.

   Where: pqr = Format specification; 100 for composite clock (TG70 pack) or 200 for sine wave 2.048 MHz (TG71 pack).

7. Verify TB plug-in is installed in TLI-3 side 1 position before entering `CRTE-EQPT::SYNC::TBpqr:TLI-3;` to grow additional TB (same stratum as others) for use as clock reference oscillator.

8. Enter `RST-EQPT::SYNC-0::TLI-1;` and `RST-EQPT::SYNC-1::TLI-1;` to restore TLI 1 on both sides.

9. Wait 30 minutes for the timebase to warm up then enter, `RST-EQPT::TLI-3::CRO;` to restore TLI 3.

   The procedure to configure the sync for MASTER mode has been completed.

10. Enter `ED-PRMTR-EQPT::SYNC::SLAVED;`.

11. Enter `RST-EQPT::SYNC-0;` and then `RST-EQPT::SYNC-1;`.

3.2.4 Grow and Restore Sync TLIs

Use this procedure to grow and restore the sync TLIs.

1. How will the TLI pack be used?
   - If **TIMING EXTRACTOR**, continue with Step **2.**
   - If **TIMING DISTRIBUTOR**, proceed to Step **7.**
2. Note the following comments about the command fields:
   — The sync ports (SSP 0 and SSP 1) on each TLI are grown separately; the type (TE versus TU) must be the same, but the parameters may be different.
   — The source priority for the two SSPs on a TLI must be different.
   — The optional NPC field is used when an NPC is used as a timing source for the TLI. In this case, the TLI is a TU type and the unipolar signal is wired through the miscellaneous terminal strip on the frame.
3. To grow SSP 0 for the TLI, enter
   `CRTE-EQPT::SYNC::TLI-n:tepqr,SSP-0,SRC-p[,NPC-<npc No.>];`
   Where: n = TLI number (1 through 4)
   te = TE for code TG64 card; TP for code TG65 or TG75 cards; TC for code TG66 card; TU for code TG67 card; or TR for code TG68 card
   pqr = Signal format specification; for TP, see Table 3-2; for others, pqr is not defined (000 through 999)
   a = Sync port (0 or 1)
   p = Priority for sync port, p=1 (highest) to p=8 (lowest)
   <npc No.> = Optional, to name NPC supplying timing from incoming line; This field only appropriate with TLI type TU.
4. To restore the same SSP on both sides, enter
   `RST-EQPT::SYNC-0::TLI-n:SSP-0;` and then
   `RST-EQPT::SYNC-1::TLI-n:SSP-0;`.
5. Repeat Steps **3** and **4** to grow SSP 1 and restore it on both sides (substitute SSP 1 for SSP 0 in commands).
6. Repeat Steps **3**, **4**, and **5** as required to grow and restore remaining timing extractor TLIs.

   The procedure to provision TLIs has been completed. If additional TDs (timing distributors) are needed, continue with Step **7**.

Table 3-2. Growth Options

TP (Primary Block Timing Extractor)	
Option x	**Frame Format**
1 or 5	Common Channel Signaling
2 or 6	Channel Associated Signaling - Mode 0
3 or 7	Channel Associated Signaling - Mode 1
4 or 8	European Remote Switching Module (ERSM)
0 or 9	Invalid
Option y	**Line Format**
0 or 2	Alternate Mark Inversion
1 or 3	High Density Bipolar of Order 3 (HDB3)
4 or 9	Invalid
Option z	**Channel Format**
0 through 9	Unassigned

Note: TU (Unipolar clock timing extractor) options x, y and z can be any value from 0 to 9.

7. Enter **CRTE-EQPT::SYNC::TLI-n:TDpqr;**

   Where:
   n = TLI number (1, 3 or 4)
   pqr = Signal format specification;
   100 for composite clock (TG70 pack)
   200 for sine wave (TG71 pack).

8. Enter **RST-EQPT::SYNC-0::TLI-n;** and then **RST-EQPT::SYNC-1::TLI-n;** to restore the TLI on both sides.
9. Repeat Steps **7** and **8** as needed to grow and restore other timing distributor TLIs.
10. Enter **RTRV-STATE-COM:[<xy>]::[ww]:ALL;** to check the source priority.
11. Enter **RTRV-STATE-EQPT::SYNC;** and notice the status of the new links as shown in the message.

NOTE:
Sync 0 occurs before (left of) sync 1 in the status listings and the presence of a 1 alongside a condition indicates that the condition exists.

3.2.5 Query Sync Status

1. Read the query output using Table 3-3 for the TLI types and read the following:
   - — The TB types are TB000 for domestic-stratum 3, TB100 for CEPT - local office, TB200 for CEPT - toll office, and TB300 for domestic-stratum 2.
   - — The TLI types are given by the letter codes, and the signal formats are given by the associated number codes (xyz) which for TE and TP types are the same as for NPC growth (see Table 3-3).
   - — The SRC is the priority of TLI sources (from the highest 1 to the lowest 8).
2. Enter **RTRV-STATE-EQPT::SYNC;** and read the sync configuration and status using Table 3-4.
3. Enter **RTRV-REG-EQPT::SYNC-a::STR;** and read the output.

   Where: a = Sync side (0 or 1) to get the equivalent information.

   Crosscouple is the normal running mode in which the sync sides are locked together (in-phase). See Figure 3-2.
4. If the sync configuration = MASTER, verify that additional TB plug-in is installed in TLI 3, side 1 slot. This time base pack will also take up TLI 4 position. Timing distributor packs must also be installed in duplicated TLI 1 or TLI 2 slots for this application. See Figure 3-3 and Table 3-3 for equipment codes.

Table 3-3. Sync Plug-In Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Table 3-4. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

/*STR:b01,b02,b03,b04,b05,b06*/
"STR:byte1,byte2,byte3,byte4,byte5,byte6"

BYTE 1 (BITS abcdefgh)

a = spare	e = TLI 1 in service
b = sync hardware failed	f = TLI 2 in service
c = mate failed or OOS	g = TLI 3 in service
d = TB failed or OOS	h = TLI 4 in service

BYTE 3 (BITS abcdefgh)

a = sync reset, needs config.	e = crosscouple trouble
b = DPLL hardware error	f = CRO timing trouble
c = TB error	g = spare
d = PLL symmetry error	h = spare

BYTE 5 BIT POSITIONS: ab cde fgh

SOURCE (BITS ab)	ACTIVE PORT (BITS cde) (if BITS ab = 01)
00 = holdover	000 = TLI 1, SSP 0
01 = timing link	001 = TLI 1, SSP 1
10 = cross-couple	010 = TLI 2, SSP 0
11 = CRO	011 = TLI 2, SSP 1
	100 = TLI 3, SSP 0
	101 = TLI 3, SSP 1
	110 = TLI 4, SSP 0
BITS fgh (unused)	111 = TLI 4, SSP 1

BYTE 9 (BITS abcdefgh)

a = loss of energy	d = TB oven still cold
b = TB command error	e = spare
c = TB oscillator drift (master mode)	fgh = 000 for stratum 3, 001 for 2-Mb/s local 010 for 2-Mb/s toll, 011 for stratum 2

Figure 3-2. Sync Status Register

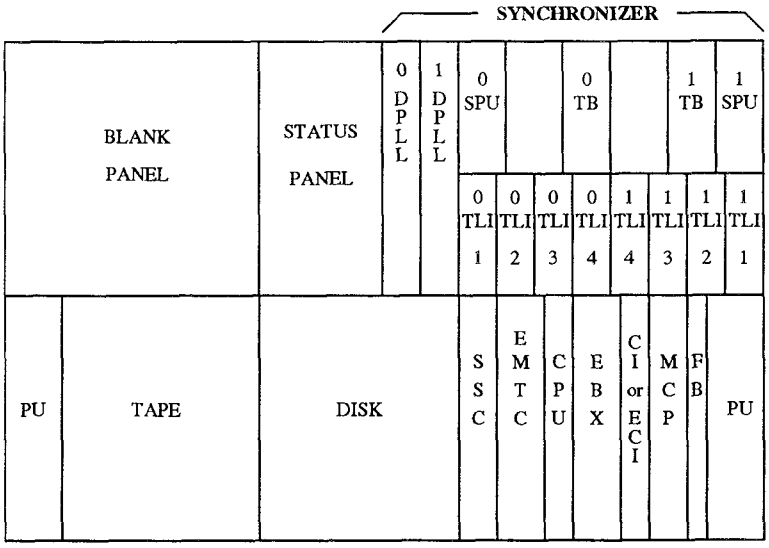


Figure 3-3. Identification of Main Controller Slots in CEF

3.2.6 Add/Change Synchronizer Timing Link Interface

Overview: This procedure allows: (1) connecting additional TLIs (timing link interfaces) for timing extraction or (2) changing the existing TLI types, NPC source, or sync port priority. Any NPC timing sources are entered in the data base in this procedure. Additional links may be used to provide extra protection in case the other links fail or to provide different priority source signals. Each TLI has two sync ports (SSP) and is duplicated on both sides of the sync. If an active SSP fails, the sync will switch to the other SSP on the TLI; if there are no more sources on the side, the sync will switch to the other side.

⚠ CAUTION:
Performing this procedure incorrectly can interrupt service. Perform each step of the procedure in the order given.

1. If office timing source is to be connected to DACS II, verify that timing signals have been wired to miscellaneous terminal strip on DACS II frame. Each DACS II sync TLI plug-in has two ports.
2. Verify that correct code(s) of timing extractor packs were installed for the additional timing links per Table 3-5. The same code must be installed in the corresponding TLI slots of both syncs. The TG68 and TG75 packs can only be installed in the TLI 2 position because of the 75-ohm coaxial connections.
3. If timing for added link is to be extracted from 2.048 Mb/s line, the involved NPC must be named in the data base so that sync failures will be related to NPC source failures. Only one of the eight allowable NPCs can be used per TLI SSP. These NPCs are the last NPCs on the designated cards in units 1 and 2 as follows:

   Hierarchical numbering

   01-1-30, 01-1-32, 01-2-30, 01-2-32, 02-1-30, 02-1-32, 02-2-30, and 02-2-32.

   Extended numbering

   030, 032, 070, 072, 190, 192, 230, and 232
4. Do you need to add timing links or change existing TLIs?
   - If **add links,** continue with Step **5.**
   - If **change TLIs,** proceed to Step **12.**

5. To grow SSP 0 on the next TLI, enter **CRTE-EQPT:[xy]:SYNC:[ww]:TLI-n:tepqr,SSP-a,SRC-p[,NPC-<npc No.>];**

   Where:

   n = TLI number (1 through 4).
   tepqr = Input signal type (TE,TP,TC,TU,TR per Table 3-5) and format; for type TE, use same format as NPC growth (for example, TE100); for type TP, see Table 3-6, for others listed, pqr is not defined (000 through 999).
   a = Sync port 0 or 1.
   p = Sets the priority, p=1 (highest) to p=8 (lowest).
   <npc No.> = Optional, to name NPC supplying timing from incoming line; either extended (for example, [0]030) or hierarchical (for example, 01-1-30). Only appropriate with TLI type TU.

6. To restore sync port 0 in the TLIs in both syncs, enter **RST-EQPT::SYNC-0::TLI-n:SSP-0;** and **RST-EQPT::SYNC-1::TLI-n:SSP-0;**.
7. Repeat Step **5** to grow the other sync port (substituting SSP 1) on the same TLI.
8. Repeat Step **6** (substituting SSP 1) to restore sync port 1 on the same TLIs and in both syncs.
9. If more TLIs are to be added at this time, repeat Steps **5** through **8** for the next TLI.
   - If no more TLIs are to be added, continue with Step **10**.

Table 3-5. Sync Plug-In Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Table 3-6. Growth Options

TP (Primary Block Timing Extractor)	
Option x	**Frame Format**
1 or 5	Common Channel Signaling
2 or 6	Channel Associated Signaling - Mode 0
3 or 7	Channel Associated Signaling - Mode 1
4 or 8	European Remote Switching Module (ERSM)
0 or 9	Invalid
Option y	**Line Format**
0 or 2	Alternate Mark Inversion
1 or 3	High Density Bipolar of Order 3 (HDB3)
4 or 9	Invalid
Option z	**Channel Format**
0 through 9	Unassigned

Note: TU (Unipolar clock timing extractor) options x, y and z can be any value from 0 to 9.

10. Enter `RTRV-STATE-EQPT::SYNC;` and notice the status of the new links as shown in the message (see Table 3-7).

    NOTE:
    Sync 0 occurs before (left of) sync 1 in the status listings and the presence of a 1 alongside a condition indicates that the condition exists.

11. For additional sync information, enter the appropriate command and read the registers:

    - For SYNC: `RTRV-REG-EQPT::SYNC-a::STR;` (Figure 3-4).
    - For TLI: `RTRV-REG-EQPT::SYNC-a::TLI-n:STR;` (Figure 3-5).
    - For SSP: `RTRV-REG-EQPT::SYNC-a::TLI-n:SSP-s:STR;` (Figure 3-6).

    The procedure to add the synchronizer timing link interface has been completed.

12. Enter the RTRV commands given in Steps **10** and **11** to check the existing status and characteristics of the TLIs to be changed.

13. To remove sync port 0 on the subject TLI in both syncs, enter `RMV-EQPT::SYNC-0::TLI-n:SSP-0;` and `RMV-EQPT::SYNC-1::TLI-n:SSP-0;`.

Table 3-7. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

14. Repeat Step **13** (substituting SSP 1) to remove sync port 1 on the same TLIs in both syncs.
15. Which change do you need to make?
    - If **TLI type** or **NPC source,** continue with Step **16.**
    - If **sync port priority,** proceed to Step **17.**
16. Enter `ED-PRMTR-EQPT::SYNC::TLI-n:SSP-b:{tepqr|NPC-<npc No.>};`.
17. Enter `ED-PRMTR-EQPT::SYNC::SRC-i/a,b[&j/c,d ...&l/g,h];`. You will also have to change the NPC growth specifications to remove/add the sync source option.

    Where:
    i,j ...`l` = Subject TLI (1 through 4)
    a,b ...g,h = Priorities (8 through 1, low to high) for the sync ports (0,1) on the subject TLI.

    - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.
18. To restore sync port 0 on the subject TLI in both syncs, enter `RST-EQPT::SYNC-0::TLI-n:SSP-0;` and `RST-EQPT::SYNC-1::TLI-n:SSP-0;`.
19. Repeat Step **18** (substituting SSP 1) to restore sync port 1 on the same TLIs in both syncs.
20. Repeat procedure from Step **10.**

/*STR:b01,b02,b03,b04,b05,b06*/
"STR:byte1,byte2,byte3,byte4,byte5,byte6"

BYTE 1 (BITS abcdefgh)

a = spare	e = TLI 1 in service
b = sync hardware failed	f = TLI 2 in service
c = mate failed or OOS	g = TLI 3 in service
d = TB failed or OOS	h = TLI 4 in service

BYTE 3 (BITS abcdefgh)

a = sync reset, needs config.	e = crosscouple trouble
b = DPLL hardware error	f = CRO timing trouble
c = TB error	g = spare
d = PLL symmetry error	h = spare

BYTE 5 BIT POSITIONS: ab cde fgh

SOURCE (BITS ab)	ACTIVE PORT (BITS cde) (if BITS ab = 01)
00 = holdover	000 = TLI 1, SSP 0
01 = timing link	001 = TLI 1, SSP 1
10 = cross-couple	010 = TLI 2, SSP 0
11 = CRO	011 = TLI 2, SSP 1
	100 = TLI 3, SSP 0
	101 = TLI 3, SSP 1
	110 = TLI 4, SSP 0
BITS fgh (unused)	111 = TLI 4, SSP 1

BYTE 9 (BITS abcdefgh)

a = loss of energy	d = TB oven still cold
b = TB command error	e = spare
c = TB oscillator drift (master mode)	fgh = 000 for stratum 3, 001 for 2-Mb/s local 010 for 2-Mb/s toll, 011 for stratum 2

Figure 3-4. Sync Status Register

/*STATUS:aa,bb,cc*/
"byte1,byte2,byte3"

BYTE 1 BIT POSITIONS: abcd e f g h

0000 = 1.544 Mb/s	0100 = BSRF	e = TLI grown
0001 = 2.048 Mb/s	0101 = 64 kb/s Clock Out	f = TLI out-of-service
0010 = Composite Clock	0110 = 2.048 Mb/s Clock Out	g = TLI hardware error
0011 = Unipolar Clock		h = spare

Figure 3-5. TLI Status Register

/*STATUS:aa,bb,cc,ee,ff*/
"byte1,byte2,byte3,byte4,byte5"
[/*SYNC SOURCE*/]
["NPC-<npc No.>"]

BYTE 2 SELECTION PRIORITY (01-08) FOR SSPs.

BYTE 3 BIT POSITIONS: abc de fgh

FRAME FORMAT (abc)		LINE FORMAT (de)	FREQ (fgh)
NORTH AMER.	CEPT		
000 = D4	000 = NSA	00 = Bipolar	000 = 512 KHz
001 = ESF	001 = ERSM	01 = B8ZS	001 = 1.0 MHz
010 = DDS	010 = CAS0	10 = AMI	010 = 1.544 MHz
	011 = CAS1	01 = HDB3	011 = 2.048 MHz
			100 = 5.0 MHz

BYTE 4 (BITS abcdefgh)

BIT a = Carrier Failure	BIT e = Jitter
BIT b = Energy Loss	BIT f = Phase Step
BIT c = Unipolar Clock Not Defined	BIT g = Spare
BIT d = Spare	BIT h = Spare

Figure 3-6. Sync Port Status Register

3.2.7 Change Synchronizer Time Base Stratum

Overview: This procedure allows changing the level (stratum) of the sync time base while the sync remains in operation. The procedure is to remove one side, degrow the TB and replace it, regrow the sync at the new stratum, configure the sync mode, and restore the side; then repeat the procedure for the TB on the other side. For master timing, the third TB must be replaced before the TB on the other side. A higher stratum (2 versus 3 or toll versus local) provides a more precise timing signal for the network sync plan or office application.

CAUTION:
Performing this procedure incorrectly can interrupt service. Perform each step of the procedure in the order given. Clear any alarms or OOS conditions in the synchronizer before beginning this procedure.

1. Enter the following commands to see the status of each side of sync and to determine which is supplying timing (active). The active side is indicated in the SOURCE field of the STATE message by one of the following: TLI, CRO, or HOLDOVER. The other side will show MATE.

   `RTRV-STATE-EQPT::SYNC;` and `RTRV-REG-EQPT::SYNC-a::STR;`

   Where: a = Side 0 or 1.

2. Enter `RMV-EQPT::SYNC-a;` to remove the inactive sync side.

3. Enter `RMV-EQPT::UNIT-[q]q::FC-sb;` to remove all FCs (format converters) *on the same side* for all FTU units and modules in each unit.

   Where:
   [q]q = Unit number (1 through 16)
   sb = FC side and module number.

   NOTE:
   The FCs (same side as inactive sync) are being removed and disconnected to prevent noise on circuits, but this precaution will not be necessary after a change notice is implemented to add a wiring termination to the ECCN.

4. Unplug the same FCs that were previously removed from service.

   CAUTION:
   Unplugging FC packs on the active side of the sync will cause loss of service in the unit.

5. Enter `DISC-EQPT::SYNC::TB;` to degrow sync time base.

6. Replace TB pack for same side with code (TG60-TG63) for required stratum (equipment codes are listed in Table 3-8).

Table 3-8. Sync Plug-In Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

7. Enter `CRTE-EQPT::SYNC::TBpqr;` to grow new time base.

   Where: pqr = 000 for North American stratum 3
   = 100 for international local
   = 200 for international toll
   = 300 for North American stratum 2.

NOTE:
The completion of this command causes the stratum of the time base in the DACS II data base to differ from the actual in-service sync. DGNDET messages (test number 312) will occur because of this difference, but the situation will be corrected and the DGNDET will cease when this procedure is completed.

8. Enter `ED-PRMTR-EQPT::SYNC::{MASTER|SLAVED};` to configure the sync for the mode that existed previously.

9. If the sync is to be operated at a lower stratum (than it was equipped for above, see Note), enter **ED-PRMTR-EQPT::SYNC::<level>;**

   Where: <level> = STR2 or STR3 for TB TG63;
   TOLL, or LOCAL for TB TG62.

   NOTE:
   This step is provided in case the stratum must be changed for a trouble situation, but it is not likely that the sync would be operated at the lower stratum.

10. Wait 30 minutes for TB oven to reach temperature and then enter **RST-EQPT::SYNC-a;** to restore sync side.

    NOTE:
    A conditional command completion will be received because the other side must still be changed.

11. How was sync configured?
    - If configured as MASTER, continue with Step **12.**
    - If configured as SLAVED, proceed to Step **17.**

12. Enter **RMV-EQPT::TLI-3::CRO;** to remove additional TB pack from service.
13. Replace additional TB pack (located in center TLI slots) with new code for stratum.
14. Enter **DISC-EQPT::SYNC::TLI-3;** to degrow the additional TB.
15. Enter **CRTE-EQPT::SYNC::TBpqr:TLI-3;** to regrow same TB with same type field as the TBs on the sides.
16. Wait 30 minutes for TB oven to reach temperature and then enter **RST-EQPT::SYNC::TLI-3::CRO;**.
17. Reinstall the FC packs in their slots and enter **RST-EQPT::UNIT-[q]q::FC-sb;** to restore each one.
18. Verify that each one restored correctly.
19. Enter **RMV-EQPT::SYNC-a;** to remove other sync side.
20. Enter **RMV-EQPT::UNIT-[q]q::FC-sb;** to remove all FCs *on the same side* for all FTU units and modules in each unit.

21. Unplug the same FCs that were previously removed from service.

    CAUTION:
    Unplugging FC packs on the active side of the sync will cause loss of service in the unit.

22. Replace TB pack for same side.
23. Wait 30 minutes for TB oven to reach temperature and then enter `RST-EQPT::SYNC-a;`.
24. Reinstall the FC packs in their slots and enter `RST-EQPT::UNIT-[q]q::FC-sb;` to restore each one.
25. Enter `RTRV-STATE-EQPT::SYNC;` to check status of sync.
26. If additional timing links are to be added in SLAVED configuration, proceed to add the links (see *Grow and Restore Sync TLIs*).
27. For stratum 2 operation, it may take 2 hours to reach the rated operating precision.

3.3 Cross-Connect Network/Expanded Cross-Connect Network (CCN/ECCN)

3.3.1 Install ECCN Plug-Ins

NOTE:
If necessary, the installation of the power units for the CCN and CCN2 can be checked per *Install Power Units and Fuses*. The ECCN plug-ins have built-in power converters.

NOTE:
If this procedure is being used to check the installation of the ECCN plug-ins, you can simply read through the procedure and check the location of the plug-ins.

NOTE:
The TSI/CCB/CCN/CCNI entities are used in conjunction with the Non-CEF frames while the ETSI/CCI entities are used the CEF frames.

1. Locate the side 0 and side 1 shelves of the ECCN in bay 2 of the frame. See Figure 3-7.
2. Verify that the BT (bus terminator, BBR1 code) plug-ins are securely installed in the designated far-left and far-right slots on each side of the network (ECCN0 and ECCN1). See Figure 3-8.

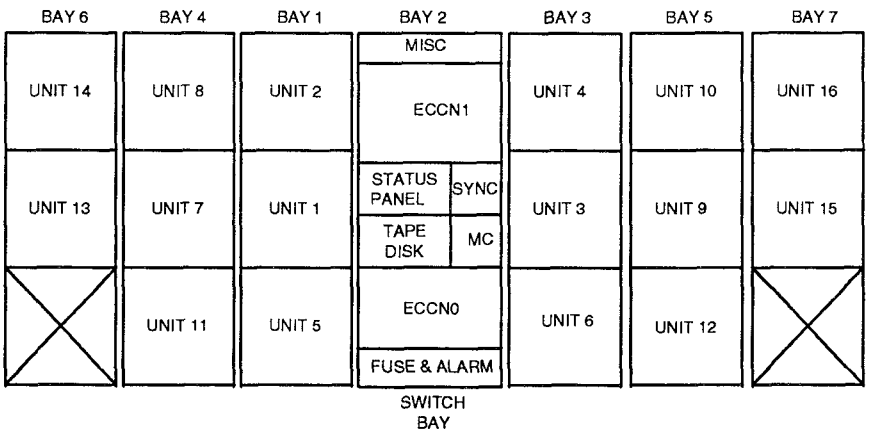


Figure 3-7. Fully-Equipped Capacity Expansion Frame

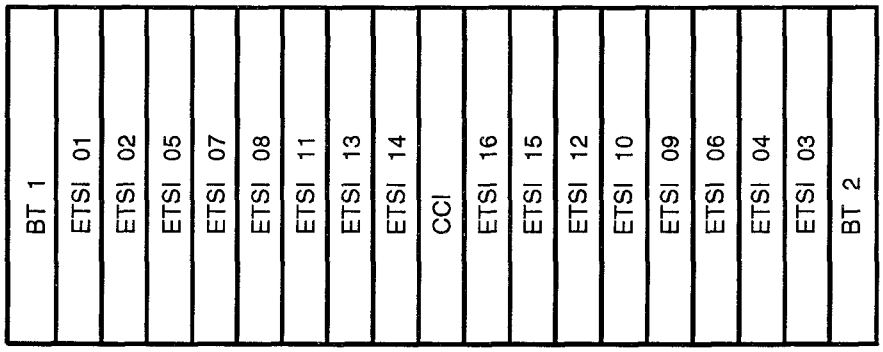


Figure 3-8. Location of Plug-Ins on ECCN Shelf

3 Verify that the CCI (clock control interface, BBS1 code) plug-in is securely installed in the designated slot on each side of the network (ECCN0 and ECCN1). See Figure 3-8.

4. Enter **RTRV-REG-EQPT::XC-a::STR;** and determine the active and inactive sides. The active side is indicated when the right most data byte equals 05.

   Where: a = Either side (0 or 1).

5. Enter **RMV-EQPT::CCI-s;** to remove the *inactive* side from service.

6. Working in the network shelf for the inactive side, install the ETSI (expanded time slot interface) (BBS2) for each unit to be equipped. Push at top and bottom of plug-in to evenly seat it; then use the latches to secure it in the slot.

   NOTE:
   The ETSI slots are assigned on each side of the common CCI pack to roughly match the associated unit positions and ordering of the units in the CEF configuration.

   NOTE:
   Plugging into the out-of-service side prevents possible transmission hits and possible service removal of NPCs on the ETSI ports.

7. Enter **RST-EQPT::CCI-s;** to restore the CCI for the inactive side to service.

   Where: s = Same side.

8. Enter **SW-DX-EQPT::XC-a;**

   Where a = Inactive side to cause side switch (change active side).

   ⇒ NOTE:
   Switching (E)CCN sides does not cause the SYNCs to switch sides.

9. Enter **RMV-EQPT::CCI-s;** to remove the side (*that was made inactive by the side switch*) from service.

   Where: s = New inactive side.

10. Install the required ETSIs on the shelf for the remaining side (now inactive). The equipage is duplicated on both sides of the network so that service can be switched to the duplicated side if the active side fails.

11. Enter **RST-EQPT::CCI-s;** to restore the CCI for the inactive side to service.

    Where: s = Same side.

3.3.2 Install Multibay CCN Plug-Ins

1. Locate CCN (cross-connect network) in the frame and notice the organization within the CCN; Figure 3-9 shows the organization.
2. Verify that the CCNI (cross-connect interface) card (UM30) is installed in designated slots on both sides of the CCN.

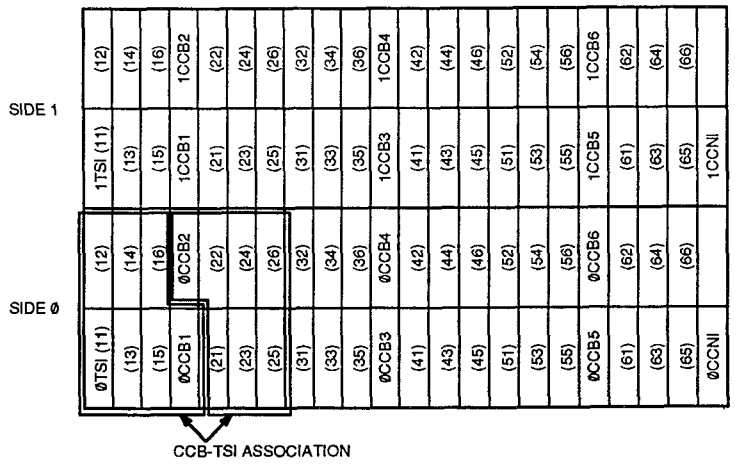


Figure 3-9. Duplicated Cross-Connect Network for Multibay Frame

3. From Table 3-9, determine which CCB (cross-connect buffer) (UM26) and TSI (TM660) plug-in slots must be equipped to support the DACS units which will be used (1 through 6).

NOTE:
The TSI slot numbers show how the cards are connected; for example, TSI 21 connects data from unit 2 to unit 1.

NOTE:
Normally, as units are added, TSIs are installed to connect the new unit with every other one and the total number of TSIs equals the total number of units squared.

4 Enter **RTRV-REG-EQPT::XC-a::STR;** and determine the active and inactive sides. The active side is indicated when the rightmost data byte equals 05.

Where a = Either side (0 or 1).

5. Install the required CCBs (UM26) and TSIs (TM660) on the inactive side. Plugging into the inactive side prevents possible transmission hits.
6. Enter **RTRV-STATE-COM:[<xy>]::[ww]:ALL;** and verify that the inactive side is not failed because switching to a failed side will cause loss of service.
7. Enter **SW-DX-EQPT::XC-a;**

   Where a = Inactive side to cause side switch.
8. Install the required CCBs and TSIs on the remaining side (now inactive).

Table 3-9. Circuit Packs Needed

Unit Number	TSI Number	CCB Number
1	11	1
1, 2	11, 12, 21, 22,	1, 2
1, 2, 3	11, 12, 13, 21, 22, 23, 31, 32, 33	1, 2, 3
1, 2, 3, 4	11, 12, 13, 14, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44	1, 2, 3, 4
1, 2, 3, 4, 5	11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45, 51, 52, 53, 54, 55	1, 2, 3, 4, 5
1, 2, 3, 4, 5, 6	11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 31, 32, 33, 34, 35, 36, 41, 42, 43, 44, 45, 46, 51, 52, 53, 54, 55, 56, 61, 62, 63, 64, 65, 66	1, 2, 3, 4, 5, 6

3.3.3 Install Single-Bay CCN Plug-Ins

1. Locate the CCN (cross-connect network) in the frame and notice the organization within the network; see Figure 3-10.

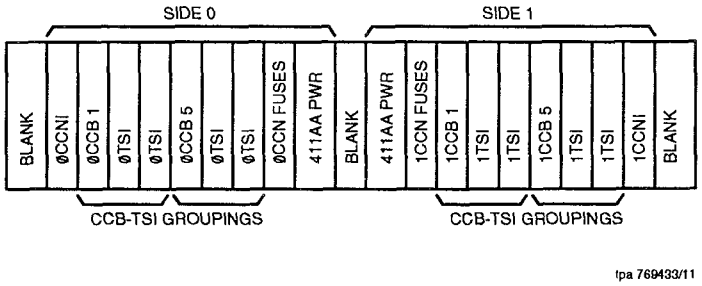


Figure 3-10. CCN Network

2. Verify that the CCNI (cross-connect interface) card (UM30 code) is installed in the designated slots on both sides of CCN.
3. Enter **RTRV-REG-EQPT::XC-a::STR;** and determine the active and inactive sides. The active side is indicated when the rightmost data byte equals 05.

   Where a = Either side (0 or 1).

4. Install the required CCBs (UM26) and TSIs (TM660) on the inactive side. Plugging into the inactive side prevents possible transmission hits.

   NOTE:
   The TSI designation numbers (11, 15, and 51) indicate how the cards are connected; for example, TSI 11 connects data from unit 1 back to unit 1. If unit 5 is not to be equipped, the procedure to install single-bay CCN plug-ins has been completed.

5. Enter **RTRV-STATE-COM:[<xy>]::[ww]:ALL;** and verify that the inactive side is not failed because switching to a failed side will cause loss of service.
6. Enter **SW-DX-EQPT::XC-a;**

   Where a = Inactive side to cause side switch.

7. Install the required CCBs and TSIs on the remaining side (now inactive).

3.4 Units (FTU, DS3U, and DSPU)

3.4.1 Install Power Units and Fuses

3.4.1.1 Install CEF (Capacity Expansion Frame) Power Units and Fuses

1. Locate the power unit slots for the section of the frame being equipped using shelf designation strips. See Figure 3-11 for the original interface bay; where the power units are not included with the unit or circuit group.
2. Determine whether the required codes and quantities of power units are installed per Table 3-10.
3. Determine whether the required 48-volt input fuses are installed in the fuse and alarm panel (bottom frame) per Table 3-11.

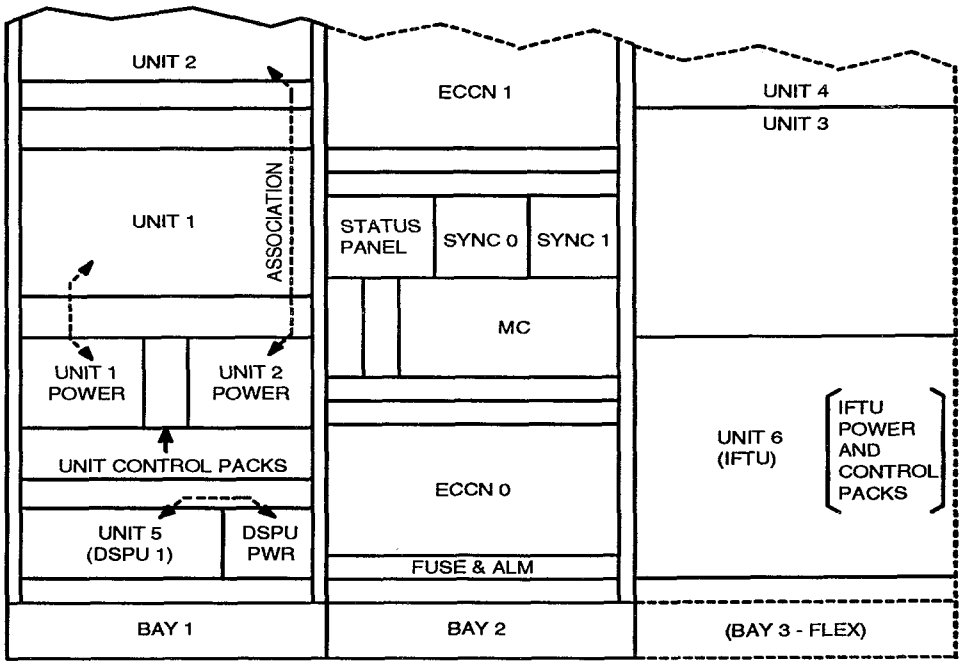


Figure 3-11. Original Interface Bay (Bay 1)

4. Determine whether the fuses are installed in fuse boards per designation strips and Table 3-12 (sync and main controller), Table 3-13 (IFTU), Table 3-14 (DSPU fuses), Table 3-15 (DSPUs 5 and 6 fuses, original interface bay), and Table 3-16 (77-Type Fuses).

   NOTE:
   FTUs in original interface bays use two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU and multibay CCN both use GRP 3 (7.5A) DFBs.

   - If the proper power units and fuses have already been installed, the procedure to install CEF power units and fuses has been completed.
   - If power units and fuses have not been installed, continue with Step **5**.

5. Install the required 48-volt fuses per Table 3-11.
6. Install the required LED fuses per Tables 3-12 through 3-16.
7. Install the required power units. As you move the latch/switch on each to the closed position, notice the LED on the power unit.

   Response: The red LED on the power unit is lighted while the latch/switch is open and goes off and remains off when the latch is closed.
8. If any of the required responses did not occur, replace the power unit and confirm the operation of the faceplate LED.
9. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
10. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 3-17. The SPU (sync power unit) does not have test jacks to perform this test.
    - If the requirement of Table 3-17 is met, disconnect the meter.
    - If the requirement of Table 3-17 is not met, replace the power unit.

    NOTE:
    The FTU power units feed a common bus, and low voltage can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

Table 3-10. CEF Power Unit Summary

Circuit Block	CP Code	Designation/ Location	Equipage
EFC	484GA SM565 411AA	PU /04-012 MCP /04-144 PU /04-160	One. One. One.
SYNC	TG58 TG58	0SPU /14-106 1SPU /14-160	One. One.
ECCN 0	—	—	The CCI and ETSI packs have built-in power converters.
ECCN 1	—	—	The CCI and ETSI packs have built-in power converters.
IFTU (Flex Bay)	411AA 411AA 411AA	PU /x06-168 PU /x14-145 PU /x14-158	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
DSPU (Flex Bay)	SM566 411AA 411AA	DCP /x04-130 1PU /x04-142 0PU /x04-150	One. One. One.
FTU1/3	411AA 411AA 411AA	PU /x28-012 PU /x28-024 PU /x28-048	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1). Location x = 1 for units 1 & 3 and x = 3 for units 2 & 4.
FTU2/4	411AA 411AA 411AA	PU /x28-124 PU /x28-148 PU /x28-160	Same as FTU 1.
DSPU5/6	SM566 411AA 411AA	DCP5/6 /X12-130 1PU /X12-142 0PU /X12-160	One. Location x = 1 for unit 5 and x = 3 for unit 6. One. One.

Table 3-11. 48-Volt Power (For CEF)

Feed A Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
A1	411A,SM566, or 563A	Unit 1	70D,5A	Green
A2	411A,SM566, or 563A	Unit 2	70D,5A	Green
A3	411A,SM566, or 563A	Unit 3	70D,5A	Green
A4	411A,SM566, or 563A	Unit 4	70D,5A	Green
A5-1	CCI,ETSIs	ECCN 0	70G,0.5A	Red
A5-2	Indicator	-	74J,7.5A	-
A6-1	-	-	-	-
A6-2	-	-	-	-
A7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A9	411AA,SM566, or 563A	Unit 6	70D,5A	Green
A12	411AA,SM566, or 563A	Unit 7 (0PU)	70D,5A	Green
A13	411AA,SM566, or 563A	Unit 8 (0PU)	70D,5A	Green
A14	411AA,SM566, or 563A	Unit 10	70D,5A	Green
A15	411AA,SM566, or 563A	Unit 11 (0PU)	70D,5A	Green
A16	411AA,SM566, or 563A	Unit 13 (0PU)	70D,5A	Green
A17	411AA,SM566, or 563A	Unit 14 (0PU)	70D,5A	Green
A18	411AA,SM566, or 563A	Unit 15	70D,5A	Green
A19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 3-11. *Continued*

Feed B Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
B1	411A,SM566, or 563A	Unit 1	70D,5A	Green
B2	411A,SM566, or 563A	Unit 2	70D,5A	Green
B3	411A,SM566, or 563A	Unit 3	70D,5A	Green
B4	411A,SM566, or 563A	Unit 4	70D,5A	Green
B5-1	-	-	-	-
B5-2	-	-	-	-
B6-1	-	-	-	-
B6-2	-	-	-	-
B7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
B8	-	CRO	70D,5A	Green
B9	411AA,SM566, or 563A	Unit 6	70D,5A	Green
B12	411AA,SM566, or 563A	Unit 7	70D,5A	Green
B13	411AA,SM566, or 563A	Unit 9 (0PU)	70D,5A	Green
B14	411AA,SM566, or 563A	Unit 10 (0PU)	70D,5A	Green
B15	411AA,SM566, or 563A	Unit 11	70D,5A	Green
B16	411AA,SM566, or 563A	Unit 12 (0PU)	70D,5A	Green
B17	411AA,SM566, or 563A	Unit 14	70D,5A	Green
B18	411AA,SM566, or 563A	Unit 15 (0PU)	70D,5A	Green
B19	411AA,SM566,	Unit 16 (0PU)	70D,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 3-11. *Continued*

Feed C Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
C1	411A,SM566, or 563A	Unit 1 (1PU)	70D,5A	Green
C2	411A,SM566, or 563A	Unit 2 (1PU)	70D,5A	Green
C3	411A,SM566, or 563A	Unit 3 (1PU)	70D,5A	Green
C4	411A,SM566, or 563A	Unit 4 (1PU)	70D,5A	Green
C5-1	CCI,ETSIs	ECCN 0	70G,0.5A	Red
C5-2	Indicator	-	74J,7.5A	-
C6-1	-	-	-	-
C6-2	-	-	-	-
C7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
C8	TG58	1SPU (SYNC 1)	70D,5A	Green
C9	411AA,SM566, or 563A	Unit 6 (1PU)	70D,5A	Green
C12	411AA,SM566, or 563A	Unit 7 (1PU)	70D,5A	Green
C13	411AA,SM566, or 563A	Unit 8 (1PU)	70D,5A	Green
C14	411AA,SM566, or 563A	Unit 9	70D,5A	Green
C15	411AA,SM566, or 563A	Unit 11 (1PU)	70D,5A	Green
C16	411AA,SM566, or 563A	Unit 12	70D,5A	Green
C17	411AA,SM566, or 563A	Unit 13 (1PU)	70D,5A	Green
C18	411AA,SM566, or 563A	Unit 16	70D,5A	Green
C19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 3-11. *Continued*

Feed D Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
D1	-	-	-	-
D2	-	-	-	-
D3	-	-	-	-
D4	-	-	-	-
D5-1	-	-	-	-
D5-2	-	-	-	-
D6-1	-	-	-	-
D6-2	-	-	-	-
D7	411AA,563A	+5 MC Power	70D,5A	Green
D8	484GA	+12 MC Power	70D,5A	Green
D9	SM565 (MCP)	MC Power	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red
D12	411AA,SM566, or 563A	Unit 8 (0PU)	70D,5A	Green
D13	411AA,SM566, or 563A	Unit 9 (1PU)	70D,5A	Green
D14	411AA,SM566, or 563A	Unit 10 (1PU)	70D,5A	Green
D15	411AA,SM566, or 563A	Unit 12 (1PU)	70D,5A	Green
D16	411AA,SM566, or 563A	Unit 13	70D,5A	Green
D17	411AA,SM566, or 563A	Unit 14 (1PU)	70D,5A	Green
D18	411AA,SM566, or 563A	Unit 15 (1PU)	70D,5A	Green
D19	411AA,SM566, or 563A	Unit 16 (1PU)	70d,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 3-12. Secondary Power Distribution (Sync and Main Controller) (CEF)

Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /14-106	0TLI1 /10-104	MCP /04-144	SSC /04-104
	0TLI2 /10-112		EBX /04-128
	0TLI3 /10-120		CPU /04-120
	0TLI4 /10-128		EMTC /04-112
	0DPLL /12-084		CI /04-136
	0TB /14-128	PU /04-012	SSC /04-104
1SPU /14-160	1TLI4 /10-136		EBX /04-128
	1TLI3 /10-144		CPU /04-120
	1TLI2 /10-152		EMTC /04-112
	1TLI1 /10-160		CI /04-136
	1DPLL /12-092		DISK UNIT /04-092
	1TB /14-150		TAPE UNIT /04-048
		PU /04-160	DISK UNIT /04-092
			TAPE UNIT /04-048

Table 3-13. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30	+5A1 through +5A4	
ED-9C011-30	(1-4 through 17-20)	4 plug-ins (8 NPCs) per fuse
	+5A5	(see +5A5 below)
ED-9C012-30	+5A1 through +5A4	
ED-9C011-30	(1 through 20)	1 plug-in (2 NPCs) per fuse
	+5A5, number 1	CPU
	+5A5, number 2	UBX
	+5A5, number 3	FTMI
	+5A5, number 4	0-Side FC
	+5A5, number 5	1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 3-14. DSPU Fuses (Flexible Bay)

Fuse	Side	DSP Position (Note)
(Top)	0 DSPU	(Left Panel)
No. 1		First and second
No. 2		Third and fourth
No. 3		Fifth and sixth
No. 4		Seventh and eighth
(Bottom)	1 DSPU	(Right Panel)
No. 5		First and second
No. 6		Third and fourth
No. 7		Fifth and sixth
No. 8		Seventh and eighth

Note: Each fuse supplies two DSP plug-ins.

Table 3-15. DSPU5 and DSPU6 Fuses (Original Interface Bay)

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/112-160		0PU/312-160	
JBH/112-148	NPC641 /112-006	JBH/312-148	NPC801 /312-006
	NPC661 /112-012		NPC821 /312-012
JBG	NPC681 /112-018	JBG	NPC841 /312-018
	NPC701 /112-024		NPC861 /312-024
JBF	NPC721 /112-030	JBF	NPC881 /312-030
	NPC741 /112-036		NPC901 /312-036
JBE	NPC761 /112-042	JBE	NPC921 /312-042
	NPC781 /112-048		NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/112-142		1PU/312-142	
JBD/112-148	NPC641 /112-074	JBD/312-148	NPC801 /312-074
	NPC661 /112-080		NPC821 /312-080
JBC	NPC681 /112-086	JBC	NPC841 /312-086
	NPC701 /112-092		NPC861 /312-092
JBB	NPC721 /112-098	JBB	NPC881 /312-098
	NPC741 /112-104		NPC901 /312-104
JBA	NPC761 /112-110	JBA	NPC921-310
	NPC781 /112-116		NPC941 /312-116
DCP5 /112-130	CPU5 /112-056	DCP6 /312-130	CPU6 /312-056
	DSPI5 /112-062		DSPI6 /312-062

Table 3-16. 77-Type, FTU Fuses - Original Interface Bay

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU,UBX	CPU,UBX	CPU,UBX	CPU,UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 3-17. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
484GA	+11.60 to +12.60	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

3.4.1.2 Install Multibay Power Units and Fuses

1. Locate the power unit slots for the section of the frame being equipped using Figure 3-12 and the shelf designation strips. A DSPU is shown in unit 5; but with flexible side bays, DSPUs can be mounted in other unit positions.

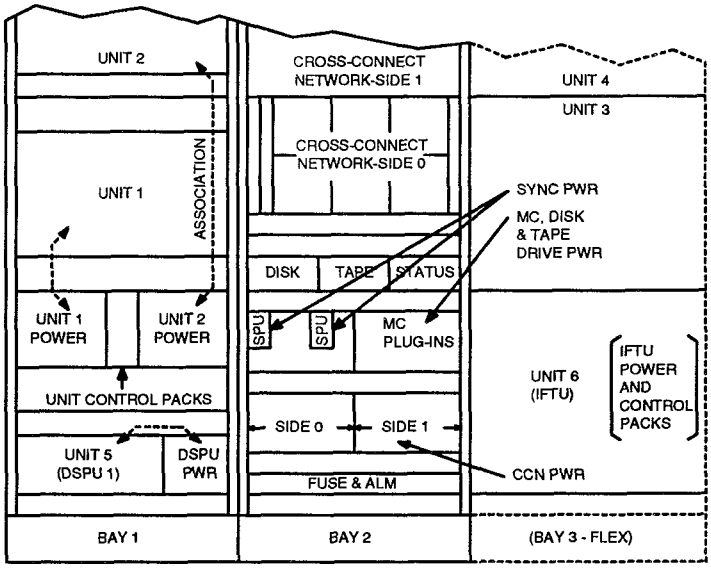


Figure 3-12. Multibay Frame Layout

2. Determine whether the required codes and quantities of power units are installed per Table 3-18.

> **NOTE:**
> Only three power units are needed in FTUs equipped with the codes of Series 5 (or later) TG80 DDCs (for DS1 lines). Because of the lower power requirements, three power units will supply the load and provide reserve power in case one fails.

3. Determine whether the required 48-volt input fuses are installed in the fuse and alarm panel (bottom frame) per Table 3-19.

4. Determine whether the LED output fuses are installed in ED-2C863-30 DFBs (dual fuse boards) per designation strips and Tables 3-20 through 3-24.

   NOTE:
   Version 1 FTUs use two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU and multibay CCN both use GRP 3 (7.5A) DFBs.

   - If the proper power units and fuses already have been installed, the procedure to install multibay power units and fuses has been completed.
   - If proper units and fuses have not been installed, continue with Step **5**.

5. Install the required 48-volt fuses per Table 3-19.
6. Install the required LED fuses per Tables 3-20 through 3-24.
7. Install the required power units. As you move the latch/switch on each to the closed position, notice the LED on the power unit.

   Response: The red LED on the power unit is lighted while the latch/switch is open and goes off and remains off when the latch is closed.

8. If any of the required responses did not occur, replace the power unit and confirm the operation of the faceplate LED.
9. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
10. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 3-25. The SPU (sync power unit) does not have test jacks to perform this test.

    - If the requirement of Table 3-25 is met, disconnect the meter.
    - If the requirement of Table 3-25 is not met, replace the power unit.

    NOTE:
    The FTU power units feed a common bus, and low voltage can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

Table 3-18. Power Unit Summary (Non-CEF)

Circuit Block	CP Code	Designation/ Location	Equipage
MC	SM565	MCP /225-136	One
	411AA	PU /225-148	One
	484GA	PU /225-160	One
SYNC	TG58	0SPU /227-010	One
	TG58	1SPU /227-064	One
FTU1	411AA	PU /128-012	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
	411AA	PU /128-024	
	411AA	PU /128-048	
	411AA	PU /128-064*	
FTU2	411AA	PU /128-108*	Same as unit 1.
	411AA	PU /128-124	
	411AA	PU /128-148	
	411AA	PU /128-160	
FTU3	411AA	PU /328-012	Same as unit 1.
	411AA	PU /328-024	
	411AA	PU /328-048	
	411AA	PU /328-064*	
FTU4	411AA	PU /328-108*	Same as unit 1.
	411AA	PU /328-124	
	411AA	PU /328-148	
	411AA	PU /328-160	
CCN0	485AB	PU1 /215-016	PU1 for CCNI, CCBs 1, 2, TSIs 11, 12, 13, 14, 15, 16, 21, 22
	485AB	PU2 /215-032	PU2 for CCB 3, TSIs 23, 24, 25, 26, 31, 32, 33, 34, 35, 36
	485AB	PU3 /215-048	PU3 for CCB 4, TSIs 41, 42, 43, 44, 45, 46, 51, 52, 53, 54
	485AB	PU4 /215-068	PU4 for CCBs 5, 6, TSIs 55, 56, 61, 62, 63, 64, 65, 66
	485AB		
CCN1	485AB	PU5 /215-108	PU5 Same assignment as Side 0
	485AB	PU6 /215-128	PU6
	485AB	PU7 /215-144	PU7
	485AB	PU8 /215-160	PU8
	485AB		
DSPU5	SM566	DCP5 /109-130	One
	411AA	1PU /109-142	One
	411AA	0PU /109-160	One
DSPU6	SM566	DCP6 /312-130	One
	411AA	0PU /312-142	One
	411AA	1PU /312-160	One

*These PUs are not required with Series 5 (or later) TG80 and new DDC codes; three PUs per unit will supply the load plus reserve in case one fails.

Table 3-19. 48-Volt Power (Non-CEF)

	Power Unit/CP			
Fuse	Type	Designation/ Location	Size	Bead Color
A1	411AA	128-012	70D,5A	Green
A2	411AA	128-108	70D,5A	Green
A3	411AA	328-012	70D,5A	Green
A4	411AA	328-108	70D,5A	Green
A5-1	485AB	PU1 (CCN0)	70D,5A	Green
A5-2	-	-	-	-
A6-1	485AB	PU2 (CCN 0)	70D,5A	Green
A6-2	-	-	-	-
A7	411AA	1PU (Unit 5)	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A8	-	0TB	70D,5A	Green
A9	411AA	1 PU (UNIT 6)	70D,5A	Green
B1	411AA	128-024	70D,5A	Green
B2	411AA	128-124	70D,5A	Green
B3	411AA	328-024	70D,5A	Green
B4	411AA	328-124	70D,5A	Green
B5-1, B5-2	485AB	PU3 (CCN 0)	70D,5A	Green
B6-1, B6-2	485AB	PU4 (CCN 0)	70D,5A	Green
B7	411AA	0PU (UNIT 5)	70D,5A	Green
B8	TG58	1SPU (SYNC 1)	70D,5A	Green
B8	-	1TB	70D,5A	Green
B9	411AA	0PU (UNIT 6)	70D,5A	Green

Table 3-20. Sync and Main Controller (Non-CEF)

Synchronizer		Main Controller	
Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /227-010	0TLI1 /223-008	MCP /225-136	SSC /225-092
	0TLI2 /223-016		BX /225-100
	0TLI3 /223-024		CPU /225-108
	0TLI4 /223-032		MTC /225-120
	0DPLL /225-076		CI /225-128
A8 FUSE	0TB /227-032	PU /225-148	SSC /225-092
1SPU /227-064	1TLI1 /223-064		BX /225-100
	1TLI2 /223-056		CPU /225-108
	1TLI3 /223-048		MTC /225-120
	1TLI4 /223-040		CI /225-128
	1DPLL /225-084		DISK UNIT /233-024
B8 FUSE	1TB /227-054		TAPE UNIT /233-064
		PU /225-160	DISK UNIT /233-024
			TAPE UNIT /233-064

Table 3-21. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30	+5A1 through +5A4	
ED-9C011-30	(1-4 through 17-20)	4 plug-ins (8 NPCs) per fuse
	+5A5	(see +5A5 below)
ED-9C012-30	+5A1 through +5A4	
ED-9C011-30	(1 through 20)	1 plug-in (2 NPCs) per fuse
	+5A5, number 1	CPU
	+5A5, number 2	UBX
	+5A5, number 3	FTMI
	+5A5, number 4	0-Side FC
	+5A5, number 5	1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 3-22. CCN Fuses (Original Interface Bay)

CCN0		CCN1	
Fuse/ Location	Associated Circuit Pack/Location	Fuse/ Location	Associated Circuit Pack/Location
JA1 /215-072	0CCNI /246-150	JA1 /215-088	1CCNI /269-150
	0TSI11 /246-014		1TSI11 /269-014
	0TSI13 /246-020		1TSI13 /269-020
JA2	0CCB1 /246-032	JA2	1CCB1 /269-032
	0TSI15 /246-026		1TSI15 /269-026
	0TSI21 /246-038		1TSI21 /269-038
JA3	0TSI12 /254-014	JA3	1TSI12 /277-014
	0TSI14 /254-020		1TSI14 /277-020
	0TSI16 /254-026		1TSI16 /277-026
JA4	0CCB2 /254-032	JA4	1CCB2 /277-032
	0TSI22 /254-038		1TSI22 /277-038
JA5	0TSI23 /246-044	JA5	1TSI23 /269-044
	0TSI25 /246-050		1TSI25 /269-050
	0TSI31 /246-056		1TSI31 /269-056
JA6	0CCB3 /246-078	JA6	1CCB3 /269-078
	0TSI33 /246-066		1TSI33 /269-066
	0TSI35 /246-072		1TSI35 /269-072
JA7	0TSI24 /254-044	JA7	1TSI24 /277-044
	0TSI26 /254-050		1TSI26 /277-050
	0TSI32 /254-056		1TSI32 /277-056
JA8	0TSI34 /254-066	JA8	1TSI34 /277-066
	0TSI36 /254-072		1TSI36 /277-072
JB1 /215-076	0TSI41 /246-084	JB1 /215-092	1TSI41 /269-084
	0TSI43 /246-090		1TSI43 /269-090
	0TSI45 /246-096		1TSI45 /269-096
JB2	0TSI51 /246-102	JB2	1TSI51 /269-102
	0TSI53 /246-108		1TSI53 /269-108
JB3	0CCB4 /254-078	JB3	1CCB4 /277-078
	0TSI42 /254-084		1TSI42 /277-084
	0TSI44 /254-090		1TSI44 /277-090
JB4	0TSI46 /254-096	JB4	1TSI46 /277-096
	0TSI52 /254-102		1TSI52 /277-102
	0TSI54 /254-108		1TSI54 /277-108
JB5	0CCB5 /246-124	JB5	1CCB5 /269-124
	0TSI55 /246-118		1TSI55 /269-118
	0TSI61 /246-130		1TSI61 /269-130
JB6	0TSI63 /246-136	JB6	1TSI63 /269-136
	0TSI65 /246-142		1TSI65 /269-142
JB7	0CCB6 /254-124	JB7	1CCB6 /277-124
	0TSI56 /254-118		1TSI56 /277-118
	0TSI62 /254-130		1TSI62 /277-130
JB8	0TSI64 /254-136	JB8	1TSI64 /277-136
	0TSI66 /254-142		1TSI66 /277-142

Table 3-23. 77-Type, FTU Fuses (Original Interface Bay)

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU, UBX	CPU, UBX	CPU, UBX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 3-24. DSPU5 and DSPU6 Fuses

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/112-160		0PU/312-160	
JBH/112-148	NPC641 /112-006 NPC661 /112-012	JBH/312-148	NPC801 /312-006 NPC821 /312-012
JBG	NPC681 /112-018 NPC701 /112-024	JBG	NPC841 /312-018 NPC861 /312-024
JBF	NPC721 /112-030 NPC741 /112-036	JBF	NPC881 /312-030 NPC901 /312-036
JBE	NPC761 /112-042 NPC781 /112-048	JBE	NPC921 /312-042 NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/112-142		1PU/312-142	
JBD/112-148	NPC641 /112-074 NPC661 /112-080	JBD/312-148	NPC801 /312-074 NPC821 /312-080
JBC	NPC681 /112-086 NPC701 /112-092	JBC	NPC841 /312-086 NPC861 /312-092
JBB	NPC721 /112-098 NPC741 /112-104	JBB	NPC881 /312-098 NPC901 /312-104
JBA	NPC761 /112-110 NPC781 /112-116	JBA	NPC921-310 NPC941 /312-116
DCP5 /112-130	CPU5 /112-056 DSPI5 /112-062	DCP6 /312-130	CPU6 /312-056 DSPI6 /312-062

Table 3-25. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	**Negative Lead**
SM565	+11.75 to +12.25 −11.75 to −12.25	+V2 −V2	RTN RTN
411AA	+5.1 to +5.3	+	−
484GA	+11.60 to +12.60	+	−
TG58	+4.75 to +5.25 −4.95 to −5.45	+ +	− −
485AB	+5.1 to +5.4	+	−
SM566	+4.75 to +5.25	+	−
563A	+4.9 to +5.3	5.5V	GRD

3.4.1.3 Install Single-Bay Power Units and Fuses

1. Locate the power unit slots for the section of the frame being equipped using Figure 3-13 and the shelf designation strips.
2. Determine whether the required codes and quantities of power units.
3. Determine whether the required 48 V input fuses are installed in the fuse and alarm panel (top-frame) per Table 3-26.

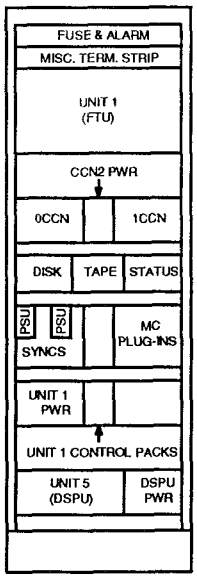


Figure 3-13. Single-Bay Frame

4. Determine whether the LED output fuses are installed in the ED-2C863-30 DFBs (dual fuse boards) per designation strips and Tables 3-27 (only FTU 1 column of Table 3-27 applies to a singe-bay frame), Table 3-28 (DSPU 5 side only), and Table 3-29. The FTU uses two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU uses a GRP 3 (7.5A) DFB, and the CCN2 uses a GRP 4 (5A) DFB.
   - If the proper power units and fuses have already been installed, the procedure to install single-bay power units and fuses has been completed.
   - If power units and fuses have not been installed, continue with Step **5**.
5. Install the required 48 V fuses per Table 3-26.
6. Install the required LED fuses per Tables 3-27, 3-28, and 3-29.
7. Install the required power units. The FTU power units should be equipped in left-to-right order even though they all feed a common bus.

   Response: The red LED on the power unit lights and remains lighted with the power unit latch/switch open.
8. Close the power unit latch/switch.

   Response: The red LED on the power unit goes off and remains off.
9. If any of the responses did not occur, replace the power unit, turn the replacement on, and confirm the operation of the power unit LED.
10. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
11. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 3-30. The SPU (sync power unit) does not have test jacks to perform this test.
    - If the requirement of Table 3-30 is met, disconnect the meter.
    - If the requirement of Table 3-30 is not met, replace the power unit.

NOTE:
The FTU power units feed a common bus, and low "" can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

Table 3-26. Single-Bay 48-Volt Fuses

Fuse	Power Unit	
	Type	Designation/Location
A1	411AA	FTU1-First PU
A2	TG58	0SPU (Sync Power)
A3	411AA	0PU (DSPU Side 0 Power)
A4	411AA	CCN2 Side 0 Power Unit
B1	411AA	FTU1-Second PU
B2	TG58	1SPU (Sync Power)
B3	411AA	1PU (DSPU Side 1 Power)
B4	411AA	CCN2 Side 1 Power Unit
C1	411AA	FTU1-Third PU
C2	NONE	48 Volts to TLIs 1-4, Both Sides
C3	SM566	DCP (DSPU Power)
D2	411AA	+5 Controller Power
D3	484GA	+12 Controller Power
D4	SM565	MCP (Main Controller Power)
D5	NONE	48 Volts to MTC Pack

Table 3-27. 77-Type, FTU Fuses - Single-Bay Frame

Fuse (Note)	Associated NPCs FTU 1
CA	1-8
CB	9-16
CC	17-24
CD	25-32
CE	33-40
CF	41-48
CG	49-56
CH	57-64
CI	65-72
CJ	73-80
CK	81-88
CL	89-96
CM	97-104
CN	105-112
CO	113-120
CP	121-128
CQ	129-136
CR	137-144
CS	145-152
CT	153-160
CU	(0)FC 1-4
CV	(1)FC 1-4
JW	FTMI 1-4
JX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 3-28. DSPU5 Fuses

DSPU5		DSPU6	
Fuse or PU/ Location	Associated Circuit Pack/Location	Fuse or PU/ Location	Associated Circuit Pack/Location
(SIDE 0)		(SIDE 0)	
0PU/109-160		0PU/312-160	
JBH/109-148	NPC641 /109-006	JBH/312-148	NPC801 /312-006
	NPC661 /109-012		NPC821 /312-012
JBG	NPC681 /109-018	JBG	NPC841 /312-018
	NPC701 /109-024		NPC861 /312-024
JBF	NPC721 /109-030	JBF	NPC881 /312-030
	NPC741 /109-036		NPC901 /312-036
JBE	NPC761 /109-042	JBE	NPC921 /312-042
	NPC781 /109-048		NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/109-142		1PU/312-142	
JBD/109-148	NPC641 /109-074	JBD/312-148	NPC801 /312-074
	NPC661 /109-080		NPC821 /312-080
JBC	NPC681 /109-086	JBC	NPC841 /312-086
	NPC701 /109-092		NPC861 /312-092
JBB	NPC721 /109-098	JBB	NPC881 /312-098
	NPC741 /109-104		NPC901 /312-104
JBA	NPC761 /109-110	JBA	NPC921-310
	NPC781 /109-116		NPC941 /312-116
DCP5 /109-130	CPU5 /109-056	DCP6 /312-130	CPU6 /312-056
	DSPI5 /109-062		DSPI6 /312-062

Table 3-29. Sync and Main Controller (Single-Bay)

Synchronizer		Main Controller	
Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /134-010	0TLI1 /130-008	MCP /132-136	SSC /132-092
	0TLI2 /130-016		BX /132-100
	0TLI3 /130-024		CPU /132-108
	0TLI4 /130-032		MTC /132-120
	0DPLL /132-076		CI /132-128
1SPU /134-064	1TLI1 /130-064	PU /132-148	SSC /132-092
	1TLI2 /130-056		BX /132-100
	1TLI3 /130-048		CPU /132-108
	1TLI4 /130-040		MTC /132-120
	1DPLL /132-084		CI /132-128
			DISK UNIT /140-024
			TAPE UNIT /140-064
		PU /132-160	DISK UNIT /140-024
			TAPE UNIT /140-064

Table 3-30. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 −11.75 to −12.25	+V2 −V2	RTN RTN
411AA	+5.1 to +5.3	+	−
484GA	+11.60 to +12.60	+	−
TG58	+4.75 to +5.25 −4.95 to −5.45	+ +	− −
485AB	+5.1 to +5.4	+	−
SM566	+4.75 to +5.25	+	−
563A	+4.9 to +5.3	5.5V	GRD

3.4.2 Install Plugs-Ins, Grow and Restore FTU/IFTU

3.4.2.1 Install FTM Plug-Ins (FTMIs and FCs)

1. Determine which unit and FTMs (facility terminating modules) need to be equipped to support the added service; see Table 3-31 for NPC location in the unit (table shows extended numbering).
2. Notice the two versions of FTUs shown in Figures 3-14 and 3-15. Figure 3-14 shows the FTUs used in the original side bays, and Figure 3-15 shows the IFTUs (integrated FTUs) used in flexible side bays.
3. If not already installed, install the **TG81** code FTMI and the **TG79** code of FCs (format converters) for the FTMs to be equipped (Figure 3-14 or 3-15).
4. If the plug-in dual cards (for example, DDC) for the NPCs to be equipped are provided, install them in the NPC slots.

NOTE:
Each plug-in card contains the circuitry for two NPCs.

NOTE:
Various codes of plug-ins for the NPCs are available to provide the required line interface and functions. If you do not know the NPC requirement, wait until the facility is established to install NPC plug-ins.

Table 3-31. NPC Location in Unit (Extended Numbering)

Nonhierarchical NPC Number	Unit Number	FTMI Number
001-040	1	1
041-080	1	2
081-120	1	3
121-160	1	4
161-200	2	1
201-240	2	2
241-280	2	3
281-320	2	4
321-360	3	1
361-400	3	2
401-440	3	3
441-480	3	4
481-520	4	1
521-560	4	2
561-600	4	3
601-640	4	4
641-680	5	1
681-720	5	2
721-760	5	3
761-800	5	4
801-840	6	1
841-880	6	2
881-920	6	3
921-960	6	4
961-1000	7	1
1001-1040	7	2
1041-1080	7	3
1081-1120	7	4
1121-1160	8	1
1161-1200	8	2
1201-1240	8	3
1241-1280	8	4
1281-1320	9	1
1321-1360	9	2

Continued on next page

Table 3-31. *Continued*

Nonhierarchical NPC Number	Unit Number	FTMI Number
1361-1400	9	3
1401-1440	9	4
1441-1480	10	1
1481-1520	10	2
1521-1560	10	3
1561-1600	10	4
1601-1640	11	1
1641-1680	11	2
1681-1720	11	3
1721-1760	11	4
1761-1800	12	1
1801-1840	12	2
1841-1880	12	3
1881-1920	12	4
1921-1960	13	1
1961-2000	13	2
2001-2040	13	3
2041-2080	13	4
2081-2120	14	1
2121-2160	14	2
2161-2200	14	3
2201-2240	14	4
2241-2280	15	1
2281-2320	15	2
2321-2360	15	3
2361-2400	15	4
2401-2440	16	1
2441-2480	16	2
2481-2520	16	3
2521-2560	16	4

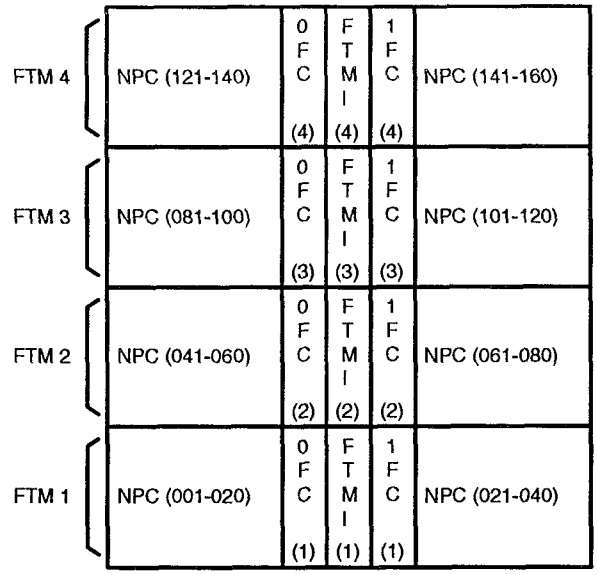


Figure 3-14. Original FTU

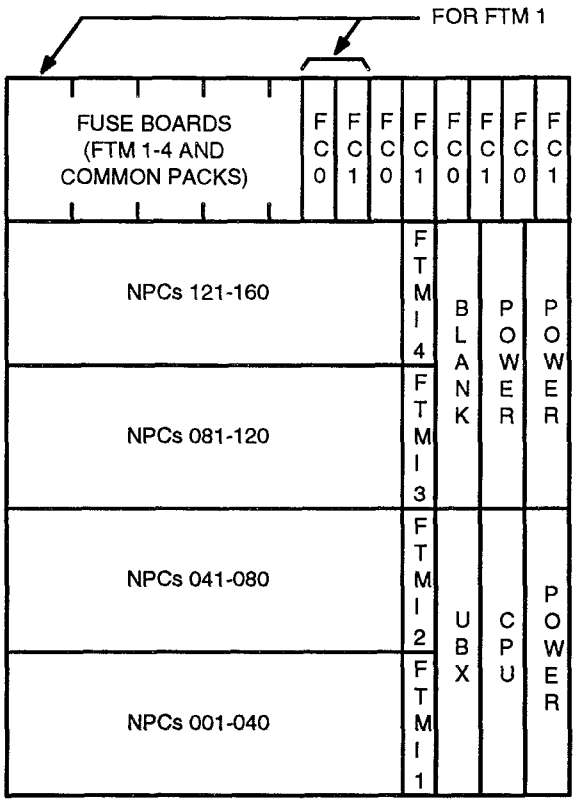


Figure 3-15. Integrated Facility Terminating Unit

3.4.2.2 Grow FTU/IFTU

Overview: This procedure is used to grow the unit in the data base and to define the type of application (FTU/IFTU). The associated ETSI in the cross-connect network is grown when this command is executed as indicated in the completion message. The ETSI will be restored in *Restore ECCN and CCN* in this section.

NOTE:
If the peripheral unit is not recorded in the software configuration file, the growth command in this procedure will be denied (INERR BAD ARG).

1. If you need to see the unit assignments that have been entered in the software configuration file, enter **`RTRV-PRMTR-NE;`** (see Note). This configuration was set during the equipment installation and acceptance, but it can still be changed with the INIT-SYS FRAME program.

   NOTE:
   Unit designations (1 through 16, left to right) are 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for FTU Version 2, or dash for not designated.

2. Familiarize yourself with the command
   `CRTE-CNFGRN-EQPT:[xy]:UNIT-[q]q:[ww]`
   `[:a[,b[,c[,d[,e[,f]]]]]]:[mnxyz];`

   Where: xy = Unique id (target id); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   [q]q = Unit number (1 through 16)
   mn = Unit type; FT for DS1 FTU.
   Default is FT100
   xyz = Variables that define type parameters;
   xyz = 100 unless different value is given in
   circuit order information.

3. Enter the command with the required information.
   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Repeat the procedure for any other units to be grown.

3.4.2.3 Restore ECCN and CCN

3.4.2.3.1 Restore ECCN

1. If the CCI pack was just installed in a previous procedure, enter
   `RST-EQPT:[xy]:CCI-s:[ww];`

   Where: xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   s = Network side (0 or 1).

   NOTE:
   The two BTs (bus terminators) for the shelf are also restored with the CCI plug-in.

2. Use one of the following commands to restore the ETSIs:

   Restore all ETSIs - `RST-EQPT::ETSIS,ECCN-s;`

   Restore ETSIs individually - `RST-EQPT::ETSI-sqq;`

   Where: sqq = ETSI number consisting of Side (0 or 1) and peripheral unit number (01 through 16).

   - If any restore command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.4.2.3.2 Restore CCN

Overview: The restore commands in this procedure are given in the order which establishes communications within the network and enables the restoral of the next pack in the list. The CCB and TSI packs that need to be restored after a new unit is grown are listed in the growth completion message.

1. If the network interface pack (CCNI) was just installed in a previous procedure, enter `RST-EQPT:[xy]:CCNI-s:[ww];`

   Where:
   xy = DACS unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   s = Network side (0 or 1).

2. If a network buffer pack (CCB) was just equipped in a previous procedure, enter `RST-EQPT:[xy]:CCB-sf:[ww];`

   Where: sf = CCB number consisting of the Side (0 or 1) and position (1 through 6); for example, CCB 12 is on side 1 and is associated with Unit 2 TSIs.

3. Use one of the following commands to restore the TSIs:

   Restore all TSIs in a unit

   ```
   RST-CNFGRN-EQPT:[xy]:UNIT-q:[ww]:CCN-s
   [:a[,b[,c[,d[,e[,f]]]]]];
   ```

   Restore all the TSIs on a side (see Note)

   ```
   RST-EQPT:[xy]:CCN-s,TSIS[:ww];
   ```

   Restore TSIs individually

   ```
   RST-EQPT:[xy]:TSI-sft:[ww];
   ```

   NOTE:
   Each of the 72 TSIs is listed in the output by the From-, To-Unit ID along with results (DGN A, S, D and RST C or D).

   A = ATP (all tests passed)
   C = Completed
   D = Denied
   S = STF (same test failed)

   - If any restore command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

   Where:
   q = Unit number (1 through 6).
   s = Side (0 or 1)
   (a[,b[,c[,d[,e[,f]]]]]) = Optional, to specify the limited unit connectivity (thereby the associated TSIs)
   sft = TSI number consisting of Side (0 or 1), FROM-unit (1 through 6), and TO-unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

3.4.2.4 Restore UC

1. Enter `RST-EQPT::UNIT-[q]q::UC;` to restore unit controller.
   Where [q]q = Unit number (1 through 16).

   NOTE:
   For the CEF, the unit UC diagnostic for the restore operation runs wiring tests between the unit and the EMC.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.4.2.5 Grow FTMI

This procedure presents the command to grow the FTMI in the data base. This growth operation results in the associated FCs being grown also. If TYPE DE NPCs are going to be installed in the module for 1.544-Mb/s lines, the setting for the line signal equalizers in the transmit direction is entered here. If TYPE PB/PC PBCs are going to be installed in the module for 2.048-Mb/s lines, the impedance of the line interfaces, either 75-ohm coaxial or 120-ohm twisted wire, is entered here.

1. Which type (and line rate) NPCs will be installed in the module?
   - If **TYPE-PB/PC (2.048-Mb/s Line),** continue with Step **2.**
   - If **TYPE-DE (1.544-Mb/s Line),** proceed to Step **5.**

2. Do you want to enter the initial impedance setting or change the impedance (or change from equalization)?
   - If **INITIAL SETTING**, continue with Step **3.**
   - If **CHANGE SETTING**, proceed to Step **8.**

3. Enter `CRTE-EQPT:[xy]:UNIT-[q]q:[ww]:FTMI-d:IMP-zzz;`

   Where:
   xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   [q]q = Unit number (1 through 16)
   d = FTM interface number (1 through 4)
   zzz = 075 for 75-ohm coaxial impedance or 120 for 120-ohm twisted pair impedance.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Repeat the procedure for other FTMs to be grown. The procedure to grow the FTMI has been completed.
5. Obtain (or measure) the line cable length from the DACS II to the line-jack bay in order to select equalizer values at DACS II; there are 5 equalizer settings per Table 3-32.
6. Enter `CRTE-EQPT:[xy]:UNIT-[q]q:[ww]:FTMI-d:EQL-l,r;`

   Where:

   [q]q = Unit number (1 through 16)
   d = FTM interface number (1 through 4)
   l = Equalizer setting (1 through 5) for left half of shelf (20 NPCs)
   r = Equalizer setting (1 through 5) for right half of shelf (20 NPCs).

NOTE:
Something must be entered for both halves even if the same value is used on both sides.

NOTE:
FCs will also be grown.

- If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

Table 3-32. DS1 (1.544 Mb/s) Equalizer Settings

Setting	Cable Length (22 Gauge)	Cable Length (26 Gauge)
1	0 through 133 feet	0 through 90 feet
2	133 through 267 feet	90 through 180 feet
3	267 through 400 feet	180 through 270 feet
4	400 through 533 feet	270 through 360 feet
5	533 through 655 feet	360 through 450 feet

7 Repeat the procedure for other FTMs to be grown The procedure to grow the FTMI has been completed.

8. Enter commands to remove (see Note) and degrow any equipped NPCs in the module. The commands are:
   `RMV-EQPT::NPC-<npc No.>[&&[&]-<range>];`
   `DISC-EQPT::NPC-<npc No.>[&&[&]-<range>];`

   Where:
   <npc No.> = NPC number, either extended (for example, 001) or hierarchical (for example, 01-1-01).
   <range> = Optional, to name the last NPC of range. Extra ampersand (&) required for hierarchical.

NOTE:
It is unlikely that the NPCs are still in-service because different codes of NPCs and different facilities will be used.

CAUTION:
If the NPCs must still be removed from service, arrangements must be made with customers because the service on the channels of the NPCs will be interrupted.

9. Enter `RMV:[xy]:UNIT-[q]q:[ww]:FTMI-b;`

   Where:
   xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   [q]q = Unit number (1 through 16)
   b = FTM interface number (1 through 4).

10. Enter `DISC-EQPT::UNIT-[q]q::FTMI-d;` to degrow the current FTMI and impedance from the data base.

11. Return to Step **3** to enter the new impedance value. The FTMI must also be restored to service after the impedance is changed and before NPCs can be added to service.

3.4.2.6 Restore FTMI and FCs

Overview: The following restore commands are given in the order which establishes communications with the unit and enables the restoral of the next pack in the list. After a higher level pack is restored, all the next lower packs can be restored which in turn allows restoral of any of the lower level packs.

1. Enter `RST-EQPT:[xy]:UNIT-[q]q:[ww]:FTMI-b;`

   Where: b = FTM interface number (1 through 4).

2. Enter `RST-EQPT:[xy]:UNIT-[q]q:[ww]:FC-sf;` to restore the FCs (format converters) associated with the FTMI.

   Where: sf = FC number consisting of side (0 or 1) and position in FTU (1 through 4).

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3.4.3 Install Plug-Ins, Grow and Restore DS3U

3.4.3.1 Install Common Equipment and Protection MMFG

1. Familiarize yourself with the designated positions on the DS3U shelf. See Figure 3-16.

NOTE:
Each MMFG (MXR function group) position shown in the DS3U consists of MXR (multiplexer) positions. The MMFG for protection switching is located in the far-left MMFG position.

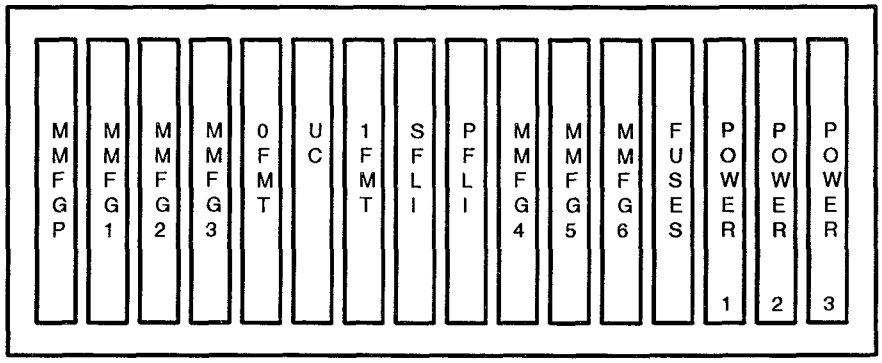


Figure 3-16. Location of MMFGs on DS3U Shelf

2. If not already installed, install the 563A power units in designated slots. Verify that all the green power LEDs are lighted and that no red failure LED is lighted.

   NOTE:
   Two of the three power units will supply the load, but the third one is required for backup reserve power.

3. Verify that all the 77H LED fuses are installed in the fuse board. See Table 3-33 for the fuse assignments.
4. Disconnect any one of the power units and verify that the red failure indicator on the other two power units does not light.
5. Return the power unit to operation.
6. Repeat the above test (disconnecting a different 563A unit, observing the LEDs on others, and repowering) to test all combinations in the power group.

Table 3-33. DS3U Fuse Assignment

Fuse Designation	Associated CPs
L	P MXR
K	1 MXR
J	2 MXR
I	3 MXR
H	0 FMT
G	UC
F	1 FMT
E	S FLI
D	P FLI
C	4 MXR
B	5 MXR
A	6 MXR

3.4.3.2 Grow DS3U Common Equipment and Protection MMFG

Overview: This command is used to grow the unit in the data base and to define the type of application (FTU, DSPU, DS3U). The associated ETSI, or the associated CCBs and TSIs, in the cross-connect network are grown when this command is executed as indicated in the completion message. The FLI S and P, FMT 0 and 1, and protection MXR are also grown when this command is executed.

⇒ NOTE:
If the peripheral unit is not recorded in the software configuration file, the growth command in this procedure will be denied.

1. If you need to see the unit assignments that have been entered in the software configuration file, enter **`RTRV-PRMTR-NE;`** (see Note). This configuration was set during the equipment installation and acceptance, but it can still be changed with the INIT-SYS FRAME program.

   ⇒ NOTE:
   Unit designations (1 through 16 left to right) are 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for FTU Version 2, or dash for not designated.

2. Familiarize yourself with the command
   `CRTE-CNFGRN-EQPT:[xy]:UNIT-[q]q:[ww]::[mnxyz];`

   Where:
   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   [q]q = Unit number (1 through 16).
   mn = Unit type; DT for DS3U.
   Default is FT100.
   xyz = Variables that define type parameters; xyz = 100 unless different value is given in circuit order information.

3. Enter the command with the required information.
   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Repeat procedure for any other units to be grown.

3.4.3.3 Restore ECCN/CCN

3.4.3.3.1 Restore ECCN

1. If the CCI pack was just installed in a previous procedure, enter
   RST-EQPT:[xy]:CCI-s:[ww];

   Where: xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   s = Network side (0 or 1).

   NOTE:
   The two BTs (bus terminators) for the shelf are also restored with the CCI plug-in.

2. Use one of the following commands to restore the ETSIs:

   Restore all ETSIs

   RST-EQPT::ETSIS,ECCN-s;

   Restore ETSIs individually

   RST-EQPT::ETSI-sqq;

   Where: sqq = ETSI number consisting of Side (0 or 1) and peripheral unit number (01 through 16).

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3.4.3.3.2 Restore CCN

Overview: The restore commands in this procedure are given in the order which establishes communications within the network and enables the restoral of the next pack in the list. The CCB and TSI packs that need to be restored after a new unit is grown are listed in the growth completion message.

1. If the network interface pack (CCNI) was just installed in a previous procedure, enter **RST-EQPT:[xy]:CCNI-s:[ww];**

   Where:
   xy = DACS unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   s = Network side (0 or 1).

2. If a network buffer pack (CCB) was just equipped in a previous procedure, enter `RST-EQPT:[xy]:CCB-sf:[ww];`

   Where: sf = CCB number consisting of the Side (0 or 1) and position (1 through 6); for example, CCB 12 is on side 1 and is associated with Unit 2 TSIs.

3. Use one of the following commands to restore the TSIs:

   Restore all TSIs in a unit

   `RST-CNFGRN-EQPT:[xy]:UNIT-q:[ww]:CCN-s[:a[,b[,c]]];`

   Restore all the TSIs on a side (see Note)

   `RST-EQPT:[xy]:CCN-s:[ww];`

   Restore TSIs individually

   `RST-EQPT:[xy]:TSI-sft:[ww];`

   NOTE:
   Each of the 72 TSIs are listed in the output by the From-, To-Unit ID along with results (DGN A, S, D and RST C or D).

   - If any restore command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

   Where:

   q = Unit number (1 through 6).
   s = Side (0 or 1)
   (a[,b[,c]]) = Optional, to specify the limited unit connectivity (thereby the associated TSIs)
   sft = TSI number consisting of Side (0 or 1), FROM-unit (1 through 6), and TO-unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

3.4.3.4 Restore UC

1. Enter `RST-EQPT::UNIT-[q]q::UC;` to restore unit controller.
   Where [q]q = Unit number (1 through 16).

   NOTE:
   For the CEF, the unit UC diagnostic for the restore operation runs continuity tests between the unit and the EMC.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.4.3.5 Restore DS3U Common Equipment

NOTE:
This procedure is for restoring the DS3U common equipment. It is assumed the ECCN/CCN and unit UC has been grown and restored. See *Restore ECCN/CCN* in this section to restore ECCN/CCN.

1. Enter commands to restore FMT packs as follows:
   `RST-EQPT::UNIT-[q]q::FMT-0;`
   `RST-EQPT::UNIT-[q]q::FMT-1;.`

   NOTE:
   For CEF, the FMT diagnostic runs continuity test with ECCN.

2. Enter commands to restore the protection and service FLIs as follows (see Note):
   `RST-EQPT::UNIT-[q]q::FLI-P;`
   `RST-EQPT::UNIT-[q]q::FLI-S;.`

   NOTE:
   When you restore the protection FLI, the protection FLI will be switched into the signal path; when you restore the service FLI, the service FLI will be switched into the signal path.

   - If any command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.4.3.6 Grow MMFG [MXR (KCR-1) or EMXR (KCR-5)]

Overview: This command is used to enter the type specification and any operating options for the MXR being equipped. The options are for the bit error rate calculation method and threshold and for the insertion of line buildout in the transmission path to compensate for low cabling loss. Growing the MXR also grows the facility in the data base.

1. Enter the command as follows:
   `CRTE-EQPT:[xy]:UNIT-[q]q:[ww]:`
   `MXR-c[&&-d]:[mnxyz]:[BERM-s][,BERT-t][,LBO-{ON|OFF}];`

   Where:

   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   [q]q = Unit number (flexible bay, 1 through 16).
   c = MXR number (1 through 6).
   d = Optional, last MXR number of range of MXRs in same unit.
   mn = Circuit pack type: MX for MXR (KCR-1) or EX for EMXR (KCR-5).
   xyz = Type specification; see Table 3-34 . Default is MX100.
   s = BER calculation method: s=B for bipolar violations (default) or s=P for DS3 parity errors.
   t = BER threshold, t=3 for 10^{-3} (default) or t=6 for 10^{-6}.
   ONIOFF = Turns the line buildout on or off, defaults to OFF.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check output message to verify type and option entries.
3. To familiarize yourself with query outputs, enter **`RTRV-STATE-EQPT::[UNIT-[q]q::EQPD;`** and **`RTRV-STATE-EQPT::UNIT-[q]q::PROTN;`** and notice the following in the output:

   — In the EQD UNIT output, the subject MXR is shown as equipped. The first MXR position is for the protection MXR.

   — In the PROTN output, the MXRs are shown as UEQD, IS (in-service), or OOS. The PROTN codes are explained in Table 3-35.

Table 3-34. MXR Type Specification

Option	Meaning
X	**DS3 FRAMING FORMAT**
1	M13 Format (Default)
2	C-Bit Parity Format
Y	**NOT ASSIGNED (USE 0)**
Z	**NOT ASSIGNED (USE 0)**

Table 3-35. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

3.4.3.7 Restore Protection MMFG and Service MMFG

Overview: This procedure is used to change the status of the MMFG (MXR function group) and the DS3 facility to in-service. This operation invokes diagnostic tests which are reported in messages. The failure of either pack in the MMFG causes the restoral to be denied. When placed in-service, the DS3 line and component NPCs are monitored for alarm conditions; so, to avoid alarms, the DS3 signal must be looped back at the DSX-3 or a good signal must be connected through to the DACS II. The INCL keyword for the command causes all grown NPCs on the MXR to also be restored to service. These NPCs must have already been grown in the data base.

NOTE:
This procedure is for restoring the MMFG and protection MMFG. It is assumed the ECCN has been grown and restored. See *Restore ECCN/CCN* in this section to restore ECCN/CCN.

1. Enter `RST-EQPT:[xy]:UNIT-[q]q:[ww]:MMFG-p[:INCL];`

   Where:
   - xy = Unique id (target id); up to 20 characters
   - ww = Command correlation tag; up to 10 characters
   - [q]q = DACS II unit number (1 through 16)
   - c = MMFG number (1 through 6 or P for protection)
   - d = Optional, to give last MMFG of continuous range of MMFGs in unit
   - INCL = Optional, for service MMFGs to cause all resident DS1 NPCs (full complement of 28) to also be restored to service. See Note.

NOTE:
If information was not available to grow the embedded NPCs, the INCL cannot be used to restore the NPCs. The NPCs can be grown and restored when facilities are established.

- If any command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.4.4 Install Plug-Ins, Grow and Restore DSPU

3.4.4.1 Install DSPI and CPU Plug-Ins

1. Install DSPI Card (UM29 Code) and CPU Card (TM657B) in designated slots. See Figure 3-17.

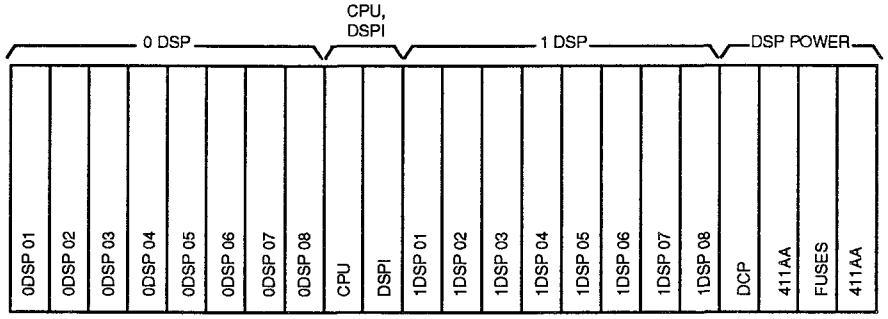


Figure 3-17. DSPU Shelf

3.4.4.2 Grow DSPU

Overview: This command is used to grow the unit in the data base and to define the type of application (DSPU). The associated ETSI in the cross-connect network is grown when this command is executed as indicated in the completion message.

> **NOTE:**
> If the peripheral unit is not recorded in the software configuration file, the growth command in this procedure will be denied.

1. If you need to see the unit assignments that have been entered in the software configuration file, enter **RTRV-PRMTR-NE;** (see Note). This configuration was set during the equipment installation and acceptance, but it can still be changed with the INIT-SYS FRAME program.

   > **NOTE:**
   > Unit designations (1 through 16, left to right) are 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for FTU Version 2 (IFTU), or dash for not designated.

2. Familiarize yourself with the command

   CRTE-CNFGRN-EQPT:[xy]:UNIT-[q]q:[ww]
   [:(a[,b[,c[,d[,e[,f]]]]]]:DP100;

   Where:

xy	=	Unique id (target id); up to 20 characters.
ww	=	Command correlation tag; up to 10 characters.
[q]q	=	Unit number (1 through 16).
a[,b[,c[,d[,e[,f]]]]]	=	Optional, to limit unit connectivity to itself (a) or certain other units (b,c, etc.).

3. Enter the command with the required information.
   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Repeat the procedure for any other units to be grown.

3.4.4.3 Restore ECCN/CCN

3.4.4.3.1 Restore ECCN

Use this procedure to restore an ECCN frame (for CCN see the next section).

1. If the CCI pack was just installed in a previous procedure, enter
   RST-EQPT:[xy]:CCI-s:[ww];

   Where: xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   s = Network side (0 or 1).

   NOTE:
   The two BTs (bus terminators) for the shelf are also restored with the CCI plug-in.

2. Use one of the following commands to restore the ETSIs:
   Restore all ETSIs
   RST-EQPT::ETSIS,ECCN-s;
   Restore individually
   RST-EQPT::ETSI-sqq;

   Where: sqq = ETSI number consisting of Side (0 or 1) and peripheral unit number (01 through 16).

   - If any restore command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
     Proceed to *Restore UC and DSPI* to restore the UC and DSPI.

3.4.4.3.2 Restore CCN

Overview: The restore commands in this procedure are given in the order which establishes communications within the network and enables the restoral of the next pack in the list. The CCB and TSI packs that need to be restored after a new unit is grown are listed in the growth completion message.

1. If the network interface pack (CCNI) was just installed in a previous procedure, enter **RST-EQPT:[xy]:CCNI-s:[ww];**
   Where s = Network side (0 or 1).

2. If a CCB was just installed (for DSPU growth) in a previous procedure, enter **RST-EQPT:[xy]:CCB-sf:[ww];**

   Where: sf = CCB number consisting of the Side (0 or 1) and position (1 through 6); for example, CCB 12 is on side 1 and is associated with Unit 2 TSIs.

3. Use one of the following commands to restore the TSIs:

   Restore all TSIs in a unit

   ```
   RST-CNFGRN-EQPT:[xy]:UNIT-q:[ww]:CCN-s
   [:a[,b[,c[,d[,e[,f]]]]]];
   ```

   Restore all the TSIs on a side (see Note)

   ```
   RST-EQPT:[xy]:CCN-s:[ww];
   ```

   Restore TSIs individually

   ```
   RST-EQPT:[xy]:TSI-sft:[ww];
   ```

   Where:

   q = Unit number (1 through 6)
   s = Side (0 or 1)
   a[,b[,c[,d[,e[,f]]]]] = Optional, to specify the limited unit connectivity (thereby the associated TSIs)
   sft = TSI number consisting of Side (0 or 1), FROM-unit (1 through 6), and TO-unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

   NOTE:
   Each of the 72 TSIs is listed in the output by the From-, To-Unit ID along with results (DGN A, C, S, D and RST C or D).

   - If any restore command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.4.4.4 Restore UC and DSPI

1. Enter `RST-EQPT::UNIT-[q]q::UC;` to restore unit controller

   Where [q]q = Unit number (1 through 16).

   NOTE:
   For the CEF, the unit UC diagnostic for the restore operation runs wiring tests between the unit and the EMC.

2. Enter `RST-EQPT::UNIT-[q]q::DSPI;` to restore DSPI.

3.4.5 Change DS1/DS3 Parameters

3.4.5.1 Change DS1 Equalizer Value

Overview: This procedure uses the command to change the value of the equalizers for the facility terminating module. The equalization for each half of the shelf, which contains 10 dual digroup cards, can be set to different values. This command is used to enter new values of equalization (or make corrections) and is used to enter the value for the second half of the shelf if it was not entered initially. The FTMI must be in-service to change an equalizer value.

1. Familiarize yourself with the five values of equalization for the length of cabling to the line interface jacks (for example, DSX-1 bay) per Table 3-36.
2. Enter the command with the value of equalization for each half of the shelf as follows (see Note):
   `ED-PRMTR-EQPT:[xy]:UNIT-[q]q:[ww]:FTMI-d:EQL-l,r;`

   Where:
   - xy = Unique id (target id); up to 20 characters
   - ww = Command correlation tag; up to 10 characters
   - [q]q = Unit number (1 through 16)
   - d = FTMI number (1 through 4)
   - l = Equalizer value (1 through 5) for left half of shelf (lower 20 NPC slots)
   - r = Equalizer value (1 through 5) for right half of shelf (upper 20 NPC slots).

   NOTE:
   For DS1 equalizers, you can use a dash (--) in place of the value for one side to indicate that the existing value remains the same.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
3. Check NEW STATE EQL values in output message to verify that correct information was entered; if there is an error, repeat this procedure to make corrections.

Table 3-36. DS1 Equalizer Values

Setting	Cable Length (22 Gauge)	Cable Length (26 Gauge)
1	0 through 133 feet	0 through 90 feet
2	133 through 267 feet	90 through 180 feet
3	267 through 400 feet	180 through 270 feet
4	400 through 533 feet	270 through 360 feet
5	533 through 655 feet	360 through 450 feet

3.4.5.2 Change DS1 Equalizer Value on 19.2-kb/s MJU Plug-In

1. With the MJU plug-in out of the shelf, locate the two miniature switches (DIP switches) on the component side of the MJU circuit board. These switches are located near the bottom edge; switch SW2 is not used.
2. Set the rockers on the DIP switch SW1 to select the required equalizer values based on the distance to the DSX-1 bay per Table 3-37.

   NOTE:
   To set a switch to the on position, push the rocker to the 1 position.

   NOTE:
   The selected equalization will be effective when the plug-in is inserted (with the reset that occurs when the MJU is powered up) and will be read again whenever the **RESET** button on the plug-in is operated.

3. Repeat the procedure to set the equalizers on the other MJUs in the self.

Table 3-37. 19.2-kb/s Equalization Settings

Cable Length (Feet)		Switch Setting		
Type 609 (22 GA.)	Type 1249 (26 GA.)	Rocker 1	Rocker 2	Rocker 3
0 through 50	0 through 90	on	on	on
51 through 267	91 through 180	on	on	off
268 through 400	181 through 270	on	off	on
401 through 533	271 through 360	on	off	off
534 through 655	361 through 450	off	on	on

3.4.5.3 Change DS3 MXR Parameters

Overview: The command in this procedure is used to change the type specification and any operating options of an MXR pack that has been already grown in the data base. These options are: the bit error rate calculation method, bit error threshold, and cable loss line buildout in the transmission path. The MXR and facility must be removed from service to change the type specification or line buildout; this is accomplished by removing the MMFG for the MXR.

1. If the type specification or line buildout is to be changed, enter the command to remove the MMFG for the MXR as follows:
   RMV-EQPT::UNIT-[q]q::MMFG-c[&&-d][:FRC[,INCL]];

   Where:
   - [q]q = Unit number (1 through 16)
   - c = MMFG number (1 through 6)
   - d = Optional, last MMFG number of range of MMFGs
   - FRC = Optional, to force removal without accompanying protection switching (required when protection switching is not available)
   - INCL = Optional, to remove all equipped component NPCs from service.

2. Enter command as follows:
   ED-PRMTR-T3:[xy]:UNIT-[q]q:[ww]:DS3-c[&&-d]
   :[BERM-s][,BERT-t][,LBO-b][,TYPE-mnxyz];.

   Where:
   - xy = Unique id (target id); up to 20 characters.
   - ww = Command correlation tag; up to 10 characters.
   - c = DS3 number associated with MXR (1 through 6).
   - d = Optional, last DS3 number of range of DS3s in same unit.
   - mnxyz = Type specification; see Table 3-38. Default is MX100.
   - s = BER calculation method: s=B for bipolar violations (default) or s=P for DS3 parity errors.
   - t = BER threshold, t=3 for 10^{-3} (default) or t=6 for 10^{-6}.
   - b = Line buildout, OFF (default), or ON.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3. Check output message to verify type and option entries.
4. Enter command to restore MMFG as follows:
   `RST-EQPT::UNIT-[q]q::MMFG-c[&&-d]:[INCL];`

   Where: INCL = Causes all component NPCs to also be restored.

Table 3-38. MXR Type Specification

Option	Meaning
X	**DS3 FRAMING FORMAT**
1	M13 Format (Default)
2	C-Bit Parity Format
Y	**NOT ASSIGNED (USE 0)**
Z	**NOT ASSIGNED (USE 0)**

3.5 NPC

3.5.1 Set Optional Alarm Threshold in Data Base

Overview: This procedure is used to enter (or change) values which are stored as options for facility NPC alarm thresholds. Up to three options can be entered for any of the NPC alarm parameters; these options can then be selected for an NPC via the CRTE or ED commands. If the alarm thresholds for an NPC are not specified, the internal default values apply. Different alarm types apply to the NPCs for DS1 and 2.048-M/bs Interface.

1. To see if other options have been established, enter `RTRV-OPT-T1::NPC::[{mn|ALL}];` where the options for one type (for example, DE or PB) or all types can be displayed. The default values are listed in the first column and any options, to the right; dashes appear if no options have been set.

2. Familiarize yourself with the command as follows and with the parameter identifiers and default values per Table 3-39:

   ```
   ED-OPT-T1:[xy]
   :NPC:[ww]:{ALL|TYPE-mn}:rr:set1,set2,set3;
   ```

   Where:

   TYPE mn|ALL = Selects all NPCs in frame or only those of specified type (for example, TYPE DE).

   rr = Identifier for parameter to be changed per Table 3-39. Alarm types 01 through 08 apply to type DE/TE NPCs, 09 and 10 apply to type DS, and 31 through 40 apply to type PB/PC NPCs.

   set1,set2,set3 = Any of three values to be stored for the parameter from the range listed in Table 3-39.

3. See the following example which shows two values being added as options for degraded minutes (1 hour) alarm threshold.

   EXAMPLE: `ED-OPT-T1::NPC::TYPE-DE:03:5,4,-;`

4. Enter command to set any one or all three of the options; use a dash when additional options for a parameter are not required. Remember that a minor alarm threshold must be lower than a major alarm option for the same facility parameter.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. Check completion message to verify changes.

6. Enter `STA-LOCL-RST::PRI;` to boot in new values and prevent FRADTS messages.

Table 3-39. Setup Options

NPC Type	Option (rr)	Performance Parameter	Threshold Range	Default Value
DE	01	SLIP Major Alarm	001-255	255
	02	SLIP Minor Alarm	001-255	4
	03	Bit Error Rate Major Alarm	10^{-6} to 10^{-3} *	10^{-3} †
	04	Bit Error Rate Minor Alarm	10^{-6} to 10^{-3} * †	10^{-6}
	05	Errored Seconds (T1DM & ESF Formats)	00001-65535	864
	06	Severely Errored Seconds	001-255	255
	07	COFA Major Alarm	001-511	511
	08	COFA Minor Alarm	1-255	17
DS	09	SANE (Self Alarm - Near End)	0-65535	0
	10	SAFE (Self Alarm - Far End)	0-65535	0
PB/PC	31	DM, Degraded Minutes, 1 hour	1-60	60
	32	DM, Degraded Minutes, 24 hours	1-1440	1440
	33	SERS, Severely Errored Seconds, 15 minutes	1-900	900
	34	SERS, Severely Errored Seconds, 24 hours	1-65535	65535
	35	ERS, Errored Seconds, 15 minutes	1-900	900
	36	ERS, Errored Seconds, 24 hours	1-65535	65535
	37	US, Unavailable Seconds, 15 minutes	1-900	900
	38	US, Unavailable Seconds, 24 hours	1-65535	65535
	39	SLIPS, 15 minutes	1-900	900
	40	SLIPS, 24 hours	1-65535	65535

* Range is 10^{-7} to 10^{-3} with ESF or T1DM line format.
† Range is 10^{-6} to 10^{-4} (default) for clear-DS1.

3.5.2 Install Plug-Ins, Grow and Restore IFTU/FTU NPC (Without *SLC*® Carrier)

3.5.2.1 Install Plug-Ins and Grow Type DE NPC

Overview: This command defines the operating characteristics of the NPC in the data base. When the NPC is subsequently restored to service, it will be provisioned per the growth specification. Included in the specification are: DS1 line and channel formats, facility alarm thresholds, and the channel insertion word. The DS1 line formats are given by the TYPE specification; TYPE DE100 is the default. If used, alarm threshold options must already be defined in the data base per *Set Optional Alarm Threshold in Data Base.* The IW (insertion word) for the NPC is sent out on all channels when the NPC is removed from service and, unless overridden by the DCC option in the disconnect command(s), the IW is sent on any non-connected channel.

1. Install the appropriate plug-in cards in the NPC slots to be equipped from the following list: TG80 or TG80B DDC, or TG186 ZDC (for special zero code suppression, Z BTSI).

2. Familiarize yourself with the following command:

```
CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:[DExyz]
[:rr/l&ss/m,&tt/n,...)][:IW-X-pq][,AIS-{INFO|MJ|MN}];
```

Where:

<npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

<range> = Optional, last NPC of continuous range of NPCs. Three ampersand (&s) are required for hierarchical.

xyz = Line and channel format specification; DE100 is the default. See Table 3-40 for values.

rr/l...tt/n = Optional, to list any one or all alarm (01 through 08) per Table 3-41 and predefined number (0 through 3) per Table 3-42 which sets alarm threshold. See EXAMPLE in Step **5**.

pq = Optional, to enter IW in hexadecimal form; default is 7F. See typical values in Step **4**. **The IW field is not applicable for clear-DS1 NPC.**

AIS field = Optional; to specify class of output message issued when AIS is received: INFO (default) for information, MJ for major alarm, or MN for minor alarm.

3. If you are going to use the optional alarm threshold field, consider the following items:
   - — The errored second parameters are only applicable with the ESF line format and T1DM format.
   - — Only alarm types 01 through 04 are applicable to FTU clear-DS1s.
   - — When TG80B is used as clear-DS1, BER is calculated from BPV and the high-end BER threshold is 10^{-4} instead of 10^{-3}.

4. If you are going to use the IW field, consider the following:
   - — The two hexadecimal digits define an 8-bit insertion word for unassigned channels. To prevent the generation of a yellow alarm condition (with D4 line format), the hexadecimal number for the left digit must not be one that corresponds to a binary number with bit 2 = 0 (that is, decodes to x0xx).
   - — Insertion word 7F is defined as the UAC (unassigned channel code) and is typically used for type DE/TE 1yz and type DS NPCs.
   - — Insertion word 18 is defined as the UMC (unassigned multiplexer code) and is required for a type DE4yz NPC (T1DM format for Digital Data System).
   - — MUX keyword - IW = IA.
   - — Insertion word FF is all ones and is used for 2.048-Mb/s Interface NPC applications.

5. Enter command with required information. See Table 3-43 for explanation of line format terminology. **For clear-DS1, the only y-option that are applicable are 1 or 2.**

   EXAMPLE: `CRTE-EQPT::NPC-012::DE400:01/1&03/2&07/2:IW-X-18;`

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

6. Check completion message to verify changes.

Table 3-40. DE Type NPC Options

X	Multiframe Format
0	Unassigned
1	D4 Channel Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression (ZCS)
1	No Zero Code Suppression
2	Bipolar with 8 Zero Substitution (B8ZS)
3	ZBTSI for TG186 Pack and ESF Format
4	DMI with ZCS
5	DMI with no ZCS
6	DMI with B8ZS
Z	**Channel Counting**
0	D4 Channel Numbering (Sequential)
1	D2 Channel Numbering
2	D1D Channel Numbering
3-8	Unassigned
9	No Channels, Clear-DS1

Table 3-41. Alarm Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Table 3-42. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

Table 3-43. Option Types

Term	Explanation
ESF	Extended superframe (24-frame); bit 193 shared for framing, 4 kb/s data link, and 2 kb/s cyclic redundancy check (CRC-6)
ESF-voice	Voice with robbed-bit signaling; D4 alarm recognition times; yellow alarm sent over data link
ESF-data	Data transmit and additional use of data link; alarm times shorter than D4
DDS	Digital Data System; high reliability special service
DDS-T	T1DM type which uses D4 superframe and bit 191 (R bit) data link connection via channel 24
SLC	For *SLC*® 96 carrier; 9-state signaling and facility data link
ZCS	Zero code suppression which inserts 1s after strings of 0s for adequate T1 line drive. No ZCS is normally used for data circuits.*
B8ZS	Bipolar with 8 zero substitution; for unrestricted data transmit via code for strings of 0s or any general application. This mode eliminates the need for Zero Code Suppression.
ZBTSI	Zero byte time slot interchange; different algorithm for zero code suppression available with ESF format
DMI	Digital multiplex interface for digital PBXs (for example, Type 75); uses A and B non-robbed-bit signaling and 64 kb/s channel transmission.

* No ZCS can also be used for voice and wideband program channels where zero code suppression is undesirable and facilities capable of B8ZS line coding are not available. This application requires that digitally encoded voice signals not violate the 1's density requirements of the DS-1 transmission facility (no more than 15 consecutive 0's and an average of 12.5% 1's density) prior to transmission.

3.5.2.2 Grow Type TE NPCs

Overview: This procedure is used to enter the type specifications of the NPCs on the MXR pack. The procedure is optional if the NPCs were restored with the MXR. These NPCs are incorporated in the MXR pack and are not separate plug-ins. The type specification determines the basic operation (TE or TI) and the line and channel formats of the DS1 signal. Optional fields in the growth command allow selecting different facility performance alarm thresholds and specifying a particular insertion word. The alarm threshold options are only applicable to the TE type; those for the TI type are established over the carrier data link. The IW for the NPC is sent out on all 24 channels when the NPC is out-of-service, and unless set otherwise by a disconnect command, is sent out on any not-connected channel. The IW is not applicable to clear-channel DS1 for which an AIS is sent in the disconnected or idle state.

1. Familiarize yourself with the command as follows:
   CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:[mnxyz]:[rr/l&ss/m ...&tt/n)][:IW-X-pq];

   Where:

   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). The additional NPCs on the DS3 are identified by suffix, A through H.
   <range> = Optional, for last NPC of continuous range to be grown. Extra ampersand [&] required for hierarchical.
   mn = Type designation, mn = **TE** for DS1 without interface unit operation or mn = **TI** for DS1 with IU operation.
   xyz = Format specification; see Table 3-44. TE100 is default.
   rr,ss,tt = Optional field for type TE NPC to select nondefault alarm thresholds; see Table 3-45 for code to represent facility parameter.
   l,m,n = Option number (1 through 3) which has been predefined in the data base; 0 selects default value.
   pq = Optional, hexadecimal notation to specify IW pattern. Typical values are 7F (default), 18 for T1DM format, or FF for all 1s.

2. Consider the following restrictions:
   - — Only y = 1 (NZCS) is applicable for Type TE clear-channel NPC.
   - — For clear-DS1, only SLIP major and minor thresholds (rr = 01 and 02) can be specified in the OPTS field. The IW field is not used at all.
   - — For the Type TI NPC, the OPTS field is not applicable.

3. Enter command with required information. If default alarm thresholds and IW are appropriate for the NPCs, the corresponding optional fields can be omitted from the command. See Note.

```
EXAMPLE: CRTE-EQPT::NPC-16A:TE110:01/1&03/2&07/2:IW-X-FF;
```

NOTE:
For clear-DS1, the IW field is not applicable and only SLIP major and minor alarm thresholds can be specified.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

4. Check output message to verify type and option entries.

Table 3-44. NPC Options

Option	Type TE
X	**Multiframe Format**
0	Unassigned
1	D4 Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24 FDL
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression (ZCS)
1	No Zero Code Suppression
2	Not Allowed
3	Not Allowed
4	DMI with ZCS
5	DMI with no ZCS
6	Not Allowed
7-9	Unassigned
Z	**Channel Counting**
0	D4 Bank/Sequential
1	D2 Bank
2	D1D Bank
3-8	Unassigned
9	No Channels, Clear-DS1

Table 3-45. Facility Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

3.5.2.3 Install Plug-Ins and Grow Type PB/PC NPC

Overview: This procedure is used to enter information (grow) into the data base to provision the PBC (primary block circuit). Entered are the line interface impedance, the mode NSA (nonsignaling associated) or CAS (channel associated signaling), and selection of line signal format options. These format options include assigning alarm meanings to transitions of bits 3, 4 and 5 of time slot 0 (TS0). The NPC also monitors the following facility parameters: slips, errored seconds, severely errored seconds, degraded minutes, and unavailable seconds. The alarm thresholds for any or all of these can be specified by listing the parameter and threshold option in the command. The IW (insertion word), which is sent by the NPC on any not-connected channels or on all channels when the NPC is removed from service, can be specified in this command.

NOTE:
Only bits a through g (for xy values) can be used for NPC provisioning with the basic 2.048-Mb/s Interface software feature. The remaining bits are used with the Enhanced 2.048-Mb/s Interface feature to assign alarm meanings to TS0 bits. The TG187 pack is needed for growth option jkl = 011 or 101 to provide MBER (minor bit error rate) operation.

1. Install the appropriate plug-in cards in the NPC slots to be equipped from the following list: TG182 - 120 ohms, TG185 - 75 ohms, TG187 - 120 ohms, or TG192 - 75/120 ohms for minor error rate.
2. Familiarize yourself with the command as follows:
   CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:[mnxyz]:
   [rr/l[&ss/m...&tt/n]:[IW-X-pw[r]][:AIS-{MI|PMA|DMA}];
   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

<range> = Optional, last NPC of continuous range of NPCs. Three ampersands (&s) required for hierarchical.

mn = NPC type, **PB** for 120-ohm line interface or **PC** for 75-ohm coaxial line interface.

xyz = 3-digit hexadecimal number; each digit corresponds to a 4-bit binary number, the bits of which represent NPC options per Table 3-46. Only bits a through g are for Basic 2.048-Mb/s Interface. The default type specification for 2.048-Mb/s Interface frame is PB100.

rr/l ...&tt/n = Optional, to list any one or all facility parameters (31-40) per Table 3-47 and predefined number (0 through C) per Table 3-48 which selects alarm threshold. See examples in Step **3**.

AIS field = Optional, to specify class of output message issued when AIS is received: INFO (default) for information, MJ for alarm major, or MN for minor alarm.

IW-X-pw[r] = Insertion word given as hexadecimal code; each digit specifies 4 bits. The r-digit is for disconnect channel signaling. Default for 2.048-Mb/s Interface is X-D5D.

3. Notice the following examples which show the command to select TYPE options, no CRC-4, no sync source, consequent AIS, CAS, and telephone channel numbering, and specifies different deferred alarm threshold for 1-hour DM and 15-minute SLIP.

   EXAMPLE 1: CRTE-EQPT::NPC-01-1-12::PB900:31/3&39/3;

   EXAMPLE 2: CRTE-EQPT::NPC-02-1-32::PB87C; (for TRANSMIC 1G)

   NOTE:
   Bit c of "x" (xyz field) selects the use of the <tc> field and, for Enhanced 2.048-Mb/s Interface, determines the alarm network timer as follows: c = 0 for 144 ms and c = 1 for 480 ms for local alarms. The c = 1 selection is required to specify <tc> for a DS1 connection (gateway).

4. Enter command with required TYPE options. If default alarm thresholds are appropriate for the NPC application, the OPTS field can be omitted from the command. To disable any facility alarms, enter "C" for the value of "m" in the "rr/l ...&tt/n" field.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

5. Check output message to verify type and option selections. Also notice the TS0 and TS0M output fields which give the default values for the spare TS0 bits and bits monitored.

Table 3-46. Hexadecimal/Binary Numbers

Hex	Bit	Value	Meaning
x	a	0	CRC-4 multiframe in TS0
		1	Non-CRC-4 framing in TS0
	b	0	NPC is not used as a synchronization source
		1	NPC is used as a synchronization source
	c	0	CCITT G.732 Consequent AIS in signaling
		1	Specified consequent action; <tc> field in commands
	d	0	Nonsignaling associated (NSA)
		1	16-state channel associated signaling (CAS)
y	e	0	Telephone Channel Numbering
		1	Time Slot Channel Numbering (NSA)
	f	0	Convert the abcd bits of TS16 to 1111 if 0000
		1	Pass signaling bits through unchanged
	g	0	AIS applied to receive TS16 upon RAI, RAIS, or R16
		1	AIS not applied to receive TS16 upon RAI, RAIS, or R16
	h	0	TS0 bit 5 = SFI unaffected by synchronizer holdover
		1	TS0 bit 5 = SFI inverted on synchronizer holdover
z	jkl	000	TS0 bit 3 = RAI indication within 2 ms.
		001	TS0 bit 3 = RAI indication in *t**
		010	TS0 bit 4 = RAIS in *t** and RAI within 2 ms.*
		011	TS0 bit 4 = Detect BER, enable RBER in *t** and RAI in 2 ms.
		100	TS0 bit 4 = RAIS and RAI in *t** (Transmic 2G)*
		101	TS0 bit 4 = Detect BER, disable RBER and RAI within 2 ms*
		110	Bits 3 through 8 in *t** (Transmic 1G)
		111	Unassigned
	m	0	Unassigned, only m = 0 is valid

* When bit c=0, time *t* is 144 ms; when bit c=1, *t* is 144 ms for remote alarms, but *t* is 480 ms for local alarms except for jkl = 011 or 101 (MBER selected). With MBER, *t* is 2496 ms (SFDT).

Reference: HEX A=1010, B=1011, C=1100, D=1101, E=1110, F=1111.

Table 3-47. Facility Parameter

Type (rr,ss,tt)	Meaning
31	DM, 1 Hour
32	DM, 24 Hour
33	SERS, 15 Minute
34	SERS, 24 Hour
35	ERS, 15 Minute
36	ERS, 24 Hour
37	US, 15 Minute
38	US, 24 Hour
39	SLIPs, 15 Minute
40	SLIPs, 24 Hour

Table 3-48. Alarms Option

Alarm Class	Option 0 (Default)	Option 1	Option 2	Option 3*
MI (Info)	0	3	6	9
DMA (Deferred)	1	4	7	A
PMA (Prompt)	2	5	8	B

* Only valid option for PB/PC types.

Note: C - disables monitoring of a facility parameter

3.5.2.4 Install Plug-Ins and Grow Type DA NPC

1. Install the TG191 circuit pack in the NPC slot.
2. Familiarize yourself with the command as follows:

```
CRTE-EQPT::NPC <npc No.>:[ww]:mnxyz:\
[rr/m][&rr/m][...]:[IW-X-pq[,INCL]]\
[,AIS-{INFO|MJ|MN}][,PL-{ENA|DSA}];
```

Where:

<npc No.> = NPC number.

<range> = Optional, last NPC of continuous range of NPCs.

mn = NPC type DA.

xyz = NPC type identifier. The following table contains identifier definitions.

Bit	Value	Explanation
x	0	Not assigned
	1	D4
	2	ESF - voice
	3	ESF - data
	4	DDST (T1DM - R bit connection via channel 24)
	5-9	Not assigned
y	0	Zero Code Suppression
	1*	No Zero Code Suppression
	2*	Bipolar with 8 Zero Substitution
	3	Not assigned
	4	Zero Code Suppression/DMI signaling
	5	No Zero Code Supression/DMI signaling
	6	Bipolar with 8 Zero Substitution/DMI signaling
	7-9	Not assigned
z	0	D4 channel bank channel numbering
	1	D2 channel bank channel numbering
	2	D1D channel bank channel numbering
	3-8	Not assigned
	9	Unchannelized 193-bit Clear Ds1 cross-connection

* Options 1 and 2 are only applicable to DA type clear-DS1 NPCs.

NOTE:
DMI signaling cannot be specified in the y field if the x field is set to 4 (DDST framing).

rr = Facility performance parameter number. The following table contains valid values.

rr	Parameter
41	Daily near-end path coding violations
42	Daily near-end path errored seconds
43	Daily near-end path severely errored seconds
44	Daily near-end severely errored framing seconds
45	Daily near-end path controlled slip seconds
46	Daily near-end path unavailable seconds
47	Daily near-end line coding violations
48	Daily near-end line errored seconds
49	Daily near-end line severely errored seconds
50	Daily far-end path coding violations
51	Daily far-end path errored seconds
52	Daily far-end path severely errored seconds
53	Daily far-end severely errored framing seconds
54	Daily far-end path controlled slip seconds
55	Daily far-end path unavailable seconds
56	Daily far-end line errored seconds
57	15-minute near-end path coding violations
58	15-minute near-end path errored seconds
59	15-minute near-end path severely errored seconds
60	15-minute near-end severely errored framing seconds
61	15-minute near-end path controlled slip seconds
62	15-minute near-end path unavailable seconds
63	15-minute near-end line coding violations
64	15-minute near-end line errored seconds
65	15-minute near-end line severely errored seconds
66	15-minute far-end path coding violations
67	15-minute far-end path errored seconds
68	15-minute far-end path severely errored seconds
69	15-minute far-end severely errored framing seconds
70	15-minute far-end path controlled slip seconds
71	15-minute far-end path unavailable seconds
72	15-minute far-end line errored seconds

m = Facility performance threshold index (0 through 3)

IW = Insertion word.

INCL = Inclusive.

AIS = Alarm Indication Signal.

INFO = Information message (not an alarm).

MJ = Major

MN = Minor

PL = Payload loopback

ENA = Enabled

DSA = Disabled

3. Enter command with required TYPE options. If default alarm thresholds are appropriate, the OPTS field can be omitted from the command.
4. Check the output mesage to verify type and option selections.
5. When the PL field is not specified, the default is payload loopback enabled.

3.5.2.5 Restore NPC

Overview: Until NPCs are restored to service, facility alarms are not registered and DACS II sends trunk conditioning out over the facility. In the process of restoring, the DACS II runs both an out-of-service and in-service diagnostic and provisions the NPCs according to the NPC growth information. The looped tests that are included in the diagnostics test the transmission paths in the NPC (except line transformers) and test some of the facility checking circuitry. A hardware failure will cause a failed diagnostic and a restore denial. A facility problem will cause a CGA or PBA alarm.

1. Enter **RST-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww];**

   Where:

   xy = Unique ID (target ID); up to 20 characters

   ww = Command correlation tag; up to 10 characters

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)

   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs. Three ampersand (&s) are required for hierarchical.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

2. Repeat the procedure as needed to restore other NPCs (or groups of NPCs).

   NOTE:
   If a NPC is restored but its FTMI is OOS the **RTRV-STATE-EQPT;** command will not show the alarm counts and alarms will not be displayed.

3.5.3 Install Plug-Ins and Grow IFTU/FTU NPC (with *SLC* Carrier)

3.5.3.1 Install Plug-Ins

3.5.3.1.1 *SLC* 96 Carrier Mode III

Consider the following guidelines on the assignment of NPC slots and install the plug-in cards for the NPCs to be equipped:

- All lines from the same RT (remote terminal) should go to the same FTU.
- The NPCs for DGA and DGP must be fed by different FTU fuses; each FTU fuse feeds eight NPCs.
- Two digroups from the same RT must connect to different dual digroup cards for service diversity.
- The TG183 (S96D) card must be used for *SLC* carrier digroups carrying the data link (DGA and DGP), but either the TG183 or TG80B can be used for the other *SLC* carrier digroups.

3.5.3.1.2 *SLC* 96 Carrier Mode I

Consider the following guidelines on the assignment of NPC slots and install the plug-in cards for the NPCs to be equipped:

- All lines from the same RT (remote terminal) must go to the same FTU.
- The NPCs for DGA and DGP must be fed by different FTU fuses; each FTU fuse feeds eight NPCs.
- Two digroups from the same RT must connect to different dual digroup cards for service diversity.
- The TG183 (S96D) card must be used for *SLC* carrier digroups carrying the data link (DGA and DGP), but either the TG183 or TG80B can be used for the other *SLC* carrier digroups.
- The NPCs going to DGA at the RT and DCLU must be on the same S96D card.

NOTE:
There is no DGP at the DCLU, thereby eliminating the protection line between the DCLU and DACS II.

3.5.3.1.3 *SLC* Series 5 Carrier FPC (Feature Package C) - Retrofit Facility and New Facility

Consider the following guidelines on the assignment of NPC slots and install the plug-in cards for the NPCs to be equipped:

— All lines from the same RT must go to the same FTM for *SLC* Series 5 carrier.

— The NPCs for DGA and DGP must be fed by different FTU fuses; each FTU fuse feeds eight NPCs.

— Two digroups from the same RT must connect to different dual digroup cards for service diversity.

— Install TG184 (SS5D card) for *SLC* Series 5 carrier.

3.5.3.1.4 *SLC* Series 5 Carrier FPB (Feature Package B)

Consider the following guidelines on the assignment of NPC slots and install the plug-in cards for the NPCs to be equipped:

— All lines from the same RT or DCLU (digital carrier line unit) must go to the same FTU.

— The TG183 (S96D) card must be used for *SLC* carrier digroups carrying the data link (DGA and DGP), but either the TG183 or TG80B can be used for the other *SLC* carrier digroups.

— The TG183 (S96D card) must be used for *SLC* Series 5 carrier FPB digroups.

— The NPCs going to DGA at the RT and DGA at the DCLU must be on the same S96D card.

— Two digroups from the same RT (or DCLU) must connect to different S96D cards for diversity.

NOTE:
There is no DGP at the DCLU, thereby eliminating the protection line between the DCLU and DACS II.

3.5.3.2 Grow NPC

3.5.3.2.1 Grow Type DS NPC

Overview: DS1 line formats, alarm threshold options, and the channel insertion word are entered in this command. The NPC records facility slips, bit error rate, errored seconds, severe errored seconds, change of frame alignment and, for *SLC* 96 carrier, records shelf alarms from the RT equipment. Either default values or stored optional values for the alarm thresholds and shelf alarms are selected with this command. These options (not the default values) must first be entered in the data base by the ED OPT T1 command. The IW (insertion word) that is defined here for the NPC is sent out on the channels when the NPC is out of service or the channels are not yet cross-connected.

1. Familiarize yourself with the command as follows and the variables per Table 3-49: **CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]::DSxyz:[rr/s&rr/s...tt/s]:[IW-X-pq];**

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   <range> = Last NPC in a range. Extra ampersand (&) needed for hierarchical.

   xyz = DS1 line format and channel counting options per Table 3-49. See example in Step **2**.

   rr/l, tt/n = Optional to select any one or all alarm types (01 through 10) per Table 3-50 and previously defined options (1, 2, or 3). Shelf alarms are not selectable for *SLC* Series 5 carrier.

   IW-X-pq = Optional to specify HEX code for IW pattern either pq = FF for all 1s pattern, or pq = 7F for unassigned channel code (default value).

2. See the following example and notes. If optional alarm thresholds or IW are not given (nor required), the corresponding fields can be omitted from the command.

   EXAMPLE: CRTE-EQPT::NPC-012::DS600:01/1&03/2:IW-X-FF;

   NOTE:
   The y value for the line format will always be as follows:

   y = 0 for a line going to a *SLC* 96 carrier RT.
   y = 0 for a line going to a *SLC* Series 5 FPB RT.
   y = 0 or 2 for a line going to a *SLC* Series 5 FPC RT.

   NOTE:
   The Fs framing format (DS60-) is used for *SLC* 96 carrier and Series 5 FPB: DGA (with data link) and DGP NPCs.

NOTE:
The extended superframe (ESF) line format is required for lines going to *SLC* Series 5 carrier FPC RTs.

3. Enter command with required information.
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

NOTE:
For *SLC* Series 5 carrier, the same type of zero code suppression (ZCS or B8ZS) must be used at both the DACS II and RT equipment or CRC6 errors can occur on the line.

4. Check output message to verify type and option selections.

Table 3-49. Type DS Options

Option	Meaning
X	**Multiframe Format**
0	Unassigned
1	D4 bank
2	ESF (extended superframe) - voice
3	Unassigned
4	Unassigned
5	Unassigned
6	*SLC*® 96 carrier Fs format
7	*SLC* Series 5 ESF with data link
8,9	Unassigned
Y	**Zero Code Suppression**
0	ZCS (zero code suppression
1	NZCS (no zero code suppression)
2	B8ZS (bipolar with 8 zero substitution)
3-9	Unassigned
Z	**Channel Counting Sequence**
0	*SLC* 96 carrier Mode III, D4 bank sequence
1	*SLC* 96 carrier Mode III, D1D bank sequence
2	*SLC* 96 carrier Mode I, D1D bank sequence
3	*SLC* Series 5 carrier, D4 bank sequence
4-9	Unassigned

Table 3-50. Facility Thresholds

Option (rr)	Parameter	Range	Default
01	SLIP major	000* to 255	255
02	SLIP minor	000* to 255	4
03	Bit error rate major	10^{-6} to 10^{-4}	10^{-4}
04	Bit error rate minor	10^{-6} to 10^{-4}	10^{-4}
05	Errored seconds	00001 to 65535	864
06	Severe errored seconds	001 to 255	225
07	Change of frame alignment, major	001 to 511	511
08	Change of frame alignment, minor	001 to 255	17
09	Shelf alarm, near end	00000 to 65535	00000
10	Shelf alarm, far end	00000 to 65535	00000

* Setting the SLIP threshold to zero suppresses the alarm.

3.5.3.2.2 Grow Type DE NPC

Overview: This command defines the operating characteristics of the NPC in the data base. When the NPC is subsequently restored to service, it will be provisioned per the growth specification. Included in the specification are: DS1 line and channel formats, facility alarm thresholds, and the channel insertion word. The DS1 line formats are given by the TYPE specification; TYPE DE100 is the default. If used, alarm threshold options must already be defined in the data base per *Set Optional Alarm Threshold in Data Base.* The IW (insertion word) for the NPC is sent out on all channels when the NPC is removed from service and, unless overridden by the DCC option in the disconnect command(s), the IW is sent on any unconnected channel.

NOTE:
Early TG80s (before Series 5) cannot be grown as clear-DS1.

1. Familiarize yourself with command as follows:
   CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:[DExyz]
   [:rr/l&ss/m,&tt/n,...)][:IW-X-pq][,AIS-{INFO|MJ|MN}];
   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Optional, last NPC of continuous range of NPCs. Extra ampersand (&) required for hierarchical.
   xyz = Line and channel format specification; DE100 is the default. See Table 3-51 for values.
   rr/l...tt/n = Optional, to list any one or all alarm types (01 through 08) per Table 3-52 and predefined number (0 through 3) per Table 3-53 which sets alarm threshold. See EXAMPLE in Step **4**.

pq = Optional, to enter IW in hexadecimal form; default is 7F. See typical values in Step **3**. **The IW field is not applicable for clear-DS1 NPC.**

AIS field = Optional; to specify class of output message issued when AIS is received: INFO (default) for information, MJ for major alarm, or MN for minor alarm.

2. If you are going to use the optional alarm threshold field, consider the following items:
   - — The errored second parameters are only applicable with the ESF line format and T1DM format.
   - — Only alarm types 01 through 04 are applicable to FTU clear-DS1s, and only types 01 and 02 are applicable to DS3U clear-DS1s (Type TE/TI).
   - — When TG80B is used as clear-DS1, BER is calculated from BPV and the high-end BER threshold is 10^{-4} instead of 10^{-3}.

3. If you are going to use the IW field, consider the following:
   - — The two hexadecimal digits define an 8-bit insertion word for unassigned channels. To prevent the generation of a yellow alarm condition (with D4 line format), the hexadecimal number for the left digit must not be one that corresponds to a binary number with bit 2 = 0 (that is, decodes to x0xx).
   - — Insertion word 7F is defined as the UAC (unassigned channel code) and is typically used for type DE/TE 1yz.
   - — Insertion word 18 is defined as the UMC (unassigned multiplexer code) and is required for a type DE 4yz NPC (T1DM format for Digital Data System).
   - — Insertion word FF is all ones and is used for Type PB/PC/DS NPC applications (extended superframe only).

4. Enter command with required information. See Table 3-54 for explanation of line format terminology. **For clear-DS1, the only y-option that are applicable are 1 or 2.**

   EXAMPLE: `CRTE-EQPT::NPC-012::DE400:01/1&03/2&07/2:IW-X-18;`

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. Check output message to verify type and option selections.

Table 3-51. Type DE Options

X	Multiframe Format
0	Unassigned
1	D4 Channel Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression (ZCS)
1	No Zero Code Suppression
2	Bipolar with 8 Zero Substitution (B8ZS)
3	ZBTSI for TG186 Pack and ESF Format
4	DMI with ZCS
5	DMI with no ZCS
6	DMI with B8ZS
Z	**Channel Counting**
0	D4 Channel Numbering (Sequential)
1	D2 Channel Numbering
2	D1D Channel Numbering
3-8	Unassigned
9	No Channels, Clear-DS1

Table 3-52. Alarm Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Table 3-53. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

Table 3-54. Option Types

Term	Explanation
ESF	Extended superframe (24-frame); bit 193 shared for framing, 4 kb/s data link, and 2 kb/s cyclic redundancy check (CRC-6)
ESF-voice	Voice with robbed-bit signaling; D4 alarm recognition times; yellow alarm sent over data link
ESF-data	Data transmit and additional use of data link; alarm times shorter than D4
DDS	Digital Data System; high reliability special service
DDS-T	T1DM type which uses D4 superframe and bit 191 (R bit) data link connection via channel 24
SLC	For *SLC*® 96 carrier; 9-state signaling and facility data link
ZCS	Zero code suppression which inserts 1s after strings of 0s for adequate T1 line drive. No ZCS is normally used for data circuits.*
B8ZS	Bipolar with 8 zero substitution; for unrestricted data transmit via code for strings of 0s or any general application. This mode eliminates the need for Zero Code Suppression.
ZBTSI	Zero byte time slot interchange; different algorithm for zero code suppression available with ESF format
DMI	Digital multiplex interface for digital PBXs (for example, Type 75); uses A and B non-robbed-bit signaling and 64 kb/s channel transmission.

* No ZCS can also be used for voice and wideband program channels where zero code suppression is undesirable and facilities capable of B8ZS line coding are not available. This application requires that digitally encoded voice signals not violate the 1's density requirements of the DS-1 transmission facility (no more than 15 consecutive 0's and an average of 12.5% 1's density) prior to transmission.

3.5.4 Grow and Restore DS3U NPC

3.5.4.1 Grow NPCs (Part of EMXRs/MXRs)

Overview: This procedure is used to enter the type specifications of the NPCs on the EMXR/MXR pack. These NPCs are incorporated in the EMXR/MXR pack and are not separate plug-ins. The type specification determines the basic operation and the line and channel formats of the DS1 signal. Optional fields in the growth command allow selecting different facility performance alarm thresholds and specifying a particular insertion word. The alarm threshold options are only applicable to the TE type. The IW for the NPC is sent out on all 24 channels when the NPC is out-of-service, and unless set otherwise by a disconnect command, is sent out on any not-connected channel. The IW is not applicable to clear-channel DS1 for which an AIS is sent in the disconnected or idle state.

1. Familiarize yourself with the command as follows:

```
CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:
[mnxyz]:[rr/l&ss/m ...&tt/n)][:IW-X-pq[,INCL]];
```

Where:

- xy = Unique id (target id); up to 20 characters.
- ww = Command correlation tag; up to 10 characters.
- <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). The additional NPC on the DS3 are identified by suffix, A through H for extended.
- <range> = Optional, for last NPC of continuous range to be grown. Extra ampersand [&] required for hierarchical.
- mn = Type designation, mn = **TE** for DS1.
- xyz = Format specification; see Table 3-55. TE100 is default.
- rr,ss,tt = Optional field for type TE NPC to select nondefault alarm thresholds; see Table 3-56 for code to represent facility parameter.
- l,m,n = Option number (1 through 3) which has been predefined in the data base; 0 selects default value.
- pq = Optional, hexadecimal notation to specify IW pattern. Typical values are 7F (default), 18 for T1DM format, or FF for all 1s.
- INCL = Optional, used when provisioning an NPC with D4 framing and an insertion word with bit 2 equal to zero.

2. Consider the following restrictions:
   — Only y = 1 (NZCS) is applicable for Type TE clear-channel NPC.
   — For clear-DS1, only SLIP major and minor thresholds (rr = 01 and 02) can be specified in the OPTS field. The IW field is not used at all.

3. Enter command with required information. If default alarm thresholds and IW are appropriate for the NPCs, the corresponding optional fields can be omitted from the command. See Note.

   EXAMPLE: `CRTE-EQPT::NPC-16A:TE110:01/1&03/2&07/2:IW-X-FF;`

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

4. Check output message to verify type and option entries.

Table 3-55. NPC Options

Option	Type TE	Type TI
X	**Multiframe Format**	**Multiframe Format**
0	Unassigned	Unassigned
1	D4 Bank	Interface Unit, D4-Bank
2	Extended Super Frame - Voice	Interface Unit, ESF
3	Extended Super Frame - Data	Unassigned
4	DDS T1DM Word 24 FDL	Interface Unit, T1DM
5-8	Unassigned	Unassigned
9	No Framing, Clear-DS1	Unassigned
Y	**Zero Suppression**	**Zero Suppression**
0	Zero Code Suppression (ZCS)	Same as TE
1	No Zero Code Suppression	Same as TE
2	Not Allowed	Not Allowed
3	Not Allowed	Unassigned
4	DMI with ZCS	Unassigned
5	DMI with no ZCS	Unassigned
6	Not Allowed	Unassigned
7-9	Unassigned	Unassigned
Z	**Channel Counting**	**Channel Counting**
0	D4 Bank/Sequential	Same as TE
1	D2 Bank	Same as TE
2	D1D Bank	Same as TE
3-8	Unassigned	Same as TE
9	No Channels, Clear-DS1	Unassigned

Table 3-56. Facility Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

3.5.4.2 Install Plug-Ins and Grow Type TA NPC

1. Install the KCR5 and KCR6 circuit pack in the EMXR/MXR/EMIU slot.
2. Familiarize yourself with the command as follows:

```
CRTE-EQPT::NPC <npc No.>:[ww]:mnxyz:\
[rr/m][&rr/m][...]:[IW-X-pq[,INCL]]\
[,AIS-{INFO|MJ|MN}][,PL-{ENA|DSA}]
```

Where:

<npc No.> = NPC number.

<range> = Optional, last NPC of continuous range of NPCs.

mn = NPC type TA.

xyz = NPC type identifier. The following table contains identifier definitions.

Bit	Value	Explanation
x	0	Not assigned
	1	D4
	2	ESF - voice
	3	ESF - data
	4	DDST (T1DM - R bit connection via channel 24)
	5-9	Not assigned
y	0	Zero Code Suppression
	1*	No Zero Code Suppression
	2	Not assigned
	3	Not assigned
	4	Zero Code Suppression/DMI signaling
	5	No Zero Code Supression/DMI signaling
	6-9	Not assigned
z	0	D4 channel bank channel numbering
	1	D2 channel bank channel numbering
	2	D1D channel bank channel numbering
	3-8	Not assigned
	9	Unchannelized 193-bit Clear Ds1 cross-connection

* Option 1 is only applicable to TA type clear-DS1 NPCs.

NOTE:
DMI signaling cannot be specified in the y field if the x field is set to 4 (DDST framing).

rr = Facility performance parameter number. The following table contains valid values.

m = Facility performance threshold index (0 through 3).

rr	Parameter
41	Daily near-end path coding violations
42	Daily near-end path errored seconds
43	Daily near-end path severely errored seconds
44	Daily near-end severely errored framing seconds
45	Daily near-end path controlled slip seconds
46	Daily near-end path unavailable seconds
50	Daily far-end path coding violations
51	Daily far-end path errored seconds
52	Daily far-end path severely errored seconds
53	Daily far-end severely errored framing seconds
54	Daily far-end path controlled slip seconds
55	Daily far-end path unavailable seconds
57	15-minute near-end path coding violations
58	15-minute near-end path errored seconds
59	15-minute near-end path severely errored seconds
60	15-minute near-end severely errored framing seconds
61	15-minute near-end path controlled slip seconds
62	15-minute near-end path unavailable seconds
66	15-minute far-end path coding violations
67	15-minute far-end path errored seconds
68	15-minute far-end path severely errored seconds
69	15-minute far-end severely errored framing seconds
70	15-minute far-end path controlled slip seconds
71	15-minute far-end path unavailable seconds

IW = Insertion word.

INCL = Inclusive.

AIS = Alarm Indication Signal.

INFO = Information message (not an alarm).

MJ = Major

MN = Minor

PL = Payload loopback

ENA = Enabled

DSA = Disabled

3. Enter command with required TYPE options. If default alarm thresholds are appropriate, the OPTS field can be omitted from the command.
4. Check the output mesage to verify type and option selections.
5. When the PL field is not specified, the default is payload loopback enabled.

3.5.4.3 Restore NPCs

Overview: In the process of restoring, the DACS II runs both an out-of-service and in-service diagnostic and provisions the NPCs according to the NPC growth information. A hardware failure will cause a failed diagnostic and a restore denial.

1. Enter `RST-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww];`

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs. Extra ampersand (&) required for hierarchical.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

2. Repeat the procedure as needed to restore other NPCs (or groups of NPCs).

3.5.5 Install, Grow Plug-Ins and Restore DSPU NPC

3.5.5.1 Install DSP NPC Plug-Ins (DMB or Subrate -- SRM, MJU)

1. Working on either DSPU side, enter **`RMV-EQPT::{CCNI|CCI}-s;`**

   Where:
   CCNI = CCN for non-CEF
   CCI = ECCN for CEF
   s = DSPU side (0 or 1).

   NOTE:
   The ECCN side is removed here to prevent an alarm (and DSP removal) on other in-service DSPs on the same port.

2. Install required processing CPs (for example, TM655 DMBs) in assigned NPC/DSP slots.
3. Enter **`RST-EQPT::{CCNI|CCI}-s;`** for the same side, and then enter **`RMV-EQPT::{CCNI|CCI}-s;`** for the other side of the DSPU.
4. Install required processing CPs (for example, TM655 DMBs) in assigned NPC/DSP slots. The NPCs are duplicated in both the 0DSPU and 1DSPU sides; cards must be installed in the same NPC slots on both sides.
5. Enter **`RST-EQPT::{CCNI|CCI}-s;`** to restore the corresponding network side to service.

3.5.5.2 Grow DSP NPC

1. Check circuit order information and office records to determine the next NPC to be grown for use for DMBs (digital multipoint bridges) or subrate data processing.

   NOTE:
   For DMB circuits, the pair of NPCs for each DMB is grown simultaneously by naming the lower NPC number in the command.

2. Enter `CRTE-EQPT:[xy]:NPC-<npc No.>:[ww]:mnxyz;` to grow the next NPC.

   NOTE:
   The command completion message will name both NPCs of the pair that has been grown.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

   Where:

   xy = Unique ID (target ID); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.> = Next addressable NPC in DSPU (lower NPC of each pair), either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   mnxyz = Type specification. MB100 for digital multipoint bridge, SR100 for subrate data multiplexer, or MJ100 for subrate data multipoint junction unit.

3.5.5.3 Change Subrate Hub ID

Overview: This procedure sets or changes the HUBID number.

1. Enter `ED-PRMTR-NE[:xy]:[:ww]:HUBID-O-ab;`

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If command is issued to a remote frame, the frame number **must** be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to a remote frame, the sequence number **must** be entered.

   ab = HUBID code (two octal digits; each digit can have a value of 0 to 7).

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3.5.5.3.1 Change Hub ID on 19.2-kb/s MJU Plug-In

1. With the MJU plug-in out of the shelf, locate the 6-position miniature switch (DIP switch) on the backside of the MJU circuit board. This switch is the only one on the backside of the board, and it is located near the right-side edge.
2. Familiarize yourself with making settings on the switch. The six rocker positions designated 1 through 6 allow setting hub ID numbers from 1 to 64. The six rockers correspond to six digits of a binary number (2^0, 2^1, 2^2, 2^3, 2^4, and 2^5 which have the values 1, 2, 4, 8, 16, and 32 respectively).

   NOTE:
   Counting with binary numbers proceeds as follows - 00001, 00010, 00011, 00100, 00101, 00110, 00111, 01000. For higher numbers, you add the selected values together; for example, to represent the number 50, the binary number would be 11010 (32 + 16 + 2).

3. Set the rockers on the DIP switch to select the required hub ID number. To select a position value, push the rocker to the on (1) position.

   NOTE:
   The selected hub ID will be effective when the plug-in is inserted (with the reset that occurs when the MJU is powered up) and will be read again whenever the **RESET** button on the plug-in is operated.

4. Repeat the procedure to set the hub ID on the other MJUs in the self.

3.5.5.4 Restore DSPU NPC

NOTE:
In the process of restoring, the DACS II runs both an out-of-service and in-service diagnostic and provisions the NPCs according to the NPC growth information. A hardware failure will cause a failed diagnostic and a restore denial.

1. Enter `RST-EQPT:[xy]:NPC-<npc No.>:[ww]:SIDE-s;`

   Where:

   xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)
   s = DSPU side (0 or 1).

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

   NOTE:
   With DMB plug-ins, both the NPCs on the plug-in will be restored when the lower numbered NPC of the pair is entered in the command.

2. Repeat the procedure as needed to restore NPC on the other side and any other NPCs, as required.

3.5.6 Change NPC Parameters

3.5.6.1 Change NPC Type, IW, or ALMOPT-AIS

Overview: This procedure allows changing an NPC's line format type, the NPC IW (insertion word), and the AIS alarm status. The insertion word is sent on unassigned (not-connected) channels and all channels when the NPC is removed from service to indicate these conditions to the far-end equipment. To change the IW, the NPC type specification must be reentered in the command. Whenever the NPC type is changed, all programmable alarm thresholds revert to default values and may also have to be changed.

1. Enter **RMV-EQPT::NPC-<npc No.>::[:INCL];** to remove the NPC from service.

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   INCL = Optional, to allow removal when NPC carries special service circuits.

2. Familiarize yourself with the commands:

   - If TYPE or IW:

     ED-PRMTR-EQPT::NPC-<npc No.>::[mnxyz][:IW-X-pq];

   - If ALMOPT AIS:

     ED-PRMTR-EQPT::NPC-<npc No.>[&&[&]-<range>]::[mnxyz][:ALMOPT:AIS-{INFO|MJ|MN}];

   Where:

   mnxyz = Desired NPC type given by appropriate designation (mn =DE for enhanced DS1 digroup, =TE for DS1 embedded in DS3 signal) and "xyz" specification for type per Tables 3-57 and 3-58.

   <range> = Optional, the last NPC of continuous range of NPCs.

   IW-X-pq = Insertion word given as hexadecimal code; each digit specifies 4 bits. Typical IW codes are: 7F (default for types DE and DS) and 18 (for type DE, Digital Data System). Not selectable for clear-DS1 which uses AIS signal.

   ALMOPT field = Allows changing the option for receipt of AIS (alarm indication signal) to INFO (information), MJ (major alarm), or MN (minor alarm).

3. Consider the following background information:
   - — Zero code suppression inserts 1s for adequate line drive as opposed to B8ZS for unrestricted data patterns for multiplexers (the far-end multiplexer removes B8ZS code).
   - — The DMI interface for digital PBXs uses both A and B signaling and 64 kb/s clear channel; it cannot be used with DDS where word 24 is needed.
4. Enter the command(s) for the desired change(s). The NPC type must be included in the command to change the IW (insertion word), but need not be entered to change just the AIS alarm option.
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
5. Check completion message to verify changes.
6. Enter `RST-EQPT::NPC-<npc No.>;` to restore NPC to service.

Table 3-57. Type DE NPC Options

Option	DE
X	**Multiframe Format**
0	Unassigned
1	D4 Bank Format
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS, T1DM Word 24
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression
1	No Zero Code Suppression
2	Bipolar with 8 Zero Substitution
3	ZBTSI with TG186 and ESF Format
4	DMI with ZCS
5	DMI with no ZCS
6	DMI with B8ZS
7-9	Unassigned
Z	**Channel Counting**
0	D4 Bank/Sequential
1	D2 Bank
2	D1D Bank
3	Unassigned
4	Unassigned
5-8	Unassigned
9	No Channels, Clear-DS1

Table 3-58. DS3 Component NPC Options

Option	Type TE
X	**Multiframe Format**
0	Unassigned
1	D4 Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression
1	No Zero Code Suppression
2	Unassigned
3	Unassigned
4	DMI with ZCS
5	DMI with no ZCS
6	Unassigned
7-9	Unassigned
Z	**Channel Counting**
0	D4 Bank/Sequential
1	D2 Bank
2	D1D Bank
3-8	Unassigned
9	No Channels, Clear-DS1

3.5.6.2 Change Alarm Threshold

Overview: The command in this procedure is used to change alarm thresholds for any or all the facility parameters for type DE/TE/DS and type PB/PC NPCs. The combined parameters for types DE and PB are: ERS (errored seconds), SERS (severely errored seconds), DM (degraded minutes), US (unavailable seconds), BER (bit error rate), COFA (change of frame alignment) and slips. For type DE/TE/DS NPCs, three options can be selected for each associated parameter. For the type PB/PC NPC, three options can be selected for each associated parameter and each alarm class (maintenance information, deferred, or prompt). Command options allow changing the thresholds for only the subject NPC or all NPCs of the same type. To change alarm thresholds, the identifiers for the parameters (any one or all) are listed along with the desired threshold option for each. The threshold values must be previously established using the ED-OPT-T1 command (refer to *Set Optional Alarm Threshold in Data Base*).

1. Familiarize yourself with command as follows and parameter identifiers given in Table 3-59: **`ED-PRMTR-EQPT::{NPC-<npc No.>|TYPE-mnxyz}::rr/l&ss/m...&tt/n;`**

   Where:

   NPC or TYPE field = Selects number of NPCs to be changed: NPC given as extended (for example, [0]001), hierarchical (for example, 01-1-01), or all NPCs with the same type specification (mnxyz).

   rr/l,ss/m = Listing of any of the associated alarm types (01 through 10 and 31 through 40) per Table 3-59 and predefined number (0 through 3 or 0 through b) per Table 3-60 which selects alarm threshold. Monitoring of a parameter can be disabled by entering a "c" for the alarm threshold.

2. See the following example of the command in which new major alarm options are being selected for ERS and SLIPS.

   EXAMPLE: `ED-PRMTR-EQPT::NPC-012::01/1&03/2;`

3. Obtain or determine information needed for command. You can enter `RTRV-OPT-T1::NPC::[{mn|ALL}];` to see the actual option values that have been established in the data base for all the NPCs.

4. Enter command with required information.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. Check the output message to confirm that the information was entered correctly.

Table 3-59. Alarm Parameters

Type (rr,ss,tt)	Meaning
01	Type DE/TE/DS SLIPs, Major Alarm
02	Type DE/TE/DS SLIPs, Minor Alarm
03	Type DE/TE/DS BER, Major Alarm
04	Type DE/TE/DS BER, Minor Alarm
05	Type DE/TE/DS ERS
06	Type DE/TE/DS SERS
07	Type DE/TE/DS COFA, Major Alarm
08	Type DE/TE/DS COFA, Minor Alarm
31	Type PB/PC DM, 1 Hr.
32	Type PB/PC DM, 24 Hr.
33	Type PB/PC SERS, 15 Min.
34	Type PB/PC SERS, 24 Hr.
35	Type PB/PC ERS, 15 Min.
36	Type PB/PC ERS, 24 Hr.
37	Type PB/PC US, 15 Min.
38	Type PB/PC US, 24 Hr.
39	Type PB/PC SLIPS, 15 Min.
40	Type PB/PC SLIPS, 24 Hr.

Table 3-60. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

3.5.6.3 Change Subrate ECLOC

Overview: Error correction is provided by the MJU or SRM circuit pack. Error correction should be assigned to the circuit pack with the most free space (an office with mostly two-point circuits would normally set ECLOC to the MJU circuit pack).

1. Enter `ED-PRMTR-NE:[xy]::[ww]:ECLOC:{MJU|SRM};`

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If command is issued to a remote frame, the frame number **must** be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to a remote frame, the sequence number **must** be entered.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

NOTE:
If the DNY message first line ends with {INERR|SYNTAX}2LN MSG, enter the command again. The input command has an error in it. The second line of the DNY message contains two equal signs (= =). The information within the equal signs is not acceptable.

3.5.6.4 TS0 (Time Slot 0)

3.5.6.4.1 Query or Change TS0 Bit Monitoring

Overview: This procedure contains both the commands to display the spare bits in TS0 (time slot 0) which are monitored and to set/change the monitoring. Once initialized, the DACS II monitors the bits for a change of state and issues an information message when a change occurs. This monitoring does not interfere with the signal framing at which time the TS0 bits are used to send the framing word. The normal state (0 or 1) of the monitored bits must have been previously set by the `ED-PRMTR-EQPT::NPC-01-1-1::TS0M-11011111;` command. When a change of state occurs, the DACS II issues a REPT STATE ...TS0-R BITS information. If bits 3, 4 or 5, was assigned an alarm meaningswhen the NPC was grown, it will generate REPT STATE ...AR01 MISC PBA messages when the state changes. Those bits which were assigned when the NPC was grown cannot be selected for monitoring in this procedure.

1. What procedure do you want to perform?
   - If you want to see which bits are currently being monitored, continue with Step **2**.
   - If you want to change the TS0 monitoring, proceed to Step **4**.

2. Enter the command to retrieve the monitoring as follows:
   RTRV-STATE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:TS0M;

   Where:
   - xy = Optional, DACS II target ID.
   - ww = Command correlation tag.
   - <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   - <range> = Optional, last NPC of continuous range of NPCs. Extra ampersand (&) needed for hierarchical.

3. Read the bit monitoring of TS0 bits designated abcdefgh as follows: 0 for no monitoring and 1 for monitoring. This information appears under the TS0M caption line in the message. Table 3-61 identifies bits abcdefgh.

   ⇒ **NOTE:**
   The defaults are 00000000 (for all types except TRANSMIC 1G) and 00111111 (for TRANSMIC 1G).

4. To change the monitoring, enter the command as follows:
   ED-PRMTR-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:TS0M-abcdefgh;

   Where: abcdefgh = Represents 8 TS0 bits per Table 3-61. Make entry for each bit as follows: 0 for no monitoring, 1 for monitoring, and dash (-) for no change. A dash or the value assigned during the NPC growth procedure must be entered for bits 3, 4 and 5 if these bits were assigned alarm meanings.

   - If the command was denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

5. Check the OLD and NEW fields in the output message to verify that the information was entered correctly.

Table 3-61. TS0 Bit Meanings

Variable	Meaning
a and b	International Bit (Si) in Frame and Not Frame Words (Only frames 13 and 15 with CRC enabled)
c	Not Selectable - Remote Alarm Indication
defgh	National Bits (b4 through b8)

3.5.6.4.2 Change NPC TS0 Alarm Indicator

Overview: This procedure is used to set or change the normal state of the spare bits in time slot 0 (TS0) so that a change of state can be used as an alarm indication. Except for bit 3, these bits can be set to 0, 1, or P (pass-through). The bits which are designated pass-through can be cross-connected to the same bits in TS0 of another NPC. Of course, the set or cross-connected bits are preempted during the signal framing period to send the framing word. Similarly, bits 2 and 3 which already have alarm meanings cannot be passed through for cross-connection. This command can be entered while the NPC is in-service.

1. If the international bits (referred to as Si) must be set, these bits will only be affected in frames 13 and 15 if the NPC is provisioned for CRC error detection. If you need to check whether the CRC is enabled and to see the TS0 bit defaults, enter **RTRV-STATE-EQPT::NPC-<npc No.>:;** and interpret the line type options (see *Check Facility Status and Perform End-to-end Alarm Tests*).

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

2. Familiarize yourself with the command as follows:
   `ED-PRMTR-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:TS0-abcdefgh;`

   Where:

   <range> = Optional, last NPC of continuous range of NPCs. Extra ampersand (&) needed for hierarchical.

   TS0 Field = Variables a through h represent bits per Table 3-62. The values for the bits are: 0, 1, P, or dash (-). P is for passed-through (unchanged), and a dash is for not affected.

3. Enter the command to set the bits as follows. To set the state, enter the required state (0, 1, P) or a dash for the variable in the command. To maintain a bit altered, enter a dash (-) for the variable in the command.

   NOTE:
   The dash means that the bit will not be affected by this change. In other words, the existing setting or default will be maintained.

   NOTE:
   The defaults for the TS0 bit settings are: 11011111 (for all types except TRANSMIC 1G) and 11000000 (for TRANSMIC 1G).

   - If the command was denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Check the OLD and NEW fields in the output message to verify that the information was entered correctly.
5. If the state of the TS0 bits are to be monitored in order to produce DACS II information messages, refer to *Query or Change TS0 Bit Monitoring.*

Table 3-62. TS0 Spare Bits

Variable	Meaning
a and b	International Bit (Si) in Frame and Not Frame Words (Only frames 13 and 15 with CRC enabled)
c	Not Selectable - Remote Alarm Indication
defgh	National Bits (b4 through b8)

3.6 Facilities

3.6.1 Establish DS1 Facility (without *SLC* Carrier)

3.6.1.1 Check Far-End Installation, Make DSX-1 Connections, and Remove Loops

1. Verify that far-end terminal equipment has been equipped and tested and verify that digital line has been established and tested.
2. Verify that far-end voice terminal has been optioned for looped timing (from DACS II) or external timing from office clock.
3. Use office records to determine the DACS II and DSX-1 jack appearances to be cross-connected.
4. Insert dummy plugs (258 plugs or 800-series DSX cord plugs) in the **MON** jacks of the two sets of jacks to be cross-connected. This should light the **TL** lamps and help locate the position from behind the bay.
   - If the **TL** lamp for each jack set is lighted, proceed to Step **6**.
   - If the **TL** lamp is not lighted, continue with Step **5**.
5. With VOM, check for 48 "" across the **TL** lamp which is not lighted.
   - If 48 "" lamp.
   - If 48 "" fuse at top of DSX-bay and **TL** lamp per Figure 3-18.
6. Review the following guidelines on running cross-connections: Leave at least 8 inches of slack on short runs. Dress wires through fanout at bottom of panel. Run wires in horizontal or vertical troughs (top and bottom troughs for interbay) and remember the 85-foot limit.
7. Which type DSX-bay do you have?
   - If **BACK PANEL X-CONN FIELD**, continue with Step **8**.
   - If **FRONT PANEL (800-SERIES)**, proceed to Step **9**.

8. Make cross-connections between subject jack sets per Figure 3-19 using Y1-type wire (see Note). Proceed to Step **10.**

   ⇒ NOTE:
   Only one size DSX-panel is shown in Figure 3-19, but combinations with different size panels and different jack types are likely to occur. Fortunately, only the orientation of the pins will differ in these cases; the pin numbers will be the same.

9. Make wire-wrap connections between jack sets per Figure 3-20 using five conductors of the cross-connect wire.
10. Remove one of the dummy plugs.
    - If both **TL** lamps remain lighted, remove other dummy plug.

      Response: Both lights will go off.

    - If both **TL** lamps do not remain lighted, make corrections to wiring using Figures 3-18, 3-19, and 3-20 or reference drawings.

11. Record relay rack or other jack set identification on DSX-panel designation strip.
12. At DSX-1 bay, remove line feed signal and termination on line side jacks and remove looping cords from DACS II side jacks.
13. Verify that facility alarms clear on added NPCs after alarm time-out period (approximately 15 seconds).

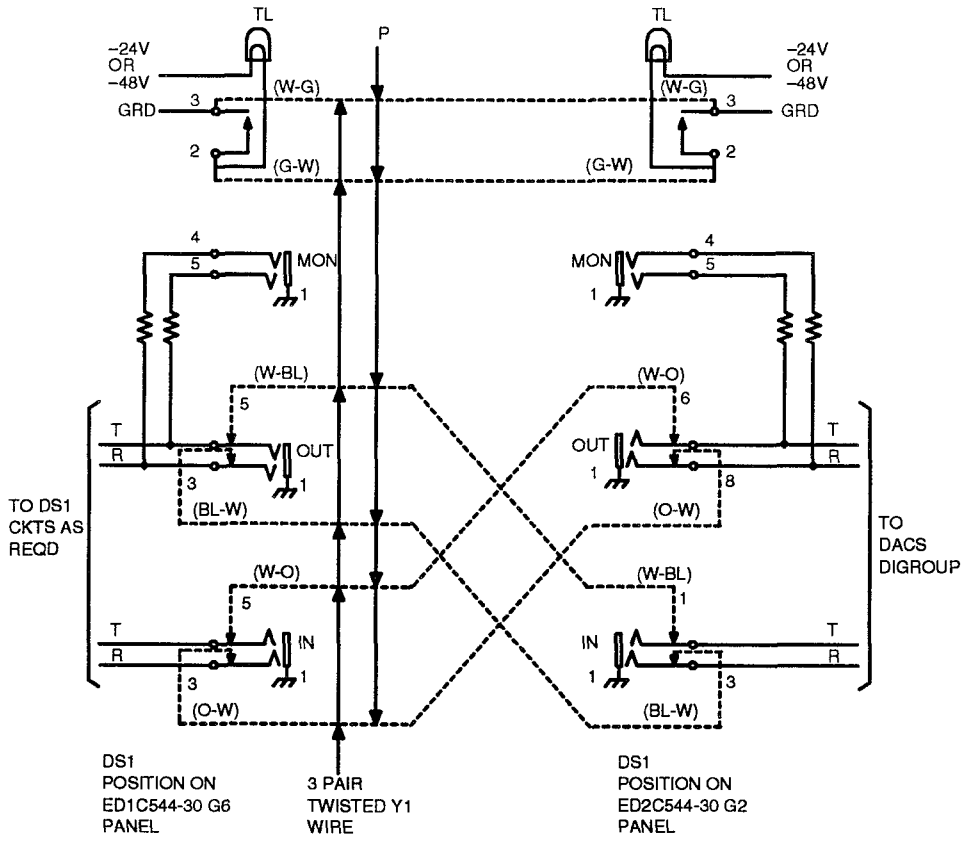


Figure 3-18. Cross-Connect Schematic

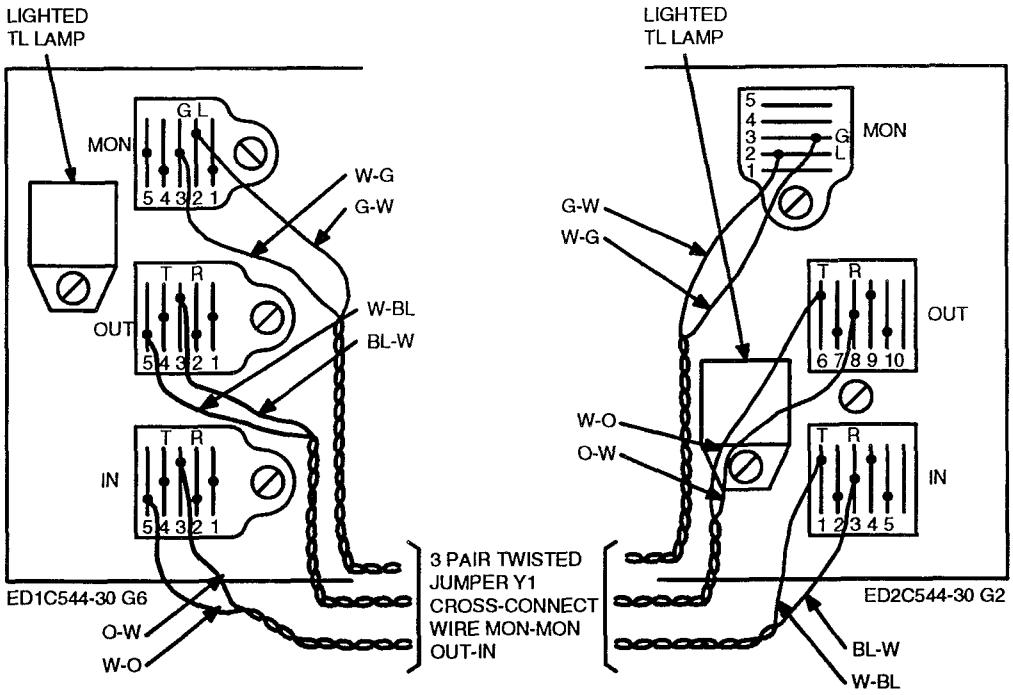


Figure 3-19. Rear View of 3-Inch Panel

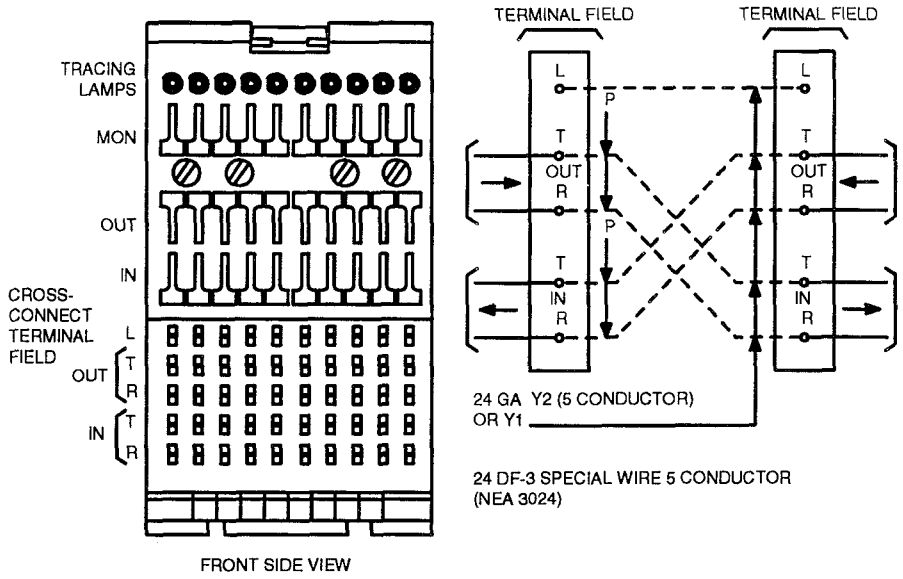


Figure 3-20. 800-Series DSX Details

3.6.1.2 Perform End-to-End Alarm Tests

Overview: In this test, the receive line signal is interrupted to cause a local alarm (CGA) at the DACS II and to send a remote alarm signal to the other end. The alarms clear after a time-out period when the alarm condition is removed. As a final test, the receive signal is interrupted at the other end to check the local and remote alarm responses in the other direction.

1. Contact the far-end office to arrange for the test.
2. At DSX-1 jacks, place a dummy plug (or loose cord end) into the **OUT** jack of digital line coming to the DACS II.
3. Press **ACO** button on DACS II status panel.
   - If the MJ (major) alarm is registered on status panel and by AR01, MISC ALM output message, proceed to Step **6.**
   - If neither alarm indication occurs, verify that the dummy plug is installed in the correct jack and that the alarm is not appearing on another facility due to a wiring error, proceed to Step **4.**

4. If neither indication occurred and there is no connection problem, install cord (loop) between IN and OUT jacks for the DACS II and wait for alarm to clear. Then enter **RMV-EQPT::NPC-<npc No.>::[:INCL];** replace NPC pack, enter **RST-EQPT::NPC-<npc No.>;** and remove looping cord.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)
   INCL = Optional, to remove NPC with special services (CUS or RDLD).

5. If status panel indication does not occur, check status panel lamp test. If lamp is good, enter **RMV-EQPT::MC;**, replace the MTC pack, and reset the DACS II at the status panel by holding **RESET ENABLE** to **ON** and momentarily pressing the **RESET** button.

6. If far end has a Y remote alarm indication, proceed to Step **8.**

   - If far end does not have a remote alarm indication, have far end check that alarm is not appearing on another facility. If it does occur elsewhere, have far end correct wiring error.

7. If no alarm occurs at far end, proceed as follows for type of far-end equipment. For voice terminal, have far end perform looped alarm test per documentation. For DACS II, have far end replace NPC per method in Step **4.**

8. Remove dummy plug installed at beginning of this test.

   Response: The alarms will clear after the time-out period of approximately 20 seconds.

9. Have far end place the terminal in a local alarm condition either by inserting a plug into the line jack or by disconnecting or failing the receive unit at the voice terminal.

10. If local alarm is obtained at far end and if Y remote alarm is received at near-end DACS II, continue with Step **11.**

    - Perform corrective action for the particular alarm not occurring as outlined for the first direction of testing in this procedure.

11. Have far end remove local alarm condition and verify that the alarms clear after the time-out period of approximately 20 seconds.

3.6.1.3 Check Facility Status and Perform End-to-End Tone Tests

1. Enter `RTRV-STATE-EQPT::NPC-<npc No.>[&&[&]-<range>];`

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)

   <range> = Optional for facility NPCs, to name last NPC of range. Three ampersand (&s) are required for hierarchical.

2. Which type NPC are you querying?

   - If **TYPE DE, IU, TE, or TI**, read the meaning of the NPC type options from Tables 3-63 and 3-64 (for DS3U) and continue with Step **3**.
   - If **TYPE MB, MJ, or SR**, proceed to Step **6**.

3. Notice the not-connected code IW. Typical values are: 7F (unassigned channel code, default), FF (all 1s), and 18 for Digital Data System.

4. Read the status and facility error counts from the fields of the output message using Table 3-65.

5. If any NPC type, IW, or alarm thresholds must be changed, refer to the appropriate procedure (*Change NPC Type, IW, or ALMOPT-AIS* or *Change Alarm Threshold*) to make changes. The procedure to check facility status has been completed.

6. Read the NPC types as follows: type MB100 is for the digital multipoint bridge, type MJ100 is for multipoint junction unit for subrate data, and type SR100 is for subrate multiplexer.

7. Look for "1s" under the out-of-service, failed, and pested headings; a zero means the condition does not exist and a 1 means it does exist. The conditions of the NPCs on both sides of the DSPU are given.

8. If channel tests are to be performed on facility channels, notify test personnel that the circuit can be tested.

Table 3-63. Type DE and IU NPC Options

Option	DE	IU
X	**Multiframe Format**	**Multiframe Format**
0	Unassigned	Unassigned
1	D4 Bank Format	IU D4 Bank Format
2	Extended Super Frame - Voice	IU ESF Format
3	Extended Super Frame - Data	Unassigned
4	DDS, T1DM Word 24	IU T1DM Format
5-8	Unassigned	Unassigned
9	No Framing, Clear-DS1	Unassigned
Y	**Zero Suppression**	**Zero Suppression**
0	Zero Code Suppression	Same as DE
1	No Zero Code Suppression	Same as DE
2	Bipolar with 8 Zero Substitution	Same as DE
3	ZBTSI with TG186 and ESF Format	Unassigned
4	DMI with ZCS	Unassigned
5	DMI with no ZCS	Unassigned
6	DMI with B8ZS	Unassigned
7-9	Unassigned	Unassigned
Z	**Channel Counting**	**Channel Counting**
0	D4 Bank/Sequential	Same as DE
1	D2 Bank	Same as DE
2	D1D Bank	Same as DE
3	Unassigned	Unassigned
4	Unassigned	Unassigned
5-8	Unassigned	Unassigned
9	No Channels, Clear-DS1	Unassigned

Table 3-64. Type TE and TI NPC Options

Option	Type TE	Type TI
X	**Multiframe Format**	**Multiframe Format**
0	Unassigned	Unassigned
1	D4 Bank	Interface Unit, D4-Bank
2	Extended Super Frame - Voice	Interface Unit, ESF
3	Extended Super Frame - Data	Unassigned
4	DDS T1DM Word 24	Interface Unit, T1DM
5-8	Unassigned	Unassigned
9	No Framing, Clear-DS1	Unassigned
Y	**Zero Suppression**	**Zero Suppression**
0	Zero Code Suppression	Same as TE
1	No Zero Code Suppression	Same as TE
2	Unassigned	Unassigned
3	Unassigned	Unassigned
4	DMI with ZCS	Unassigned
5	DMI with no ZCS	Unassigned
6	Unassigned	Unassigned
7-9	Unassigned	Unassigned
Z	**Channel Counting**	**Channel Counting**
0	D4 Bank/Sequential	Same as TE
1	D2 Bank	Same as TE
2	D1D Bank	Same as TE
3-8	Unassigned	Unassigned
9	No Channels, Clear-DS1	Unassigned

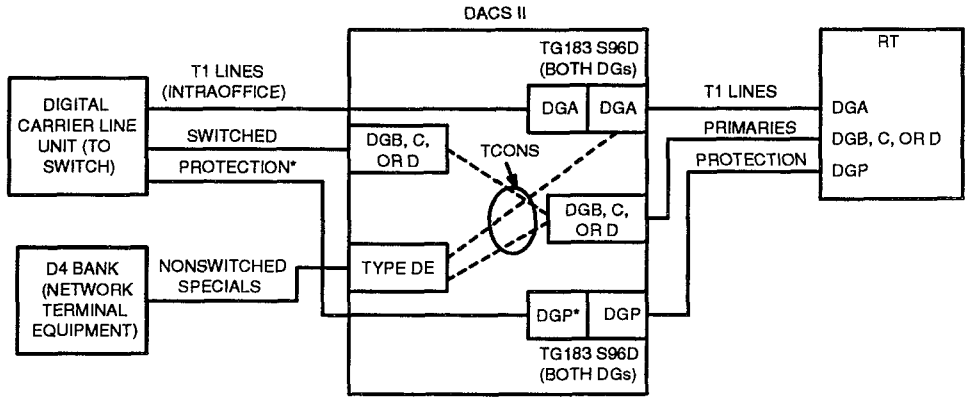
Table 3-65. NPC Status Keywords (Type TE, TI, DE, IU)

Keyword	Meaning	Output Information
OOS/FAIL/ PEST	Out-of-Service/ Failed/Pested	1 = NPC out-of-service/failed/pested
CGA	Carrier Group Alarm	R = red alarm, Y=yellow alarm, b=both red and yellow, A = AIS (blue signal), 1 = CGA, or 0 = no CGA
OOF	Out-of-Frame	Count = 0-65535
SLIP	Carrier Slips	Count = 0-65535, THRESHOLDS = major and minor alarm, OPTIONS = 0-3 for major and minor
BER	Bit Error Rate	Alarm status-MJ, MN, CL (no alarm), THRESHOLDS = major and minor (power of 10, -3 or -6), OPTIONS = 0-3 for major and minor alarms
ERS	Errored Seconds	Count = 0-65535, THRESHOLDS = 1-900 for 15-min and 1-65535 for 24-hr, OPTIONS = 0-3 for thresholds
SERS	Severely Errored Seconds	Count = 0-65535, THRESHOLDS = 1-900 for 15-min and 1-65535 for 24-hr, OPTIONS = 0-3 for thresholds
COFA	Change of Frame Alignment	Count = 0-65535, THRESHOLDS = major and minor alarms OPTIONS = 0-3 for major and minor thresholds
CRC	Cyclic Redundancy	Count = 0-65535
BPV	Bipolar Violation	Count = 0-65535
FRER	Frame Bit Error	Count = 0-65535
FS	Failed Seconds	Count = 0-65535
ESF	Extd Superframe	Count = 0-65535
LFVR	Line Format	Count = 0-65535

3.6.2 Establish *SLC* Carrier Systems

3.6.2.1 Establish *SLC* 96 Carrier System Mode I or *SLC* Series 5 Carrier System FPB (Feature Package B)

NOTE:
In this procedure, you will be equipping the NPC slots for the lines going to the RT, the DCLU, and the nonswitched voice terminal. If protection switching is provided, the NPCs for the protection line are also equipped. There is no protection line between the DCLU and DACS II. See Figure 3-21.



* PROTECTION LINE BETWEEN DACS II AND DCLU FOR RELEASES 3 AND 4 0 ONLY

Figure 3-21. Mode I Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown refer to *Install Plug-Ins and Grow IFTU/FTU NPC (with SLC Carrier.*
   - — For RT Line, specify Type DS and line format (ZCS option required).
   - — For DCLU Line, specify Type DS and line format required for DCLU.
   - — For voice terminal line (TG80, TG80B, TG183), specify Type DE and line format.

2. Verify that the RT has been loop tested and verify that the digital line has been established and tested.

   NOTE:
   If fault locate levels for single-ended testing from the office must be recorded, they can be obtained after the protection line is established in this procedure.

3. Use the specifications listed below to correlate the NPC(s) with the digroups at both the remote terminal and the DCLU. Enter
   ED-PRMTR-EQPT:[xy]:[DGA-aaa,DGB-bbb,DGC-ccc, DGD-ddd,DGP-ppp]:[ww]:{RT|DL}-ffff,g[g]:[{sss|NDL|RTF}];.
   - — If all the NPCs for the primary digroups of the RT or DCLU are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGD fields of the ED (add) command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.
   - — For *SLC* 96 carrier, determine whether the NDL option is needed to disable the data link in digroup A, and determine if a miscellaneous alarm must be specified instead of the default power minor alarm.
   - — The same ID number must be used for both RT and DCLU in *SLC* 96 Mode I and *SLC* Series 5 FPB.
   - — For *SLC* Series 5 carrier, different RT IDs must be used for two banks on the same RT shelf to avoid or prevent problems in RT data base. Do not assign both the "blue" and "white" banks with the same ID.

Where:

RT|DL = Selects either remote terminal (RT) or DCLU (DL) as the type of connecting equipment. The DCLU does not have a DGP.

ffff = RT or DCLU identifier.

g = Mode: 1 for *SLC* 96 Mode I and *SLC* Series 5 FPB.

aaa,bbb,ccc, and ddd = NPC numbers to be assigned to digroups A, B, C, and D.

ppp = NPC number to be assigned to protection facility if provided.

sss = For *SLC* 96 digroup A to specify power or miscellaneous alarm as follows: PMN (power-minor alarm, default if single RT is used at the site) or PMJ (power-major alarm) or MMJ or MMN for major or minor miscellaneous alarm.

NDL = Optional, for *SLC* 96 carrier to disable use of data link with digroup A.

RTF = Optional, for *SLC* Series 5 digroup A to assign retrofit status to the system which prevents the DACS II from overwriting (clearing) the RT channel provisioning. The RTF status must be changed after the channel provisioning is loaded into the DACS II to allow DACS II auditing.

4. Check output message to verify correct entry of information.
5. If you want to familiarize yourself with the query to list the NPC to RT association, enter
   RTRV-PRMTR-EQPT:[xy]:NPC-<npc No.>:[ww]:SCDG; for one of the NPCs.
6. At DSX-1 bay, make wiring cross-connections (*Make DSX-1 Connections*) between line jacks (to RT, DCLU, and D-bank) and NPC jacks. If used, looping cords (at DSX-1 and far end) should not be removed until Step **10**.

7. Enter `RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];` to restore NPC(s) for the lines to the RT and DCLU.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs. Extra ampersand (&) needed for hierarchical.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   If consecutive NPCs are used for the digroups, all of them can be restored in single range command. Otherwise, the NPCs for DGA can be restored in one command and those for DGP can be restored in one command.

8. Verify that the DCLU has been equipped and tested.
9. Enter CONN CRS1 commands to connect lines for digroups A through D through DACS II to the DCLU. Refer to *Cross-Connections and Disconnections.*
10. When the DCLU and RT are ready for end-to-end facility tests, assist as required by removing DSX-1 bay looping cords.
11. Do the following steps to test the protection switching:
    a. Enter `SW-TOPROTN-T1:[xy]:NPC-<npc No.>:[ww]::[:INCL]` to initiate the protection switch.

       Where: INCL = Needed to switch DGA.

       NOTE:
       There will be an SC ALM MN message indicating the switch has occurred.

       NOTE:
       If DGA is switched, the protection line will register timing slips because it derives timing from DGA. These slips must be cleared by entering `INIT-REG::NPC-<npc No.>::SLIP:;`.

b. Verify that CGA message is not received on line which has been switched onto protection. The RT will have an **ACU MN** and a **LINE ON PROT** indication on the subject LIU.

c. Enter `RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`

   Where: <npc No.> = The same NPC number.

d. Observe the following in the query output message:

   — Presence of SWMR (for manual switch) under the switched digroup; the other digroups will be in the NORM (normal state) or INHB (inhibited).

   — Presence of MNNE (minor alarm near end) for the ALST (alarm state) under the switched digroup.

e. If the listed protection switch indications were obtained, enter `SW-TOWKG-T1::NPC-<npc No.>::[:INCL];` to terminate the protection switch.

   - If the protection switch indications were not obtained, proceed to Step **11g**.

f. Enter `RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`. Observe that NORM (for switch normal) appears for PLSW (protection line switching) for the digroup. The procedure to test protection switching has been completed.

   ⇒ NOTE:
   There will also be an SC ALM IDLD message showing that the near-end minor alarm has cleared.

g. Notice whether there is an SC ALM MJ message for digroup A which would indicate that the *SLC* Carrier System data link is inoperative. The data link must have been enabled when the ED RT was entered.

h. At DACS II, enter commands to remove both NPCs on the dual digroup card, replace the card, and enter commands to restore the NPCs. If the trouble persists, have tester at RT replace the LIU (line interface unit) pack and other packs that would affect transmission.

12. If you want to check the status of any facility at DACS II, enter
`RTRV-STATE-EQPT::NPC-<npc No.>;`

    Where: <npc No.> = NPC for the facility.

13. If initial levels for single-ended fault locating must be recorded, one line can be put up on protection (SW PROTN command) and fault locate test set can be used at the DSX-1 in the DACS II office (*Operate SLC Carrier System Protection Switch or Line Loopback*).
14. Verify that D Bank or other voice terminal in the office (for nonswitched special circuits) has been installed and loop tested.
15. Verify that the NPC for the same voice terminal has been installed and grown.
16. Enter `RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];` to restore the NPC for the same voice terminal.
17. Remove line signal loops at the DSX-1 jacks. Facility alarms will clear after alarm time-out period of approximately 15 seconds.
18. If alarm test with office channel bank is required, perform end-to-end alarm test with voice terminal (see *Perform End-to-End Alarm Tests*).
19. If information is available for the connection of the special service channels through the DACS II, enter the CONN CRS commands for those channels (refer to *Cross-Connections and Disconnections*).
20. If channel tests are to be performed on facility channels, notify circuit test personnel that the circuit can be tested.
21. If timing SLIPs have not been cleared on the protection line, enter `INIT-REG:[xy]:NPC-<npc No.>;` for the protection digroup.
22. Update office records with facility information and notify circuit provisioning center of completion.

3.6.2.2 Establish *SLC* 96 Carrier System Mode III

Overview: In this procedure, you will be equipping the NPC slots for the lines going to the RT and the office terminal. If protection switching is provided, the NPCs for the protection line are also equipped. See Figure 3-22.

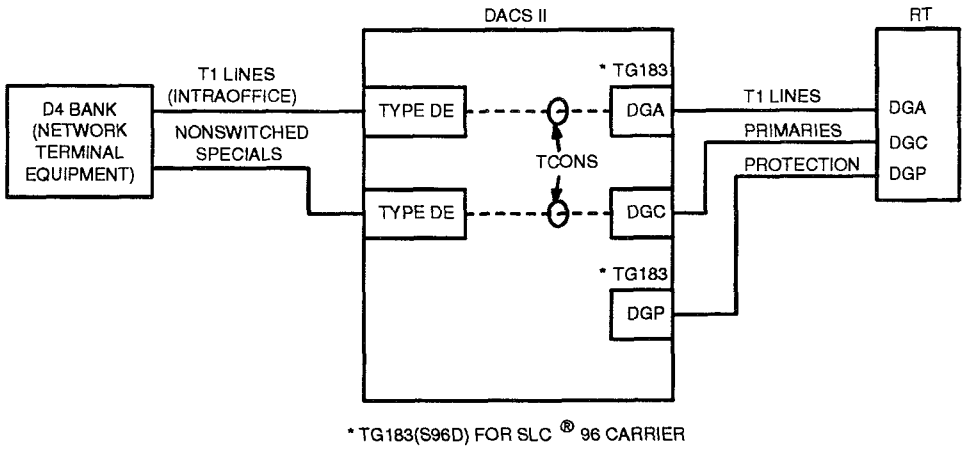


Figure 3-22. Mode III Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown, refer to *Install Plug-Ins and Grow IFTU/FTU NPC (with SLC Carrier).*
   - — For lines going to the RT, specify Type DS and line format (ZCS option required for *SLC* 96 carrier).
   - — For lines going to office equipment, specify Type DE and line format required for connecting equipment.

2. Verify that the RT has been loop tested and verify that the digital line has been established and tested.

   NOTE:
   If fault locate levels for single-ended testing must be recorded, they can be obtained after the protection line is established in this procedure.

3. Correlate the NPC(s) with the digroups at the remote terminal using the specifications listed below. Enter
   `ED-PRMTR-EQPT:[xy]:[DGA-aaa,DGC-ccc,DGP-ppp]:[ww]:RT-ffff,g[g]:[{sss|NDL}];`.

   — If all the NPCs for the primary digroups of the RT are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGC fields of the ED (add) command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.

   — Determine whether the NDL option is needed to disable the data link in digroup A, and determine if a miscellaneous alarm must be specified instead of the default power minor alarm.

   — *SLC* 96 Mode III only supports digroups A, C, and P.

   Where:

   RT = Remote terminal (RT)
   ffff = RT identifier
   g = 3 for *SLC* 96 Mode III
   aaa,ccc = NPC numbers to be assigned to digroups A, and C
   ppp = NPC number to be assigned to protection facility if provided
   sss = For *SLC* 96 digroup A to specify power or miscellaneous alarm as follows: PMN (power-minor alarm, default if single RT is used at the site) or PMJ (power-major alarm) or MMJ or MMN for major or minor miscellaneous alarm
   NDL = Optional, for *SLC* 96 carrier to disable use of data link with digroup A.

4. Check output message to verify correct entry of information.

5. If you want to familiarize yourself with the query to list the NPC to RT association, enter `RTRV-PRMTR-EQPT:[xy]:NPC-<npc No.>:[ww]:SCDG;` for one of the NPCs.

6. At DSX-1 bay, make wiring cross-connections (*Make DSX-1 Connections*) between line jacks (to RT and office D-bank) and NPC jacks. If used, looping cords (at DSX-1 and far end) should not be removed until Step **8**.

7. Enter `RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];` to restore NPC(s) for the lines to the RT.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)
   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs.
   Extra ampersand (&) needed for hierarchical.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   If lines are already connected through DSX-1, **remove digroups in sequence** (DGP, DGA, then others) to cause switching and to simulate service cutover.

8. For lines going to the RT, remove line signal loops (if provided) and verify alarm indications using the following steps.

   NOTE:
   The loops are removed systematically (DGP, DGA, then others) to control alarm indications and to cause switch to protection. This sequence would also be used for cutover of in-service facilities.

   a. Contact the far-end office to arrange for the test.

   b. If protection switching is provided for the facilities to the RT, have tester remove looping card (at RT) from **TST** jack of **PROT LIU** and watch for **MN** alarm on **ACU** and **FAIL** and **PROT** indications on LIU. At DSX-1 bay, remove line feed signal going toward the RT and remove the looping cord on the DACS II side.

      - If protection switching is not provided, proceed to Step **8d**.

      NOTE:
      Until digroup A is connected through, the DACS II will register SLIPs because the RT is trying to get timing from digroup A.

c. If ACU MN clears at RT after looping cord is removed, continue with Step **8d**.

   - If ACU MN does not clear at the RT after looping cord is removed, find and correct wiring problem between the equipment and cable pairs at either end. Check whether alarm conditions have changed on another facility to determine if cable pairs have been wired to wrong equipment. After trouble is cleared, repeat the test procedure.

d. At RT, have tester remove looping card from **LIU A TST** jack and monitor alarm indications.

e. At DSX-1 bay, remove signal looping cord from the facility going to RT digroup A. Also remove any line feed signal and termination applied on the line-side jacks.

   Response: The DACS II may show a CGA ...Y CLF message on the facility because of the signal interruption.

f. If the following indications occur at the RT and then clear (after approximately 20 seconds), proceed to Step **9**.

   — With protection: **MN** at ACU; **RCV LINE FAIL** and **LINE ON PROT** at LIU A

   — Without protection: **MJ, A, FE** at ACU; **RCV** at TRU A; and **RCV LINE FAIL** at LIU A

   - If the indications do not occur at the RT, continue with Step **8g**.

g. If the protection switch did not operate but alarms occurred as with no switching, verify that the ED RT command was entered with data link enabled and that switching is not inhibited at the RT. Continue with procedure to check cabling for each digroup; the protection switching will be tested in Step **10**.

h. If the alarms do not occur or occur on the wrong facility, find and correct wiring problem between the equipment and cable pairs at either end. After trouble is cleared, repeat from Step **8a**.

i. Repeat Step **8** for digroup C.

j. Enter `INIT-REG:[xy]:NPC-<npc No.>:[ww]:SLIP;` for protection line to clear timing slips.

9. If alarm test with office channel bank is required, perform end-to-end alarm test (see *Perform End-to-End Alarm Tests*).

10. Test the protection switching using the following steps:

    a. Enter `SW-TOPROTN-T1:[xy]:NPC-<npc No.>:[ww]::[:INCL]` to initiate the protection switch.

       Where: INCL = Needed to switch DGA.

       NOTE:
       There will be an SC ALM MN message indicating the switch has occurred.

       NOTE:
       If DGA is switched, the protection line will register timing slips because it derives timing from DGA. These slips must be cleared by entering `INIT-REG::NPC-<npc No.>::SLIP:;`.

    b. Verify that CGA message is not received on line which has been switched onto protection. The RT will have an **ACU MN** and a **LINE ON PROT** indication on the subject LIU.

    c. Enter `RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`

       Where: <npc No.> = The same NPC number.

    d. Observe the following in the query output message:

       — Presence of SWMR (for manual switch) under the switched digroup; the other digroups will be in the NORM (normal state) or INHB (inhibited)

       — Presence of MNNE (minor alarm near end) for the ALST (alarm state) under the switched digroup

    e. If the listed protection switch indications were obtained, enter `SW-TOWKG-T1::NPC-<npc No.>::[:INCL];` to terminate the protection switch.

       - If the protection switch indications were not obtained, proceed to Step **10g**.

    f. Enter `RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`. Observe that NORM (for switch normal) appears for PLSW (protection line switching) for the digroup. Proceed to Step **11**.

       NOTE:
       There will also be an SC ALM IDLD message showing that the near-end minor alarm has cleared.

g. Notice whether there is an SC ALM MJ message for digroup A which would indicate that the *SLC* Carrier System data link is inoperative. The data link must have been enabled when the ED RT was entered.

h. At DACS II, enter commands to remove both NPCs on the dual digroup card, replace the card, and enter commands to restore the NPCs. If the trouble persists, have tester at RT replace the LIU pack and other packs that would affect transmission.

11. Test the power/miscellaneous alarm sent from the RT using the following steps.

a. Arrange to have tester at RT send alarms.

NOTE:
If there is only one RT at the remote site, the power MN (PMN) or power MJ (PMJ) alarm will be sent in the miscellaneous alarm field of the data link. If there are two RTs at the site, the power alarm is sent for the first RT and a miscellaneous alarm (for example, door open) can be sent for the second RT. For RT huts with several RTs, the miscellaneous alarms can signal hazards (fire, water, gas), but only the power and door-open conditions are checked here.

b. Have tester turn off the AC power supply. This will not interrupt service because of the backup battery supply.

CAUTION:
DO NOT turn off the AC power supply unless backup battery supply is known to be functioning or service will be interrupted.

- If SC ALM PMN/PMJ message is received at the DACS II, have tester at RT turn on AC power.
- If the PMN alarm is not received, the power sensing circuit at the RT is suspect since the data link of DGA has already been used for protection switching tests. However, if there is an MJ alarm on DGA or if protection switching has not been tested, either the NPC at DACS II or the DGA pack(s) at the RT can be causing trouble.

c. If there are two RTs at the remote site, continue with Step **11d.**

- If there are not two RTs at the remote site, proceed to Step **12.**

d. Have tester activate door alarm switch that is normally disabled when the RT site is entered.

   - If SC ALM MMN or MMJ message is received from second RT, proceed to Step **11**.
   - If the MMN or MMJ alarm is not received, enter `RTRV-PRMTR-EQPT::[NPC-<npc No.>]::SCDG:;` for the system.

e. Look for MMN or MMJ in the field that follows the mode (MD) field.

   - If PMN appears, enter `ED-PRMTR-EQPT:[xy]::[ww]:RT-ffff:sss;` to the change the alarm definition.
   - If PMN does not appear and the miscellaneous alarm was defined, the RT door-open circuit is suspect.

     Where:
     ffff = Bank identification number of connecting RT for which the alarm meaning is to be changed.
     sss = Required new meaning given by one of the following:
     PMN for power minor alarm (default and required for one RT at site),
     PMJ for power major alarm,
     MMJ for miscellaneous major alarm, or
     MMN for miscellaneous minor alarm.

NOTE:
The power or miscellaneous alarm is carried over the data link on DGA; so, the NDL (no data link) must not have been used when the ED (add) DGA command was entered. The miscellaneous alarm indicates flooding, fire, or gas at the RT site. This alarm can be used for the second RT bank at the site; the power alarm is used for the first RT bank.

f. Deactivate the door alarms.

12. If you want to check the status of any facility at DACS II, enter **RTRV-STATE-EQPT::NPC-<npc No.>;**

    Where: <npc No.> = NPC for the facility.

13. If initial levels for single-ended fault locating must be recorded, one line can be put up on protection (SW PROTN command), the far end looped back, and then the fault-locate test set used at the DSX-1 bay (see *Operate SLC Carrier System Protection Switch or Line Loopback*).
14. Verify that D Bank or other voice terminal in the office (for nonswitched special circuits) has been installed and loop tested.
15. Verify that the NPC for the same voice terminal has been installed and grown.
16. Enter **RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];** to restore the NPC for the same voice terminal.
17. Remove line signal loops at the DSX-1 jacks. Facility alarms will clear after alarm time-out period of approximately 15 seconds.
18. If alarm test with office channel bank is required, perform end-to-end alarm test with voice terminal (see *Perform End-to-End Alarm Tests*).
19. If information is available, enter CONN CRS1 commands to connect channels through DACS II. Refer to *Cross-Connections and Disconnections*

    NOTE:
    If information for circuits is not available, all 24 digroup channels can be connected through to enable preliminary channel tests.

20. If channel tests are to be performed on facility channels, notify circuit test personnel that the circuit can be tested.
21. If timing SLIPs have not been cleared on the protection line, enter **INIT-REG:[xy]:NPC-<npc No.>;** for the protection digroup.
22. Update office records with facility information and notify circuit provisioning center of completion.

3.6.2.3 Establish New *SLC* Series 5 Carrier System Feature Package C (FPC)

Overview: In this procedure, you will be equipping the NPC slots for the lines going to the RT and the nonswitched voice terminal. If protection switching is provided, the NPCs for the protection line are also equipped. See Figure 3-23.

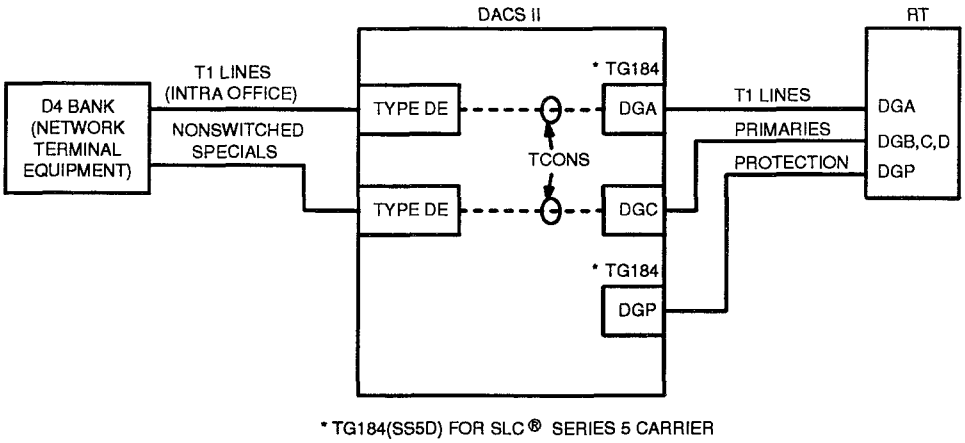


Figure 3-23. Mode C Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown, refer to *Install Plug-Ins and Grow IFTU/FTU NPC (with SLC Carrier).*
   - — For RT Line, specify TYPE DS and line format.
   - — For line going to office equipment, specify TYPE DE and line format required for connecting equipment.

2. Verify that the RT has been loop tested, that the looping cards are installed, and verify that the digital line has been established and tested.

   NOTE:
   If fault locate levels for single-ended testing must be recorded, they can be obtained after the protection line is established in this procedure.

3. If establishing new facility, use the specifications listed below to correlate the NPC(s) with the digroups at the remote terminal.
   Enter `ED-PRMTR-EQPT:[xy]:[DGA-aaa,DGB-bbb, DGC-ccc,DGD-ddd,DGP-ppp]:[ww]:RT-ffff,g[g];`.

   — If all the NPCs for the primary digroups of the RT are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGD fields of the ED (add) command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.

   — Digroup pairs (A and B) and (C and D) must be added together in the same command(s) because they are associated in the RT controller. If the restoral of the mate to a pair is delayed, a COMP MN alarm will occur.

   — Different RT IDs must be used for two banks on the same RT shelf to avoid problems in RT data base. Do not assign both the "blue" and "white" banks with the same ID.

   Where:
   FT-ffff = Remote terminal (RT) identifier.
   g = Mode: C for Series 5 FPC.
   aaa-ddd = NPC numbers to be assigned to digroups A, B, C, and D.
   ppp = NPC number to be assigned to protection facility if provided.

4. Check output message to verify correct entry of information.

5. If you want to familiarize yourself with the query to list the NPC to RT association, enter
   `RTRV-PRMTR-EQPT:[xy]:NPC-<npc No.>:[ww]:SCDG;` for one of the NPCs.

6. At DSX-1 bay, make wiring cross-connections (see *Make DSX-1 Connections*) between line jacks (to RT and office voice terminal) and NPC jacks. If used, looping cords (at DACS II and far end) should not be removed until Step **8**.

7. Enter `RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];` to restore NPC(s) for the lines to the RT.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs. Extra ampersand needed for hierarchical.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   If lines are already connected through DSX-1, restore digroups in sequence (DGP, DGA, then others) to cause switching and to simulate service cutover.

   NOTE:
   Digroup pairs (A and B) and (C and D) must be restored one after another to prevent COMP MN RT alarm.

8. For lines going to the RT, remove line signal looping cards (if provided) and verify alarm indications.

   NOTE:
   The loops are removed sequentially (DGP, DGA, then others) to control alarm indications and to cause switch to protection. This sequence would also be used for cutover of in-service facilities.

9. If alarm test with office channel bank is required, perform end-to-end alarm test (see *Perform End-to-End Alarm Tests*).

10. Do the following steps to test the protection switching:

    a. Enter `SW-TOPROTN-T1:[xy]:NPC-<npc No.>:[ww]::[:INCL]` to initiate the protection switch.

       Where: INCL = Needed to switch DGA.

       NOTE:
       There will be an SC ALM MN message indicating the switch has occurred.

       NOTE:
       If DGA is switched, the protection line will register timing slips because it derives timing from DGA. These slips must be cleared by entering `INIT-REG::NPC-<npc No.>::SLIP:;`.

    b. Verify that CGA message is not received on line which has been switched onto protection. The RT will have an **ACU MN** and a **LINE ON PROT** indication on the subject LIU.

    c. Enter `RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`

       Where: <npc No.> = The same NPC number.

    d. Observe the following in the query output message:

       — Presence of SWMR (for manual switch) under the switched digroup; the other digroups will be in the NORM (normal state) or INHB (inhibited).

       — Presence of MNNE (minor alarm near end) for the ALST (alarm state) under the switched digroup.

    e. If the listed protection switch indications were obtained, enter `SW-TOWKG-T1::NPC-<npc No.>::[:INCL];` to terminate the protection switch.

       - If the protection switch indications were not obtained, proceed to Step **10g**.

    f. Enter `RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`. Observe that NORM (for switch normal) appears for PLSW (protection line switching) for the digroup. Proceed to Step **11**.

       NOTE:
       There will also be an SC ALM IDLD message showing that the near-end minor alarm has cleared.

g. Notice whether there is an SC ALM MJ message for digroup A which would indicate that the *SLC* carrier data link is inoperative. The data link must have been enabled when the ED RT was entered (see Step **3**).

h. At DACS II, enter commands to remove both NPCs on the dual digroup card, replace the card, and enter commands to restore the NPCs. If the trouble persists, have tester at RT replace the LIU pack and other packs that would affect transmission.

11. Test power/miscellaneous alarm sent from the RT using the following steps:

a. Arrange to have tester at RT send alarms.

b. Have tester turn off the AC power supply. This will not interrupt service because of the backup battery supply.

CAUTION:
DO NOT turn off the AC power supply unless the backup battery supply is known to be functioning or service will be interrupted.

NOTE:
There will be a 4-minute delay after the AC power supply is turned off before the SC ALM PMN message is received.

- If SC ALM PMN message is received at the DACS II, have tester at RT turn on the AC power.

  NOTE:
  Wait 4 minutes after turning on the AC power before proceeding to Step **11c**.

- If SC ALM PMN is not received, proceed to Step **11e**.

c. If there are two RTs at the remote site, have the tester activate MISC switch 1.

- If there are not two RTs at the remote site, proceed to Step **12**.

d. If MISC 1 or MISC 2 message is received from the second RT, then proceed to Step **12**.

   - If MISC 1 or MISC 2 message is not received, continue with Step **11e**.

e. If the PMN alarm was not received, the power sensing circuit at the RT is suspect since the data link of DGA has already been used for protection switching test. However, if there is an MJ alarm on DGA or if protection switching has not been tested, either the NPC at DACS II or the DGA pack(s) at the RT can be causing trouble.

f. Deactivate the MISC 1 or MISC 2 alarm.

12. If you want to check the status of any facility at DACS II, enter **RTRV-STATE-EQPT::NPC-<npc No.>;**

    Where: <npc No.> = NPC for the facility.

13. If initial levels for single-ended fault locating must be recorded, one line can be put up on protection (SW PROTN command), the far end looped back, and then the fault locate test set used at the DSX-1 bay (see *Operate SLC Carrier system Protection Switch or Line Loopback*).

14. Verify that D Bank or other voice terminal in the office has been installed and loop tested.

15. Verify that the NPC for the same voice terminal has been installed and grown.

16. Enter **RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];** to restore the NPC for the same voice terminal.

17. Remove line signal loops at the DSX-1 jacks. Facility alarms will clear after alarm timeout period of approximately 15 seconds.

18. If alarm test with office channel bank is required, perform end-to-end alarm test with voice terminal (see *Perform End-to-End Alarm Tests*).

19. If information is available for the connection of the channels through the DACS II, enter the CONN CRS commands for those channels (refer to *Cross-Connections and Disconnections*).

    NOTE:
    If information for circuits is not available, all 24 digroup channels can be connected through to enable preliminary channel tests.

20. If channel tests are to be performed on facility channels, notify circuit test personnel that the circuit can be tested.

21. If an administrative link has not been conditioned for modified Snider protocol to use the CIU (craft interface unit) at the DACS II, enter **ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-M[,ALM-k][:INIT];**

    Where:
    - j = Physical link number (1 through 6)
    - M = Modified Snider
    - k = Alarm class; k = 2 for major alarm for hardware failure, or k = 1 for minor alarm (default)
    - INIT = Optional, to initialize all parameters to default values except for those parameters entered in command.

    NOTE:
    If denial COND 04 is received, it means that the link is out-of-service and must be restored (**RST-EQPT::LINK-j;**) before the ED command can be done.

22. Enter **RMV-EQPT::LINK-j;** to remove the link from service.

23. Connect the CIU to the same administrative link and apply CIU power. Refer to the CIU User's Guide (select Code 500-206) for CIU operating instructions.

24. Enter **RST-EQPT::LINK-j;** to restore the link to service.

25. Enter LOAD or COPY commands at the CIU for the RT channel unit provisioning information to be loaded or copied into the DACS II data base.

    NOTE:
    Be sure to include all the provisioning from the office records because whatever is omitted will be deleted from the RT data base when the DACS II assumes control of end-to-end auditing.

26. If timing SLIPs have not been cleared on the protection line, enter **INIT-REG:[xy]:NPC-<npc No.>;** for the protection digroup.

27. Update office records with facility information and notify circuit provisioning center of completion.

3.6.2.4 Establish Retrofit *SLC* Series 5 Carrier System Feature Package C (FPC)

NOTE:
In this procedure, you will be equipping the NPC slots for the lines going to the RT and to the office terminal. If protection switching is provided, the NPC for the protection line to the RT is also equipped. See Figure 3-24.

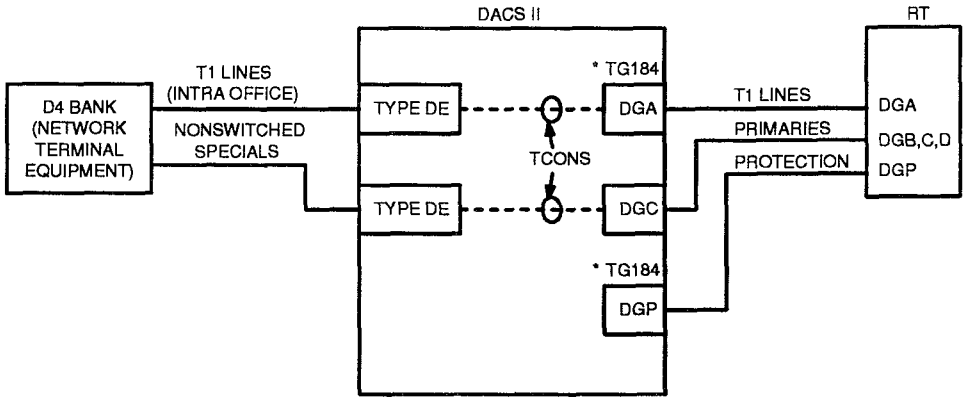


Figure 3-24. Mode C Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown refer to *Install Plug-Ins and Grow IFTU/FTU NPC (with SLC Carrier)*.
   - — For lines going to the RT, specify Type DS and line format.
   - — For lines going to office equipment, specify Type DE and line format required for connecting equipment.

2. Enter the ED (add) command, using the specifications listed below, to correlate the NPC(s) with the digroups at the far-end remote terminal. `ED-PRMTR-EQPT:[xy]:[DGA-aaa,DGB-bbb, DGC-ccc,DGD-ddd,DGP-ppp]:[ww]:RT-ffff,g[g]:RTF;`

   — If all the NPCs for the primary digroups of the RT are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGD fields of the ED (add) command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.

   — Digroup pairs (A and B) and (C and D) must be added together in the same commands(s) because they are associated in the RT controller. If the restoral of the mate to a pair is delayed, a COMP MN alarm will occur.

   — Different RT IDs must be used for two banks on the same RT shelf to avoid problems in RT data base. Do not assign both the "blue" and "white" banks with the same ID.

   Where:

   RT = Selects the remote terminal as the type of connecting equipment
   ffff = RT identifier
   g = C for *SLC* Series 5 FPC.
   aaa-ddd = NPC numbers to be assigned to digroups A, B, C, and D
   ppp = NPC number to be assigned to protection facility if provided
   RTF = For *SLC* Series 5 carrier digroup A to assign retrofit status to the system which prevents the DACS II from overwriting (clearing) the RT channel provisioning. The RTF status must be changed after the channel provisioning is loaded into the DACS II to allow DACS II auditing.

3. Check output message to verify correct entry of information.

4. If you want to familiarize yourself with the query to list the NPC to RT association, enter
   `RTRV-PRMTR-EQPT:[xy]:NPC-<npc No.>:[ww]:SCDG;`
   for one of the NPCs.

5. Enter `RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];` to restore NPC(s) for the lines to the RT.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   Digroup pairs (A and B and C and D) must be restored one after another to prevent COMP MN RT alarm.

   CAUTION:
   A service interruption can occur if the correct DSX-1 jack is not used. Be sure the correct DSX-1 is being used before doing Steps **6** through **9**.

6. In preparation for cutover, enter commands to cross-connect lines from Series 5 RTs to office equipment. Refer to *Cross-Connections and Disconnections*.
7. At DSX-1, patch incoming signals from RTs and office equipment to DACS II NPC jacks. Connect to incoming signal at MON jacks so as not to interrupt service.
8. At DSX-1 bay, perform patching for service cutover using sequence that prevents loss of service.
9. At DSX-1, make wiring cross-connections to connect the RT and office equipment lines to the DACS II and then remove the patches using the method that prevents interrupting service.
10. If an administrative link has not been conditioned for modified Snider protocol to use the CIU at the DACS II, enter
    `ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-M[,ALM-k][:INIT];`

    Where:
    - j = Physical link number (1 through 6)
    - M = Modified Snider
    - k = Alarm class; k = 2 for major alarm for hardware failure, or k = 1 for minor alarm (default)
    - INIT = Optional, to initialize all parameters to default values except for those parameters entered in command.

    NOTE:
    If denial COND 04 is received, it means that the link is out-of-service and must be restored (`RST-EQPT::LINK-j;`) before the ED command can be done.

11. Enter `RMV-EQPT::LINK-j;` to remove the link from service.
12. Connect the CIU to the same administrative link and apply CIU power. Refer to the CIU User's Guide (select Code 500-206) for CIU operating instructions.
13. Enter `RST-EQPT::LINK-j;` to restore the link to service.
14. Enter LOAD or COPY commands at the CIU for the RT channel unit provisioning information into the DACS II data base.

    NOTE:
    Be sure to include all the provisioning from the office records because whatever is omitted will be deleted from the RT data base when the DACS II assumes control of end-to-end auditing.

15. Enter `ED-PRMTR-EQPT:[xy]::[ww]:RT-ffff:RTF;` to remove the retrofit designation from the system and to initiate DACS II control and auditing.

    Where: RTF = Changes the status of the RT bank from retrofit to nonretrofit.

16. Check the output message to verify that correct information was entered. If power/miscellaneous option was changed, notice that DGA appears in the output because the alarm is conveyed over the data link on DGA.
17. If timing SLIPS have not been cleared on the protection line, enter `INIT-REG:[xy]:NPC-<npc No.>;` for the protection digroup.
18. Update office records with facility information and notify circuit provisioning center of completion.

3.6.2.5 Make DSX-1 Connections

1. Use office records to determine the DACS II and DSX-1 jack appearances to be cross-connected.
2. Insert dummy plugs (258 plugs or 800-series DSX cord plugs) in the **MON** jacks of the two sets of jacks to be cross-connected. This should light the **TL** lamps and help locate the position from behind the bay.
   - If the **TL** lamp for each jack set is lighted, proceed to Step **4.**
   - If the **TL** lamp for each jack set is not lighted, continue with Step **3.**
3. With VOM check for 48 volts across the **TL** lamp which is not lighted.
   - If 48 volts is present, replace the **TL** lamp.
   - If 48 volts is not present, clear trouble in wiring between fuse at top of DSX-bay and **TL** lamp per Figure 3-25.
4. Review the following guidelines on running cross-connections. Leave at least 8 inches of slack on short runs. Dress wires through fanout at bottom of panel. Run wires in horizontal or vertical troughs (top and bottom troughs for interbay) and remember the 85-foot limit.
5. Which type DSX-bay do you have?
   - If **BACK PANEL X-CONN FIELD**, continue with Step **6.**
   - If **FRONT PANEL (800-SERIES)**, proceed to Step **7.**
6. Make cross-connections between subject jack sets per Figure 3-26 using Y1-type wire. See note. Proceed to Step **8.**

   NOTE:
   Only one size DSX-panel is shown in Figure 3-26, but combinations with different size panels and different jack types are likely to occur. Fortunately, only the orientation of the pins will differ in these cases; the pin numbers will be the same.
7. Make wire-wrap connections between jack sets per Figure 3-27 using five conductors of the cross-connect wire.

8. Remove one of the dummy plugs.
   - If both **TL** lamps have remained lighted, remove other dummy plug.

     Response: Both lights will go off.
   - If both lamps have not remained lighted, make corrections to wiring using Figures 3-25, 3-26, and 3-27 or reference drawings.
9. Record relay rack or other jack set identification on DSX-panel designation strip.

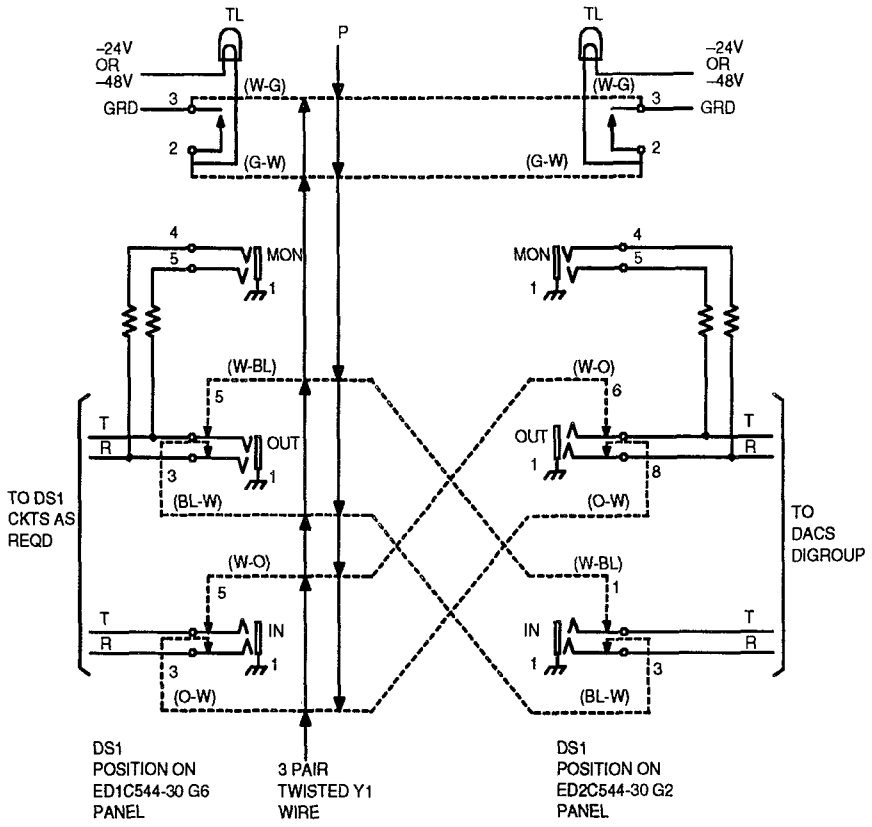


Figure 3-25. Cross-Connect Schematic

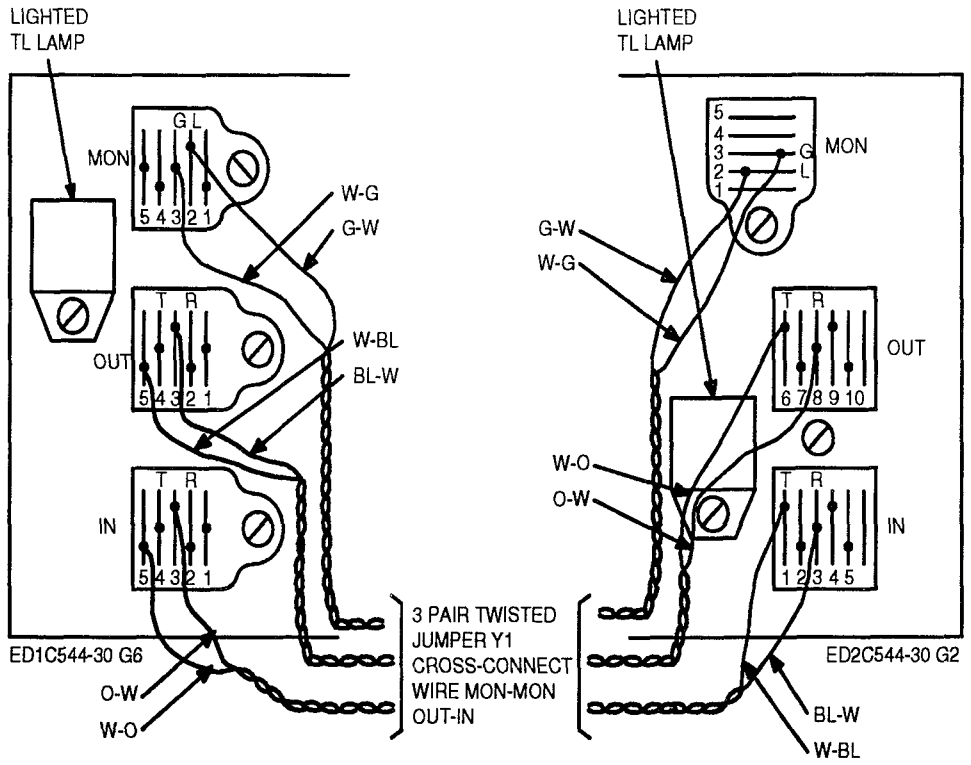


Figure 3-26. Rear View of 3-Inch Panel

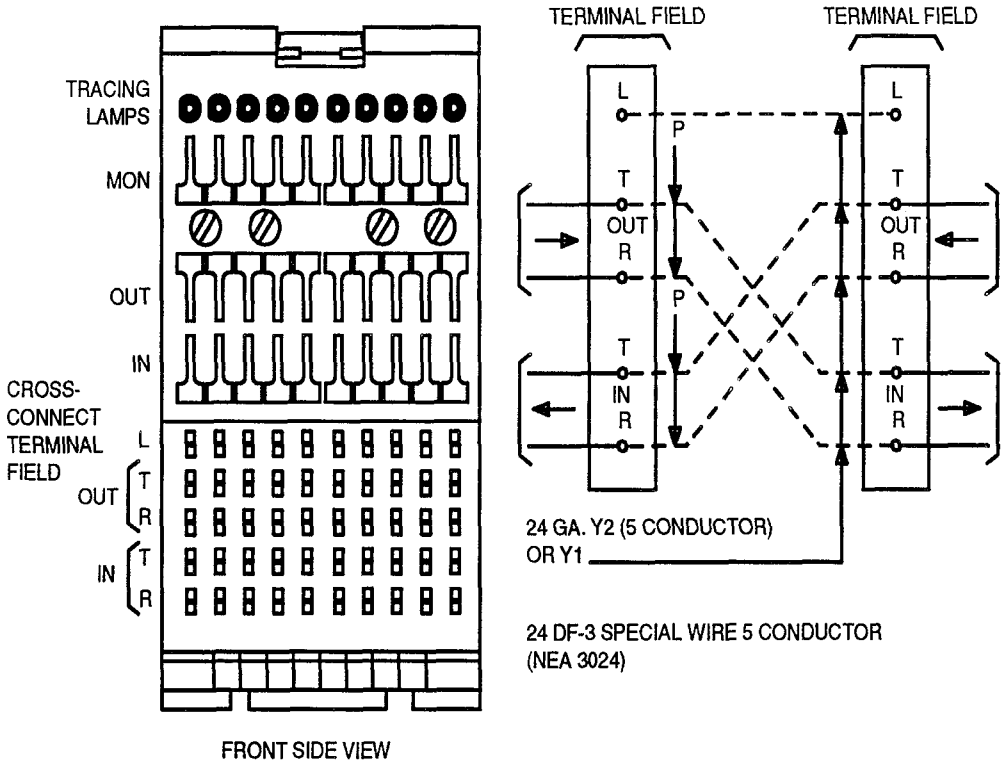


Figure 3-27. 800-Series DSX Details

3.6.2.6 Reinitialize the CIU for Use (*SLC* Series 5 Carrier)

Overview: This procedure is used to reconnect the CIU if the test set was disconnected during use or was disconnected by DACS II, because the DACS II main controller was reset. Either of these situations causes the CIU to perform self diagnostics, and, if the diagnostics fail, the CIU must be reinitialized before it can be used again. Refer to the CIU User's Guide (Select Code 500-206) for CIU operating instructions.

1. Turn off the CIU power switch.
2. At DACS II, enter command to remove the administrative link for the CIU from service as follows: `RMV-EQPT::LINK-j;`.
3. If CIU is not connected to link, connect it and turn on CIU power.
4. At DACS II, enter command to restore CIU link to service as follows: `RST-EQPT::LINK-j;`.
   - If the diagnostics on the CIU passed, the procedure to load/copy the CIU for *SLC* carrier has been completed.
   - If the diagnostic fails, repeat the procedure.
   - If the diagnostic fails a second time, enter the command to query the link to verify that the link protocol for the CIU is M as follows: `RTRV-PRMTR-LINK:[xy]:j[mm]:[ww];`. If protocol is correct, contact technical consultant to clear trouble.

3.6.3 Change *SLC* Carrier System

3.6.3.1 Add Protection Switching (Existing System)

Overview: In this procedure, you will be equipping the DACS II for a protection line going to the RT to the office switching equipment (for *SLC* 96 carrier Mode I or *SLC* Series 5 carrier). The NPC card for this protection line is always installed in the same DACS II facility unit (FTU) as the cards for the primary lines.

1. Enter `CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]::DSxyz:[rr/s&rr/s...tt/s]:[IW-X-pq]!` to grow the NPC for protection line as type DS with line format specification and any alarm threshold options.

   Where:

   xy = Unique ID (target ID); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.> = NPC number, either extended (for example, 0001) or hierarchical (for example, 01-1-01).
   <range> = Last NPC in a continuous range. Extra ampersand needed for hierarchical.
   xyz = DS1 line format and channel counting options per Table 3-66.
   rr/l,tt/n = Optional to select any one or all alarm types (01 through 10) per Table 3-67 and previously defined options (1, 2, or 3). Shelf alarms are not selectable for *SLC* Series 5 carrier.
   IW-X-pq = Optional to specify HEX code for IW pattern either pq = FF for all 1s pattern, or pq = 7F for unassigned channel code (default value).

2. Install the plug-in(s) for the NPC slot(s) assigned to the protection line as follows: use TG183 S96D card for *SLC* 96 carrier and Series 5 FPB, and use TG184 SS5D card for *SLC* Series 5 carrier FPC.

   NOTE:
   For Mode I, the NPCs going to DGA at the RT and DCLU must be on the same dual card. There is no protection line between the DCLU and DACS II.

3. Verify that the digital line has been established and tested. Verify that patching cords are placed at the DSX-1 bay to loop back signal to the DACS II NPC.

Table 3-66. Format and Channel Options

Option	Meaning
X	**Multiframe Format**
0	Unassigned
1	D4 bank
2	ESF (extended superframe) - voice
3	Unassigned
4	Unassigned
5	Unassigned
6	*SLC*® 96 carrier Fs format
7	*SLC* Series 5 ESF with data link
8,9	Unassigned
Y	**Zero Code Suppression**
0	ZCS (zero code suppression
1	NZCS (no zero code suppression)
2	B8ZS (bipolar with 8 zero substitution)
3-9	Unassigned
Z	**Channel Counting Sequence**
0	*SLC* 96 carrier Mode III, D4 bank sequence
1	*SLC* 96 carrier Mode III, D1D bank sequence
2	*SLC* 96 carrier Mode I, D1D bank sequence
3	*SLC* Series 5 carrier, D4 bank sequence
4-9	Unassigned

Table 3-67. Alarm Options

Option (rr)	Parameter	Range	Default
01	SLIP major	000* to 255	255
02	SLIP minor	000* to 255	4
03	Bit error rate major	10^{-6} to 10^{-4}	10^{-4}
04	Bit error rate minor	10^{-6} to 10^{-4}	10^{-4}
05	Errored seconds	00001 to 65535	864
06	Severe errored seconds	001 to 255	225
07	Change of frame alignment, major	001 to 511	511
08	Change of frame alignment, minor	001 to 255	17
09	Shelf alarm, near end	00000 to 65535	00000
10	Shelf alarm, far end	00000 to 65535	00000

* Setting the SLIP threshold to zero suppresses the alarm.

4. Enter `ED-PRMTR-EQPT:[xy]:[DGP-ppp]:[ww]:{RT|DL}-ffff,g[g]:[{sss|NDL|RTF}];` to correlate protection line NPC(s) with other NPCs going to RT. If the data link was not enabled when digroup A was added, the DLT command must be entered (see *Delete Digroup Designations*) for DGA followed by the ED (add) command for DGA and DATA Link in DGA.

   Where:

   RTIDL = Selects either RT for remote terminal or DL for DCLU as the type of connecting equipment.

   ffff = RT or DCLU identifier.

   g = Mode: 1 for *SLC* 96 carrier Mode I;
   3 for *SLC* 96 carrier Mode III;
   1 for *SLC* Series 5 carrier FPB;
   C for *SLC* Series 5 carrier FPC.

   aaa,bbb,ccc,ddd = NPC numbers to be assigned to digroups; A, B, C, and D.

   ppp = NPC number to be assigned to protection facility if provided.

   sss = For *SLC* 96 carrier digroup A to specify power or miscellaneous alarm as follows: PMN (power-minor alarm, default if single RT is used at the site) or PMJ (power-major alarm) or MMJ or MMN for major or minor miscellaneous alarm.

   NDL = Optional, for *SLC* 96 carrier to disable use of data link with digroup A.

   RTF = Optional, for *SLC* Series 5 carrier digroup A to assign retrofit status to the system which prevents the DACS II from overwriting (clearing) the RT channel provisioning. The RTF status must be changed after the channel provisioning is loaded into the DACS II to allow DACS II auditing.

5. Enter `RTRV-PRMTR-EQPT:[xy]:NPC-<npc No.>:[ww]:SCDG;` for the protection line NPC to see the NPCs associated with the other RT digroups.

6. At DSX-1 bay, make cross-connections between line jacks and DACS II NPC jacks.

7. Enter `RST-EQPT:[xy]:<npc No.>[&&[&]-<range>]:[ww];` to restore the NPC(s).

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the status to in-service.

   NOTE:
   When the NPCs for DGP of *SLC* 96 carrier Mode I are restored, the DACS II automatically duplicates the cross-connection of the locally-switched channels between the RT and DCLU for DGA.

8. Have tester at RT remove looping card at LIU P TSTS jack and watch the ACU MN alarm indications. This ACU MN alarm should occur and then clear approximately 15 seconds after the next step is completed.
9. At DSX-1 bay, remove line feed signal and termination on line side jacks and remove any looping cords from DACS II side jacks.
10. If you want to check the status of the facility, enter `RTRV-STATE-EQPT::NPC-<npc No.>;`.

    Where: <npc No.> = The NPC for the protection line.

11. Enter `SW-TOPROTN-T1:[xy]:NPC-<npc No>:[ww][:INCL];` at DACS II to verify data link communications and protection switching.

    Where: INCL = Optional, needed to switch DGA.

12. If protection switching of any digroups B, C, or D is to be denied, enter `INH-SW-T1:[xy]:{NPC-<npc No.>|DGx}:[ww]:[{RT|DL}-ffff];` using one of the identifiers (NPC, RT, or DL) for the digroups.

3.6.3.2 Retrofit *SLC* Mode I, 5:5 to 5:4

Overview: This procedure is used to convert a *SLC* 96 carrier Mode I, 5:5 protection configuration to a 5:4 protection configuration. There is no protection line from the DACS II and the DCLU; the only protection line will be between the DACS II and the RT. The 5:5 protection provided for earlier generics (protection was provided between the RT, DACS II and the DCLU) is replaced by the *SLC* 96 carrier Mode I, 5:4 pass-through protection. With a 5:4 configuration, the Mode I can have up to 5 DS1 lines (4 service and 1 optional protection) on the RT interface and up to 4 service DS1 lines on the DCLU interface.

CAUTION:
To ensure no service outage occurs, it is recommended that all failures on primary (for example, A, B, C, D) be cleared and the digroups restored so that all digroups P of Mode I can be freed from protecting any primary.

NOTE:
This procedure is a 2-step process where all 5:5 protection systems must be manually converted to 4:4 systems prior to the 5:4 retrofit (this must be done before the generic upgrade).

1. What conversion do you want to perform?
   - If CONVERT 5:5 to 5:4, go to Step **2**.
   - If CONVERT 4:4 to 5:4, go to Step **7**.
2. If DGP is in service to the DCLU, enter **`RMV-EQPT::NPC-<npc No.>;`** to remove the NPC from service.

   Where: <npc No.> = NPC number, either extended (for example, 0001) or hierarchical (for example, 01-1-01).
3. If DGP is in service to the RT, enter **`RMV-EQPT::NPC-<npc No.>;`** to remove the NPC from service.

   Where: <npc No.> = NPC number for DGP going to the RT.
4. Enter **`DLT-PRMTR-EQPT:[<xy>]:DGP-ppp:[ww]:DL-ffff;`** to delete the DGP for the DCLU.
5. Enter **`DLT-PRMTR-EQPT:[<xy>]:DGP-ppp:[ww]:RT-ffff;`** to delete the DGP for the RT.
6. Enter **`DISC-EQPT:NPC-<npc No.>;`**

   Where: <npc No.> = NPC for DGP going to the DCLU.

7. Enter `ED-PRMTR-EQPT:[<xy>]:DGP-ppp:[ww]:RT-ffff,g[g];`

   NOTE:
   The mate of the RT DGP is now reserved and registered to carry M-field message exchange between DCLU and the RT through the DACS II. The reservation will be done automatically by the software when the ADD command of RT DGP is issued.

8. Enter `RST-EQPT::NPC-<npc No.>;` to restore the DGP to the RT.

   Where: <npc No.> = NPC number for DGP going to the RT.

9. Reload the old software release and perform the entire retrofit procedure again.

3.6.3.3 Delete Digroup Designations

Overview: The DLT (delete) command removes the correlation from the DACS II data base in order to make a change; the NPC must be out-of-service to use the DLT command.

1. Enter `RMV-EQPT::NPC-<npc No.>::[:INCL];` to remove NPCs that are to be deleted.

   Where:
   <npc No.> = NPC number either extended (for example, 0001) or hierarchical (for example, 01-1-01)
   INCL = Optional, needed to remove an NPC with special circuits.

   NOTE:
   INCL is required to remove DGA because DGA carries the communications data link.

2. If all four NPCs going to the RT or DCLU are to be reassigned, you can enter those NPCs at one time in the DGA through DGD fields of the DLT command; otherwise, only use the involved digroup fields.

   NOTE:
   For *SLC* Series 5 carrier, digroup pairs (A and B) and (C and D) must be deleted together in command(s) because they are associated in the RT controller.

3. Enter the DLT command as follows: `DLT-PRMTR-EQPT:[xy]:[DGA-aaa, DGB-bbb,DGC-ccc,DGD-ddd,DGP-ppp]:[ww]:{RT|DL}-ffff;`.

   NOTE:
   The DCLU (DL) does not have a DGP.

   Where:
   RTIDL = Selects either RT for remote terminal or DL for DCLU as the type of connecting equipment
   ffff = RT or DL identifier
   aaa-ddd, ppp = NPC numbers to be assigned to digroups.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Check the output message to verify correct entry of information.

3.6.3.4 Change Far-End Bank Identifier

1. Enter `ED-PRMTR-EQPT:[xy]::[ww]:{RT|DL}-ffff:{RL|DL}-hhhh;`

   Where:

   ffff = Bank identification number which is to be changed

   hhhh = New bank identification number. For Series 5 carrier, different RT IDs must be assigned to banks on the same RT shelf to avoid problems in the RT data base.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check the output message to verify that correct information was entered.

3.6.3.5 Change Series 5 Retrofit Designation

1. Enter `ED-PRMTR-EQPT:[xy]::[ww]:RT-ffff:RTF` to change the status of the *SLC* Series 5 RT bank from retrofit to nonretrofit.

   Where: ffff = RT bank identification number.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check the output message to verify that correct information was entered.

3.6.3.6 Change Power/Miscellaneous Alarm Designation

1. Consider the following concerning the power/miscellaneous alarm option which only applies to *SLC* 96 carrier:

   — The power or miscellaneous alarm is carried over the data link on DGA; so, the NDL (no data link) must not have been used when the ED (add digroup) DGA command was entered.

   — The miscellaneous alarm indicates an open door, flooding, fire, or gas at the RT site. This alarm can be used for the second RT bank at the site; the power alarm is used for the first RT bank.

2. Enter **`ED-PRMTR-EQPT:[xy]::[ww]:RT-ffff:sss;`** to change the power/miscellaneous alarm for *SLC* 96 carrier.

   Where:

   ffff = Bank identification number of connecting RT for which the alarm meaning is to be changed.

   sss = Required new meaning given by one of the following: PMN for power minor alarm (default and required for one RT at site), PMJ for power major alarm, MMJ for miscellaneous major alarm, or MMN for miscellaneous minor alarm.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3. Check the output message to verify that correct information was entered.

3.6.3.7 Operate *SLC* Carrier System Protection Switch or Line Loopback

Overview: Switching to the protection line occurs automatically if one of the primary lines fails and can be initiated by entry of commands at the DACS II. For *SLC* 96 Mode III and *SLC* Series 5 carrier, protection switching is done at the DACS II and the RT. There is no protection line between DACS II and the DCLU; the protection switching occurs at the DACS II and the RT. The switching is accomplished at the DACS II by automatic cross-connections between the primary and protection line channels. Line loopbacks can be produced on command at the DACS II or connecting RT to allow trouble isolation. To prevent interruption of service, the loopbacks can only be operated if: (1) there are no cross-connections on the digroup, (2) protection switching is operated for the digroup, or (3) the digroup is already failed and protection switching is not available.

1. Which activity do you need to accomplish?
   - If **Operate/Change Protection Switching Only**, then do Step **2**.
   - If **Initiate Loopback**, then do Steps **2** and **3**.
   - If **Change Loopback State**, then go to Step **3**.

2. Enter appropriate command to change switch state as required:

```
SW-TOPROTN-T1:[xy]:{NPC-<npc No.>|DGx}:
[ww]:[{RL|DL}-ffff]:[INCL];

SW-TOWKG-T1:[xy]:{NPC-<npc No.>|DGx}:
[ww]:[{RL|DL}-ffff]:[INCL];

{ALW|INH|SW-T1}:[xy]:{NPC-<npc No.>|DGx}:
[ww]:[{RL|DL}-ffff]:[INCL];.
```

   - If COMPLD message is received, proceed to Step **4**.
   - If the command is denied, find reason for denial in the output message and perform corrective action to obtain command completion.

Where:

<npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
TOWKG = Inhibits automatic switch protection.
ffff - RT identifier or DL identifier (for *SLC* 96 Carrier System.
DG_ = Selects the digroup for loopback. The DCLU does not have a DGP.
ALW = To allow automatic switching on digroup.
INH = To inhibit automatic switching on digroup. Keywords INCL and FRC may also be required in the command.

FRC = Required to inhibit (INH) failed digroup from switching (when switch becomes available). Also required with INCL to inhibit (INH) protection of DGA in *SLC* Series 5 carrier.
INCL = Required to effect protection switching on digroup A (DGA).

3. Enter appropriate command to perform desired loopback function:
`{OPR|RLS}-LPBK-T1:[xy]:{DGA|DGB|DGC|DGD|DGP}:[ww]:LLB:{RT|DL}-ffff;`

`{INH|ALW}-LPBK-T1:[xy]:{DGA|DGB|DGC|DGD|DGP}:[ww]:LLB:{TO|FROM}:{RT|DL}-ffff;`.

Where:
ffff = RT identification or DCLU identification if DL is selected for
DG_ = Selects the digroup for loopback. The DCLU does not have a DGP.
TO/FROM = Requests loopback to be sent (TO - sends request to RT; FROM - sent from RT) either toward the far end (TO, default) or from far end (FROM).
ALW = To reverse previous inhibit and allow loopback request.
INH = To inhibit loopback request.
RLS = To terminate existing loopback. Not valid with FROM keyword.

NOTE:
If initiating loopback in DGA, manually switch DGA to protection.

- If the command is denied, find reason for denial in the output message and perform corrective action to obtain command completion.

4. Enter `RTRV-PRMTR-EQPT::[NPC-<npc No.>]::SCDG:STATE:[{RT-ffff|DL-ffff|ALL}];` with the required identifier or for all RTs. The output is in the form of a grid with the digroups on the horizontal axis and the PLSW (protection line switch), LLB (line loopback), and ALST (alarm) along the vertical axis. Read the PLSW or LLB status using Table 3-68.
5. Read the ALST column as follows: the status component is either MN (minor) or MJ (major) and the location is NE (near end), FE (far end), or CL (carrier line).
6. Use original command with appropriate keyword to return switch or loopback to normal (USW or NORM keyword) after testing is completed.

Table 3-68. Keyword Meanings

Keyword	Meaning
SWMR	Manual protection switch
SWAR	Automatic protection switch
INHB	Protection switch inhibited
NORM	Protection switch is in normal, standby state
FRTA	Loopback action coming from RT/DL active
FRTI	Loopback action coming from RT/DL inhibited
TRTA	Loopback action going toward RT/DL active
TRTI	Loopback action going toward RT/DL inhibited
NORM	Loopback is in normal, inactive state

3.6.4 Establish DS3 Facility

3.6.4.1 Check Far-End Installation, Make DSX-3 Connections, Check DS3 Line Status

1. Verify that far-end DS3 equipment has been equipped and tested and that the DS3 line has also been established and tested.
2. At the DSX-3 bay, make wiring cross-connections over to DACS II.
3. Enter `RTRV-STATE-T3::UNIT-[q]q::DS3-c[&&-d];` to check DS3 line status for unit and DS3 number (or range) in unit.
4. Remove any looping cards at the DSX-3 bay and verify that DS3 line alarms clear (ALM IDLD messages received).

NOTE:
The DS3 MMFGs should already be restored to service as per *Install Plug-Ins, Grow and Restore DS3U.*

3.6.4.2 Test DS3U Protection Switching

1. Enter command to initiate the MMFG protection switch as follows:
   SW-TOPROTN-EQPT::UNIT-[q]q::MMFG-c[:FRC];

   Where:
   [q]q = Unit number (1 through 16)
   c = MMFG number (1 through 6) to be switched
   FRC = Optional, to force switch even if protection connected to another service MMFG must be released.

   NOTE:
   The switch can also be initiated by pulling a service MXR/EMIU pack or entering the MMFG remove command as follows:
   RMV-EQPT::UNIT-[q]q::MMFG-c;.

2. Notice the SW ...COMPLD message and verify that ALM message is not received on line which has been switched onto protection.
3. Enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** to see the overall protection state for the unit.
4. Observe the following in the query output message:
   — The message is divided into the top half for the FLI status and the bottom half for the MMFG status.
   — In the FLI portion, the maintenance status and then the protection are listed for both the service and protection FLIs.
   — In the MMFG portion, there are 7 MMFG groupings; the leftmost is for the protection MMFG and the others are for MMFGs 1 through 6. In each grouping, the first item is the MXR maintenance status, followed by the EMIU maintenance status, followed by the protection status, followed by the availability of switching (if MMFG switching was requested).

5. Refer to Table 3-69 to interpret the maintenance and protection status keywords. All the possible codes are consolidated in the table; not all the codes apply to each DS3 plug-in.
6. Enter **RTRV-STATE-T3::UNIT-[q]q::DS3-c;** for same unit and MMFG (c = MMFG No.) to obtain PSTATE summary.
7. Enter command for manual switchback as follows:
   SW-TOWKG-EQPT::UNIT-[q]q::MMFG-c; for the MMFG that was switched.

   ⇒ **NOTE:**
   If switch was initiated by pulling a pack or removing the MMFG, do the reverse operation (install, restore) here to cause switchback.

8. If you want to compare the status to the switched status, enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** and read status as before.
9. If you want to test the FLI switching, enter **SW-TOPROTN-EQPT::UNIT-[q]q::FLI;** and after the completion, enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** to read the status as before.
10. Enter **SW-TOWKG-EQPT::UNIT-[q]q::FLI;** to switch back the FLI.

Table 3-69. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

3.6.4.3 Check Far-End Cross-Connection, Loop DS1 Signals, and Check DS1 Status

1. If far-end equipment for component DS1 facilities has been tested and is ready for connection, have far-end tester make wiring cross-connections at DSX-1.
2. If far-end equipment for component DS1 facilities is not ready for connection, have far-end tester connect looping cords at muldem jacks of DSX-1.
3. If you want to use the DACS II to check the status of the component DS1, enter **`RTRV-STATE-EQPT::NPC-<npc No.>;`** for the NPC.

3.6.5 Subrate (ECCN/CCN to DSPU) Connection

3.6.5.1 Establish Subrate Channel

Overview: This command connects a channel or a range of channels in a digroup to the subrate feature. Parity channels may also be established. The following types of subrate channel can be established:

— DS0B channel capable of multiplexing 5, 10, or 20 subrate customers

— DS0B channel capable of multiplexing 5, 10, or 20 subrate customers and parity error correction

— 56 kb/s channel with parity channel error correction (also referred to as 56 kb/s dataport)

— DS0A channel with subrate dataport error correction

— DS0A channel without error correction.

1. Familiarize yourself with the following commands.

For DS0A:

```
CRTE-CRS-TS:[xy]:<npc No.>-ddd[&&-eee]:[ww]:DS0A-rr:SEC;
```

```
CRTE-CRS-TS:[xy]:<npc No.>-ddd[&&-eee]:[ww]:DS0A-rr
```

For DS0B:

```
CRTE-CRS-TS:[xy]:<npc No.>-ddd[&&-eee]:[ww]:DS0B-nn
```

```
CRTE-CRS-TS:[xy]:<npc No.>-ddd[&&-eee]:[ww]:DS0B-nn:PCH[-ppp];
```

For 56kb/s:

```
CRTE-CRS-TS:[xy]:<npc No.>-ddd:[ww]:DS0A-56:PCH[-ppp];
```

Where:

- xy = Unique id (target id); up to 20 characters.
- ww = Command correlation tag; up to 10 characters.
- <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). The additional NPCs on the DS3 are identified by suffix, A through H.
- ddd = First channel number within the digroup
- eee = Last numbered channel in a range of channels The eee is eliminated in a single channel command and is not allowed when a parity channel is associated with a channel being addressed by the command (the command will be denied).
- rr = Channel rate (24, 48, 96 = 2.4, 4.8, 9.6 kb/s, respectively).
- nn = Number of DS0B subrate customer channels (5, 10, or 20).
- ppp = Parity channel number. If the parity number (ppp) is not specified, the parity channel is assigned as ddd + 1.

2. Enter the appropriate command with the required information.
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
3. Check completion message to verify changes.
4. To familiarize yourself with the query that shows subrate established channels, enter

```
RTRV-STATE-TS:[<xy>]:<npc No.>-ddd[&&-eee]
[&&[&]-<range>-jjj[&&-kkk]]:[ww];
```

3.6.5.2 Change Established Subrate Channel

Overview: This command moves a subrate established channel and all associated subrate cross-connections from an existing digroup and channel to a new digroup and channel.

1. Familiarize yourself with the following command:

   ```
   ED-CRTE-TS:[xy]:<npc no.1>-ddd[&&-eee],
   <npc no.2>-jjj[-kkk]:[ww][:PCH-ppp][:DCC];
   ```

   Where:

   xy = Unique id (target id); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <npc No.1> = OLD NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). The additional NPCs on the DS3 are identified by suffix, A through H.

   ddd,jjj = First channel in a continuous range.

   eee,kkk = Last channel in a range. The eee, or kkk is eliminated in a single channel command and is not allowed when a parity channel is associated with a channel being addressed by the command.

   <npc No.2> = NEW NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). The additional NPCs on the DS3 are identified by suffix, A through H.

   ppp = Indicates the number of the parity channel to be associated with the new data channel.

2. Enter the appropriate command with the required information.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3. Check completion message to verify changes.

4. To familiarize yourself with the query that shows subrate established channels, enter

   ```
   RTRV-STATE-TS:[<xy>]:<npc No.>-ddd[&&-eee]
   [&&[&]-<range>-jjj[&&-kkk]]:[ww];
   ```

3.6.5.3 Disestablish Subrate Channel

Overview: This procedure disestablishes a channel or a range of channels associated with a group from use by the subrate feature. Associated parity channels are also disestablished. There is an option to insert the UMC control code into the disestablished channel(s) toward the digroup facility.

1. Enter `DLT-CRS-TS:[xy]:<npc No.>-ddd[&&[&]-eee]:[ww][:PCH[-ppp]][:DCC];`

   Where:

   xy = The double-digit number assigned to the frame when it is placed in service. If the command is being issued to a remote frame, the frame number **must** be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If issued to a remote frame, the sequence number **must** be entered.

   <npc No.> = NPC number, either extended (for example, 0001) or hierarchical (for example, 01-1-01).

   ddd = Channel number within the digroup for a single channel of the number of the lowest numbered channel in a range of channels.

   eee = Last channel in a range of channels, not allowed when a parity channel is associated with a channel being addressed by the command.

   PCH = Indicates parity channel associated with channel being addressed. Downward compatibility with the equivalent DACS II/subrate command. The command will disestablish the parity channel (associated with ddd channel) with or without PCH included in the command.

   ppp = Number of the parity channel. For downward compatibility only, the command will perform the same with or without ppp.

   DCC = Causes the DCC UMC control code to be inserted in the disestablished channel(s) toward the digroup facility.

2. Enter the appropriate command with the required information.
3. Check completion message to verify changes.
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3.7 Links

3.7.1 Check Link Connections

1. If data sets (such as 202T) are required for remote connections or for equipment more than 50 feet (RS-232C specification) or 2,000 feet (RS-449 specification, 1200 baud) away, verify that data sets have been installed. Data set specifications are given with the information notes in SD-96662-01.
2. Connect data link cable (for example, M25B) to the TTY connector for the link (behind DACS II main controller). No adapter is required for RS-449 format, but ED-2C646-30 adapters are required for RS-232C format as follows:
   - — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).
   - — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).
   - — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).
   - — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

   NOTE:
   The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

3. Links that are in service but not in use are autonomously removed and restored with SOFT ERR hardware messages. To avoid this output, links that are not in use should be manually removed from service.

3.7.2 Initialize, Set Type and Rate Characteristics

Overview: This procedure is used to prepare DACS II links for connections. There are six links available for connection of terminal equipment and operations systems. With the ECI (TM736C), links 5 and 6 are synchronous links using X.25 protocol (through level 3) at rates up to 9.6 kb/s. The HECI (high-speed, TM762) extends the rate up to 56 kb/s. Up to 16 virtual circuits can be established on each synchronous link. The characteristics of each link can be changed from the defaults provided by DACS II using the ED PRMTR LINK commands herein. The ECI or HECI is required for TABS (telemetry asynchronous block serial) links.

1. What type of link is being established?
   - If **ASYNCHRONOUS**, continue with Step **2.**
   - If **TABS**, proceed to Step **3.**
   - If **SYNCHRONOUS**, proceed to Step **4.**

2. Enter the appropriate command to initialize link or make changes:
   `ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-S[,BAUD-bb][,ALM-k][,BS-e][,ENQ-q][,XON x][:INIT];` or

   `ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-M[,ALM-k][:INIT];`.
   Proceed to Step **8.**

   Where:

   j = Physical link number (1 through 6)

   SIM = Asynchronous Snider (S) protocol or Modified (M) Snider for *SLC* Series 5 Carrier System; only one of the 6 links can be set for modified Snider

   bb = Baud rate; 03, 06, 12, 24, 48, or 96 for rate of 300, 600, 1200, 2400, 4800, or 9600; default is 1200

   k = Alarm class; k = 2 for major alarm for link hardware failure, or k = 1 for minor alarm (default)

   e = Backspace; e = 1 for backspace indicated by underscore or e = 0 to actually move cursor backward for backspace (default)

   ENQ-q = To enable/disable ENQ/ACK acknowledgment protocol to match terminal requirement; q = 0 to disable or q = 1 to enable (default).

   XON-x = To allow use of CTRL s and CTRL q commands to temporarily stop and start long output messages; x = 0 to disable (default) or x = 1 to enable. [See Note]

   INIT = Optional, to initialize all parameters to default values except for those parameters entered in command.

NOTE:
If the output on a Snider link provisioned with the XON feature is suppressed by a DTE sending an XOFF character, the link is periodically removed from service by the error recovery.

3. Enter the following commands to make required settings:

   ED-PRMTR-LINK::j::PTCOL-T,BAUD-bb;

   ED-PRMTR-LINK:[<xy>]:j:[ww]:APPL-{ASCS|ASCD|PM}
   [,L2AD-aa][,POLL-ttt];

   Where:

   j = Physical link number (3 or 4)
   T = TABS protocol
   bb = Baud rate (24 for 2400)
   ASCS, ASCD, or PM = Selects application as follows: alarm surveillance and control summary or detailed, or performance monitoring.
   ttt = Optional, to specify polling time as follows: 001 through 255 for ASCS or ASCD applications.
   aa = Optional, to specify Layer 2 address (00 through 31).

4. To initialize the link or change alarm class, enter
   ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-X[,ALM-k][:INIT];

   Where:

   j = Physical link number (5 or 6)
   PTCOL X = X.25 synchronous link protocol
   k = Alarm class; 2 for major alarm for link hardware failure or 1 for minor alarm (default)
   INIT = Optional, to initialize all parameters to default values except for those parameters entered in the command.

5. Enter **RTRV-PRMTR-LINK:[xy]:j[mm]:[ww];** to see the existing (or default) link parameter values (see Table 3-70). The link must be removed from service to change parameters. See Figure 3-28.

6. To enter different **data layer** values, list the subject parameter followed by the value (for example, K-5). Enter the command as follows:
   ED-PRMTR-LINK:[xy]:j:[ww]:[K-b][,T1-eee][,T3-ggg]
   [,N2-aa][,FRMAD-{A|B}];

   Where:

   j = Physical link number (5 or 6)
   FRMAD {A|B} = Frame address in X.25 layer; default is A.

7. To enter different **packet layer** values, list the subject parameter followed by the value (for example, R20-nn) and use commas to separate parameter entries. Enter the command as follows:

   ```
   ED-PRMTR-LINK:[xy]:j[mm]:[ww]:
   [<param>-<value>,...<param>-<value>]\
   [,VC-ppss&-gghh][,DBIT v];
   ```

   Where:

   j = Physical link number (5 or 6)
   mm = Permanent virtual circuit (01 through 16) on same link
   <param> = One of the **packet layer** parameters of Table 3-70 for which different values are to be specified; identified by designation (for example, T20)
   <value> = Value of named parameter
   ppss = Number of virtual circuits (01 through 16) for permanent (pp) and switched (ss) VCs; defaults are pp = 08 and ss = 08
   gghh = Virtual circuit groups (00 through 15) for above ranges; defaults are gg = 00 and hh = 00.
   v = X.25 d-bit setting (0 or 1); 0 is default.
   0 = off (unset) (acknowledgement done from local DTE)
   1 = on (set) (acknowledgement done from remote DTE)

8. If DENY message with explanation that link is out-of-service is received, enter `RST-EQPT::LINK-j;` and reenter ED LINK command. Enter `RMV-EQPT::LINK-j;` if link is in-service.

   Where: j = Link number.

9. Verify that any administrative terminal to be connected to the link is set to the following major characteristics: full duplex, 7/8-bit ASCII, even parity, answerback (if ENQ/ACK protocol is used) and same baud rate as the link. Complete terminal specifications are found in the information notes of SD-96658-01.

10. If you are restoring the link to service, enter `RST-EQPT::LINK-j[mm];`.

Table 3-70. Synchronous Link Level Parameters

Parameter Designation	Meaning	Value Range	Default
Data Layer Values			
N2	Frame Transmission Attempts	2 through 16	7
K	Window Size	1 through 7	7
T1	Acknowledgment Timer	2 through 20 seconds	3
T3	Idle Channel Timer	4 through 120 seconds	26
Packet Layer Values			
W	Window Size	1 through 7	2
P	Packet Size	128 through 512 octets	128
R20	Restart Retries	1 through 10	1
R22	Reset Retries	1 through 3	1
R23	Clear Retries	1 through 10	1
R25	Data Retransmissions	0 through 3	0
T20	Restart Timer	10 through 180 seconds	180
T22	Reset Timer	10 through 180 seconds	180
T23	Clear Timer	10 through 180 seconds	180
T25	Data Acknowledgment Timer	10 through 200 seconds	200
T26	Interrupt Confirmation Timer	10 through 180 seconds	180

Note: The following timers are not supported by DACS II:

T2 - Built-in to the XPC-MC 68605 chip of the ECI, time is 0.3 seconds and cannot be changed with the software.

T4 - Inactive link timer.

T21 - Call request response timer for SVCs.

```
/*Protocol*/
"{S/X}"
/*Baud:Backspace:Alarm:Enq/Ack:Xon/Xoff:Mode,Software,Hardware status*/
"bb:e:k:q:x:m,p,hh"
```

Protocol = S for Snider (Async) or X for X.25 (Synchronous)

bb = <baud> = 03,06,12,24,48,96

e = <backspace> = 0 for true backspace, 1 for underscore backspace, or dash (—) for synchronous link.

k = <alarm> = 1 (link alarm defined as minor) or 2 (defined as major)

q = ENQ/ACK protocol 0 disabled, 1 enabled (default)

x = Xon/Xoff protocol 0 disabled (default), 1 enabled.

m = <mode> = 0 (idle), 1 (input message), or 2 (output message)

p = <software> = 0 (protocol exchanges in-service) or 1 (protocol exchanges out-of-service, which slows down DACS II response time)

hh = <hardware> = 03 (hardware in-service) or 04 (hardware out-of-service)

ADDITIONAL LINES FOR X.25:

```
/*Data Link Layer parameters:  Frame address*/
"K-b,T1-eee,T3-ggg,N2-aa:{A/B}"
/*Packet Layer parameters*/
"W-c,P-ddd,T20-iii,T22-jjj,T23-kkk,T25-lll,T26-mmm,R20-nn,R22-p,R23-q,R25-r"
/*PVC and SVC range:  PVC and SVC group number*/
"ppss:gghh"
```

Figure 3-28. Link Status Register

3.7.3 Change Input Command Priority, Link Language, NPC Addressing, and Output Message Screening

1. Consider the following information and then refer to *Administration* for the appropriate procedure to make the necessary changes:

   — **Input Command Priority** Commands from a single active link go into a queue and are executed in the order issued. Commands from different links go into separate waiting queues, and the *input command priorities* from these links control the order of execution; priority level 1 commands first, then priority 2, then priority 3. Commands from different links with the same priority are executed alternately. To prevent long waits for all lower priority commands, those that have been waiting in the queue for 2 minutes will be executed while higher priority commands that require more processing, like diagnose tape, are underway. Until set otherwise, the system processes all user commands as level 3 by default, and all system administrator commands as level 1. By setting the priority of the command groups on all LINKS to zero (excluded), the administrator can establish the use of the login mode because each user will have to log in to access the command set defined for that USER.

   — **Link Language** DACS II Snider and X.25 links will operate in either PDS or MML message languages. Unless previously changed, the message language for the links and users will default to what is defined in the software load. If you want to use a different message language during your login session, you can change the message language for your user id. For example, if the link defaults to PDS but you work in MML, the link will switch to MML when you log in.

   — **NPC Numbering Scheme** DACS II Snider and X.25 links will operate in one of the following NPC addressing schemes:

   Extended - This scheme uses 3 digits to number the NPCs consecutively (for example, `041`). It can only be used on systems of three bays or less.

   4-Digit Extended - This scheme uses 4 digits to number the NPCs consecutively (for example, `1041`). The extra digit allows the system to accommodate additional bays.

   Hierarchical - This scheme uses a 5 digit number (`uvmnp`). It assigns a number to each NPC according to the unit number (`uv`), module or group number (`m`), and the NPC number within the module (`np`).

Unless previously changed, NPC addressing for the links and users will default to what is defined in the software load. If you want to use a different addressing scheme during your login session, you can change the scheme for your user id. For example, if the link defaults to *extended* but you work in *hierarchical*, the link will switch to hierarchical when you log in. Ensure that the addressing scheme for the link is allowable as defined in the configuration file.

— **Output Message Screening** Output message screening allows you to block groups of messages or include messages associated with other links. Any user can change his/her own message screening.

Unless previously changed, output message screening for the links and users will default to what is defined in the software load. If you want to use a different screening option during your login session, you can change the option for your user id. For example, if the link defaults to option 2 but your user id is set to option 5, the link will switch to option 5 when you log in.

Test Access

4

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Test Access

4

4.1 Establish NPC Test Ports and Groups

4.1.1 Establish Test Access Facility

4.1.1.1 Check Connecting Equipment and Make DSX-1 Cross-Connections

1. Verify that connecting equipment (D4 bank or digital test) has been tested.
2. Use office records to determine the DACS II and DSX-1 jack appearances to be cross-connected.
3. Insert dummy plugs (258 plugs or 800-series DSX cord plugs) in the MON jacks of the two sets of jacks to be cross-connected. This should light the TL lamps and help locate the position from behind the bay.
4. If the TL lamp for each jack set does not light, check for 48 volts with VOM across the TL lamp which is not lighted.
   - If 48 volts is present, replace the TL lamp.
   - If 48 volts is not present, clear trouble in wiring between fuse at top of DSX-bay and TL lamp per Figure 4-1.
5. Review the following guidelines for running cross-connections: Leave at least 8 inches of slack on short runs. Dress wires through fanout at bottom of panel. Run wires in horizontal or vertical troughs (top and bottom troughs for interbay) and remember the 85-foot limit.

6. With the BACK PANEL X-CONN FIELD DSX-bay, make cross-connections between subject jack sets per Figure 4-2 using Y1-type wire.
7. With the FRONT PANEL (800-SERIES) DSX-bay, make wire-wrap connections between jack sets per Figure 4-3 using five conductors of the cross-connect wire.

   NOTE:
   Only one size DSX-panel is shown in Figure 4-2, but combinations with different size panels and different jack types are likely to occur. Fortunately, only the orientation of the pins will differ in these cases; the pin numbers will be the same.

8. Remove one of the dummy plugs.
   - If both TL lamps remain lighted, remove other dummy plug.

     Response: Both lights will go off.

   - If both TL lamps remain unlighted, make corrections to wiring using Figures 4-1, 4-2, and 4-3 or reference drawings.
9. Record relay rack or other jack set identification on DSX-panel designation strip.

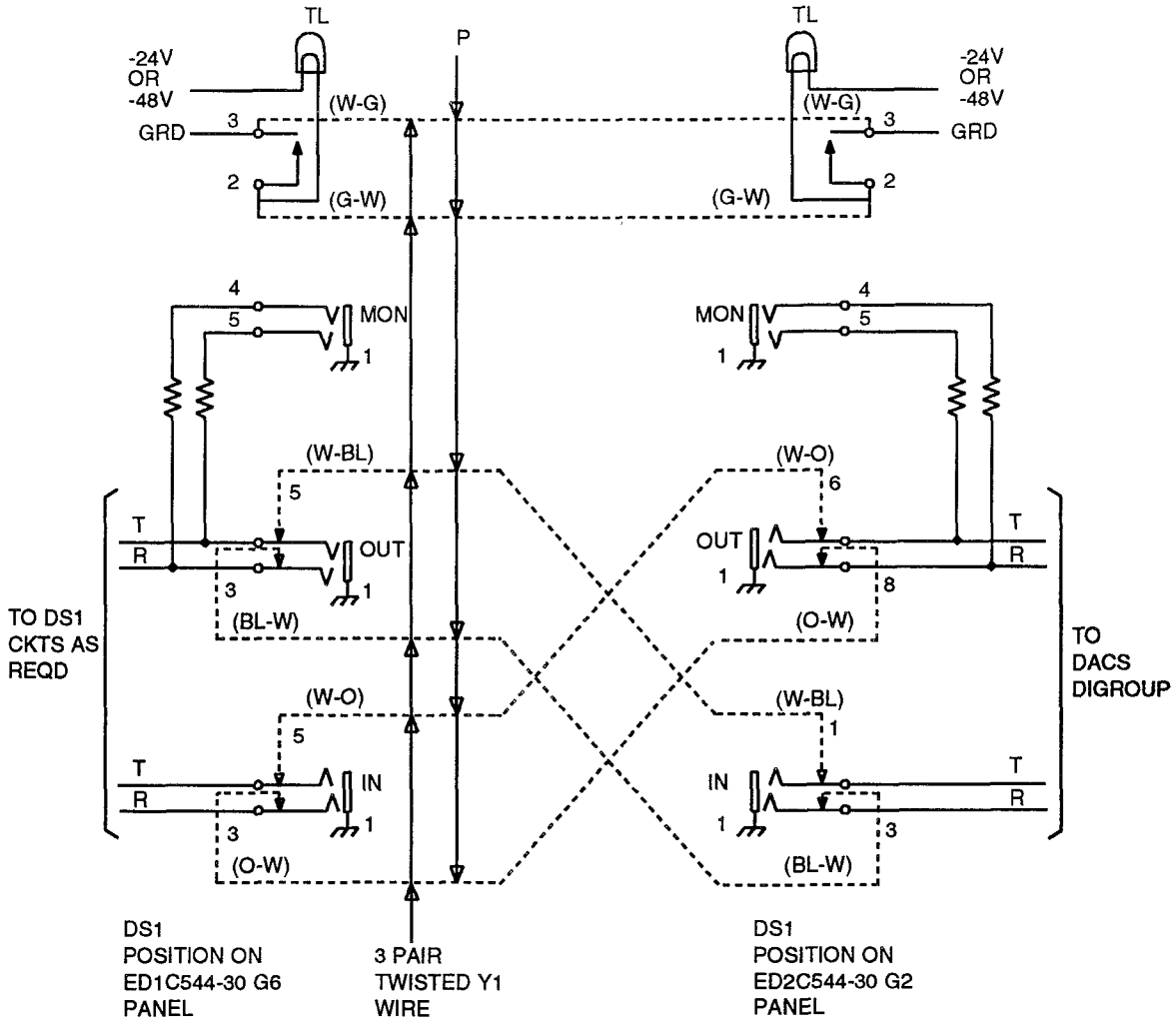


Figure 4-1. Cross-Connect Schematic

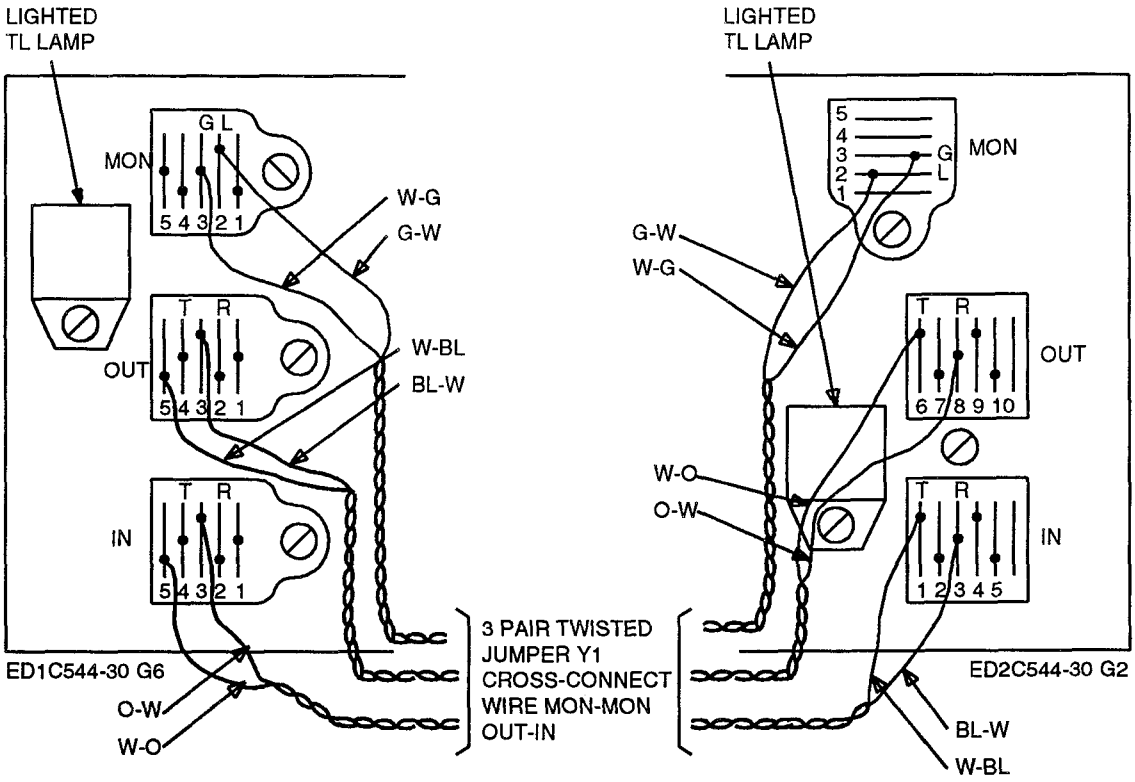


Figure 4-2. Rear View of 3-Inch Panel

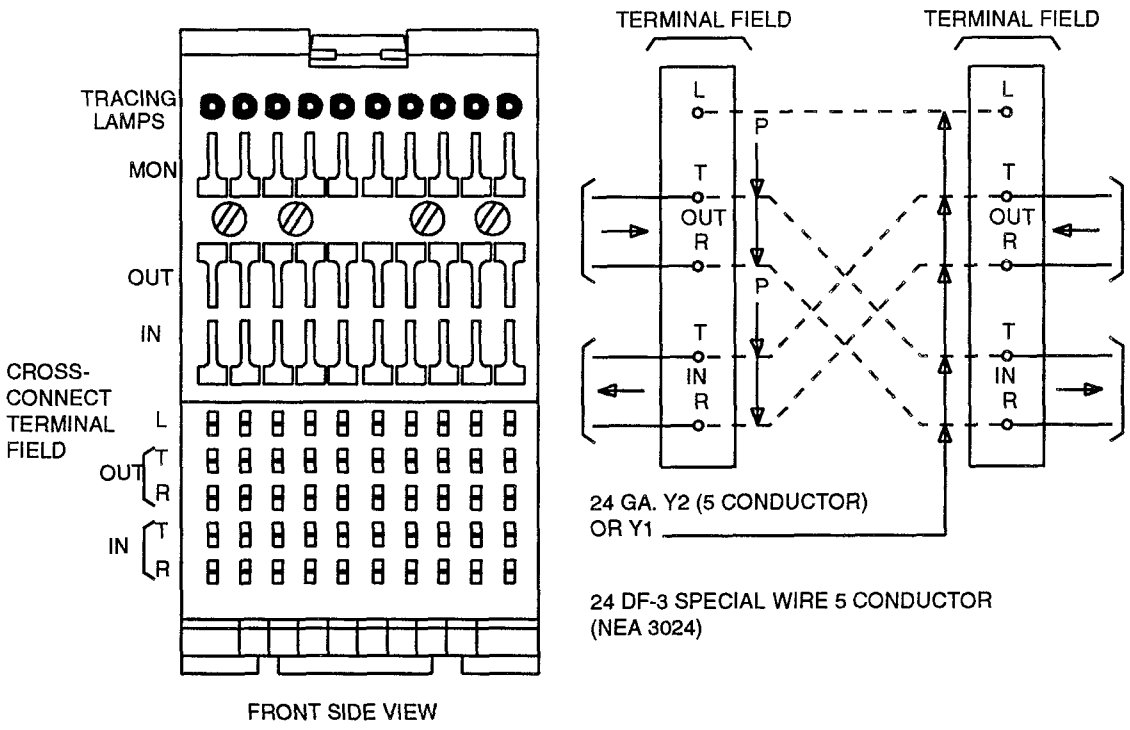


Figure 4-3. 800-Series DSX Details

4.1.1.2 Install Plug-Ins, Grow and Restore NPC to Function as NPCTP or NPCTG

Overview: This procedure defines the operating characteristics of the NPC in the data base. When the NPC is subsequently restored to service, it will be provisioned per the growth specification. Included in the specification are: DS1 line and channel formats, facility alarm thresholds, and the channel insertion word. The DS1 line formats are given by the TYPE specification; TYPE DE100 is the default. If used, alarm threshold options must already be defined in the data base.

1. Install TG80 or TG80B dual digroup card for two testport NPCs.
2. Before you enter the command, familiarize yourself with command as follows:

   CRTE-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww]:[DExyz][:rr/l&ss/m,&tt/n,...)];

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   <range> = Optional, last NPC of continuous range of NPCs. Three ampersand (&s) are required for hierarchical.

   xyz = Line and channel format specification; DE100 (default).

   rr/l...tt/n = Optional, to list any one or all alarm per Table 4-1 and predefined number (0 through 3) per Table 4-2 which sets alarm threshold.

3. Enter command with required information.

   EXAMPLE: **CRTE-EQPT::NPC-012::DE100:01/1&03/2&07/2;**

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. Check output message to verify type and option selections.
5. Enter `RST-EQPT:[xy]:NPC-<npc No.>[&&[&]-<range>]:[ww];`

   Where:

   xy = Unique ID (target ID); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs. Three ampersand (&s) are required for hierarchical.

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

Table 4-1. Alarm Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Table 4-2. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

4.1.1.3 Designate NPC as NPCTP

1. Enter : `CRTE-EQPT::NPC-<npc No.>::NPCTP-n;`
   Where: n = 1 through 8.
2. Notice the associated TPs that can now be grown.

4.1.1.4 Designate NPC as NPCTG

1. Enter : `CRTE-EQPT:[<xy>]:NPC-<npc No.>:[ww]:NPCTG-rrr;`
   Where: rrr = 1 through 400.

4.1.2 Grow Test Ports

Overview: This procedure is used to grow test ports on a TAD (test access digroup). These TADs are given a NPCTP designation in the data base by the entry of a CRTE NPCTP command. Up to eight NPCs can be so designated on the frame, providing up to 96 test ports, 12 on each TAD. As each test port is grown, two more channels from the NPC are assigned a test port number. During subsequent test access, the channels of the test port are cross-connected to the channel under test. Splitting access is achieved by having two channels per test port.

1. Consider the following information concerning the variables used in the command:
   - — The trunk conditioning (tc) is programmed signaling and a message insertion word that is sent on the connecting carrier channel during a carrier failure.
   - — The <tc> specification is used when static "tc" is needed for an analog test system (SARTS/RTS-5A in the USA); otherwise, the "tc" will be dynamic (that is, match what was specified for the cross-connection).
   - — Twelve test ports are available on each designated NPCTP and up to eight NPCTPs can be designated. The test port numbering is kk = 01-12 on NPCTP 1, 13-24 on NPCTP 2, 25-36 on NPCTP 3, 37-48 on NPCTP 4, 49-60 on NPCTP 5, 61-72 on NPCTP 6, 72-84 on NPCTP 7, and 85-96 on NPCTP 8.
   - — If trunk conditioning is required for static test ports, see the format of the "tc" field.

2. Enter `CRTE-EQPT:[xy]:TP-kk:[ww][:<tc>];`

   Where:
   xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   kk = Test port number (01 through 96) on test access digroup
   tc = Optional, used for Static Trunk Conditioning.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.1.3 Grow Test Groups

Overview: This procedure is used to grow test groups (TGs) on a TAD (test access digroup). These TADs are given a NPCTG designation in the data base by the entry of a CRTE NPCTG command. Up to 400 test groups can be established. Each test group consists of two Nx64 Kbit/s bundles for testing both directions, where N is the width of the bundles and may be from 1 to 24. The bundles, called east and west, can be on separate NPCs or on the same NPC, if bandwidth permits. During subsequent test access, the channels of the test group are cross-connected to the channels under test.

1. Consider the following information concerning the variables used in the command:

   — The trunk conditioning (tc) is programmed signaling and a message insertion word that is sent on the connecting carrier channel during a carrier failure.

   — The <tc> specification is used when static "tc" is needed for an analog test system (SARTS/RTS-5A in the USA) when testing unmapped channel(s). Otherwise, the "tc" will be dynamic (that is, match what was specified for the cross-connection).

   — Each test group consists of two equal ranges having a width of up to 24 channels, for DS1. The two ranges may belong to two NPCTGs, or the same NPCTG but not overlapping.

2. Enter

```
CRTE-EQPT:[<xy>]:TG-mmm:[ww]:\
rrr-eee[&&-fff],sss-www[&&-xxx][:<tc>];
```

Where:

xy = Unique ID (target ID); up to 20 characters
ww = Command correlation tag; up to 10 characters
mmm = Test group number
rrr = NPCTG number
eee[-fff] = [Range of] channels of east bundle on NPCTG rrr
sss = NPCTG number
www[-xxx] = [Range of] channels of west bundle on NPCTG sss
tc = Optional, used for Static Trunk Conditioning.

- If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2 Establish Test Connection

4.2.1 DS0 (or Subrate DS0A) Circuits

4.2.1.1 Connect Hubbed Testport(s) to Local DACS II

Overview: The HUB command in this procedure is used at a DACS II frame which serves as the interface between a mechanized test system and the other DACS II frames in the complex. The HUB command connects a pair of test port channels from the interface (concentrator DACS II frame) to test port channels on one of the other frames in the complex.

1. To establish a test port-to-test port connection, enter

   `CONN-HUB-T0::<npc No.>-jjj::kk:<tc>;`

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <npc No.> = NPC number on concentrator frame that terminates line to other frame. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   jjj = Lower channel of pair going to test port group on another frame. The connecting test port group NPC must be the same type.

   kk = Testport number (01 through 96) on concentrator DACS II.

   <tc> = Trunk conditioning. This field should not be specified for a 2.048 Mb/s Test Port unless the NPC termination specified in the command belongs to a 1.544 Mb/s circuit.

   NOTE:
   If both terminations are 2.048 Mb/s type framing, <tc> will default to 16-state signaling with all ones and an insertion word of all ones.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check completion message for additional information. The presence of T or P in the first explanation line of the output message indicates a facility failure on that side or on the test port (P) NPC; zeros in the CGA field indicate no such failure.

3. To release a test port-to-test port connection, enter

   DISC-TACC-T0:::kk[:OOS];

   Where:
   OOS = Optional, to allow releasing connection when any of the involved NPCs are out-of-service.

4.2.1.2 Looping Back a Test Port

DACS II provides a loopback test access command to loop back the two channels of a specified Test Port. Looping back a Test Port is useful for testing the connection between the DACS II Test Port and the external test equipment. When a loopback test access command is executed, each of the two 64 kbit/s channels of the Test Port is individually looped back on itself so that the signal received from the facility side is returned to the facility.

The loopback is released using a Test Port release command.

To loop back a DS0 Test Port, enter the following command:

OPR-LPBK-T0:[<xy>]::[ww]:kk[:<tc>]

Where:

kk = Test Port number (01 through 96) to loop back.

tc = Trunk Conditioning. The need to specify a value depends on the type of Test Port that is being looped back.

Trunk conditioning must be specified in this command only when looping back a dynamic Test Port. If it is not specified for a dynamic Test Port, the command will be denied. A dynamic Test Port is defined as a Test Port in which trunk conditioning was not specified when the Test Port was provisioned.

Although it is not required, trunk conditioning may be specified in this command to loop a static Test Port. A static Test Port is defined as a Test Port in which trunk conditioning was specified when the Test Port was provisioned. If trunk conditioning is specified in this command, it will be used. If it is not specified for a static Test Port in this command, the Test Port's trunk conditioning value will be used.

4.2.1.3 Connect Testport in Monitor Mode and Split Circuit

Overview: This procedure gives the command and considerations for establishing test access to a 64 Kbit/s channel. This initial access is a bridged connection to allow monitoring the circuit for service before it is split for testing.

In a DS1 2.048-Mb/s Interface gateway environment, either a DS1 NPC or a type PB/PC NPC can be used as the test access NPC. In either case, the test access NPC performs the necessary signal conversions to allow testing either side of the Gateway circuit. To test signaling with a type PB/PC NPC, the test access NPC must be provisioned for CAS (odd-numbered x value in growth specification). Generally, DACS II test access adopts the characteristics of the accessed circuit, but, for unmapped terminations, there is a trunk conditioning option and a NAM option (for Gateway) in the command.

1. Enter **RTRV** to see which test ports are grown and available (TPR alongside test port number in output message).
2. Familiarize yourself with the monitor command as follows:

   CONN-TACC-TO:[xy]:<npc No.2>-jjj:[ww]:kkk:[<tc>][,NAM]:MON;

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <npc No.> = NPC number of termination to be tested. Conference legs must be accessed by entering one of the FTU/DS3U legs in the command. For 1-way circuits, the TO-side entered in the CONN-CRS1 must be entered here.

   jjj = Channel to be accessed; can be part of cross-connected circuit or unmapped termination.

   tc = Allows entering <tc> for test access to unmapped termination; if not entered, the <tc> of GRTH TP command will be used for access to unmapped termination.

   kk = Testport number (01 through 96).

   NAM = Optional for gateway to disable A-law to μ-law signal conversion at test access NPC. Needed to test digital data circuits (where there is no encoding) at unmapped terminations.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3. If you need to know the test access channel numbers associated with the test port numbers, refer to Table 4-3.

Table 4-3. Test Access Channels

Test Access Port	DS1 Channel		Type PB Channel	
	From	To	From	To
01,13,25,37,49,61,73,85	1	2	5	6
02,14,26,38,50,62,74,86	3	4	7	8
03,15,27,39,51,63,75,87	5	6	9	10
04,16,28,40,52,64,76,88	7	8	11	12
05,17,29,41,53,65,77,89	9	10	13	14
06,18,30,42,54,66,78,90	11	12	16	17
07,19,31,43,55,67,79,91	13	14	18	19
08,20,32,44,56,68,80,92	15	16	20	21
09,21,33,45,57,69,81,93	17	18	22	23
10,22,34,46,58,70,82,94	19	20	24	25
11,23,35,47,59,71,83,95	21	22	26	27
12,24,36,48,60,72,84,96	23	24	28	29

4. If you are going to use the <tc> field in the command, consider the following:
   - — When a mapped circuit is accessed, whatever <tc> is entered here will be overwritten by the <tc> of the mapped circuit.
   - — When an unmapped circuit is accessed, whatever <tc> is entered here will overwrite the <tc> that was specified in the GRTH TP command.
   - — Access to an unmapped circuit will be denied if the <tc> is not entered here or was not entered in the GRTH TP command.

5. Enter the command with the required information. For 1-way circuits, the TO side entered in the CONN-CRS1 must be entered here.
   - ■ If the CONN ...COMPLD message is not received, find the reason for denial in the output message and perform corrective action to obtain command completion.

6. Note the meanings of the following possible output message keywords:
   - — Signaling (SG) type field - T for transparent, R for robbed bit, and C for CAS.
   - — The next three positions are for primary block alarms, either the alarmed side (F, T, or P for test port NPC) or 0s for no alarms.
   - — The next field is the termination state of the circuit, either the terminated side (F, T, or Both) or R (released/not terminated).

— RDLD indicates red, special service circuit.

— CUS indicates customer control of channel.

— ONEWAY indicates one-way circuit accessed.

7. To split the circuit for transmission or signaling tests, enter:

```
CHG-TACC-TO:[xy]::[ww]:kk:SPLT;
```

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

8. At this point, you can run tests from the local test panel or test position.

4.2.1.4 Change Circuit Termination State (TLA/TLR)

1. Enter the command listed under TERMINATION STATE in Figure 4-4 to make desired changes. Command options allow changing the state of all the bridge terminations or all except the one named in the NOT field.

   NOTE:
   The termination state or TLP (transmission level point) of a conference bridge circuit cannot be changed using the command in Figure 4-4 if the T or F side was previously designated as NTR (no transmit) in TLA command.

2. Enter the command listed under CONFERENCE BRIDGE PARAMETERS in Figure 4-4 to enter given parameters.

   NOTE:
   To make a change, the DMB bridge side of the conference must be entered in the <npc No.2> field of the command.

3. Check completion message for required changes; note the NEW STATE field in the message. The presence of RNG in the termination change message indicates that the states in the range of circuits changed may differ. The RDLD/CUS word will occur if special service circuits were changed.

TERMINATION STATE:

ED-PRMTR-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj[&&-kkk]:[ww]:[INCL]:{TERM|RLS}{F/T/B/L/G/A}[:NOT-<npc No.3>-vvv];

CHG-TL-T0:[xy]::[ww]:kk:TERM{F/T/B/L/G/A}[:NOT-<npc No.3>-vvv];

CONFERENCE BRIDGE PARAMETERS

ED-PRMTR-T0:[xy]:<npc No.1>-ddd,<npc No.2>-jjj:[ww]:[INCL]:[TLP-snn-smm,NG-nn,ES-ee];

EXPLANATION OF VARIABLES

<npc No.1>	=	NPC number on FROM side, extended (for example, 001) or hierarchical (for example, 01-1-01). Refer to **DLP-569** for NPC numbering information.
<npc No.2>	=	NPC number on TO side. See <npc No.1>.
-ddd/-jj	=	Channel number on NPC.
-eee/-kk	=	Optional, last channel of range.
TERM|RLS	=	Desired state, terminated or released on circuit as follows: From-Side/abc (F), To-Side/ghi (T), Both (B), all legs toward bridge (G), all legs toward facilities (L), or all legs in both directions (A)-also see "NOT-<npc No.3>-vvv" below.
NOT-<npc No.3>-vvv	=	One leg specified that is NOT to be changed with all others.
kk	=	Testport number (01-48).
INCL	=	Optional, needed if channel in command is red special service circuit.
TLP-snn-smm	=	Signal level adjustment, "snn" is the input level and "smm" is output level; s = sign (+ or -). Range for nn is –9.0 to +8.8 in 0.2 db steps (entered as whole Nos. –90 to +88).
NG-nn	=	Noise guard adjustment in db (00, 06, 12, or 18).
ES-ee	=	Echo suppression in db (00, 06, 12, or 18).

Figure 4-4. Change Commands

4.2.1.5 Release Test Port

1. When testing is completed, release test access by entering,

   DISC-TACC-T0:[xy]::[ww]:kk;

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.2 Clear-DS1 Signals

4.2.2.1 Establish/Change Clear-DS1 Test Access

1. Familiarize yourself with the different test access modes described in Table 4-4 and illustrated in Figures 4-5 through 4-15 as referenced. See *Establish Loopback on Facility Access Digroup* for loopback.

Table 4-4. Clear-DS1 Test Access Modes

Mode	Meaning	Illustration
MONE	Monitor Equip (E) End of Idle Port or Cross-Connection	Figure 4-5
MONF	Monitor Fac (F) End of Idle Port or Cross-Connection	Figure 4-6
MONEF	Monitor Both Ends	Figure 4-7
SPLTA	Splits E-to-F Connection To Test E-to-F Direction	Figure 4-8
SPLTB	Splits F-to-E Connection To Test F-to-E Direction	Figure 4-9
SPLTAB	Splits both A and B signals of a two-way test session	Figure 4-10
SPLTE	Splits E-to-F Connection To Test E End	Figure 4-11
SPLTF	Splits F-to-E Connection To Test F End	Figure 4-12
SPLTEF	Splits Both Directions To Test E and F Ends	Figure 4-13
LOOPE	Loops E End and Monitors Signal; on 2-Way Circuit, F End Is Disconnected	Figure 4-14
LOOPF	Loops F End and Monitors Signal; on 2-Way Circuit, E End Is Disconnected	Figure 4-15

2. To establish connection, enter the command as follows with the appropriate connection mode:

   ```
   CONN-TACC-T1:[xy]:<npc No.1>[&<npc No.2>],<npc No.3>\
   [,<npc No.4>] :[ww]:<tmode>[:AIS][:INCL];
   ```

   Where:

   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <tmode> = Test mode; see Table 4-4.
   <npc No.1> = NPC number of FAD; NPC of pair for MONEF, SPLTAB, or SPLTEF. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <npc No.2> = Optional, second NPC number of FAD pair.
   <npc No.3> = Reference NPC, E-end NPC or backbone of BDCST.
   <npc No.4> = Optional, to name different F-end NPC of broadcast circuit; if omitted, existing F-end or full tributary will supply.
   AIS = Optional, to select AIS termination signal sent on disconnected side of split circuit; not valid for unmapped termination. QRSS may be a future offering.
   INCL = Optional, to test special service or customer controlled circuit. Required for all modes, except monitor modes.

3. To change the test access mode, modes MONEF, SPLTEF, and SPLTAB each require two FADs and can only be changed from one to the other.

   ```
   CHG-ACCMD-T1:[xy]:<npc No.1>[,<npc No.2>:[ww]:\
   <tmode>[:AIS][:INCL];
   ```

   Where:
   <npc No.> = NPC number of FAD
   <tmode> = Test mode; see Table 4-4.

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4. To familiarize yourself with the connection query, enter the following using the FAD for the <npc No.>.

   ```
   UTL::QRY,TO <npc No.>!
   ```

5. To familiarize yourself with all current test ports (TADs and FADs), enter the following. `RTRV-TACC-T1:[<xy>][::ww];`

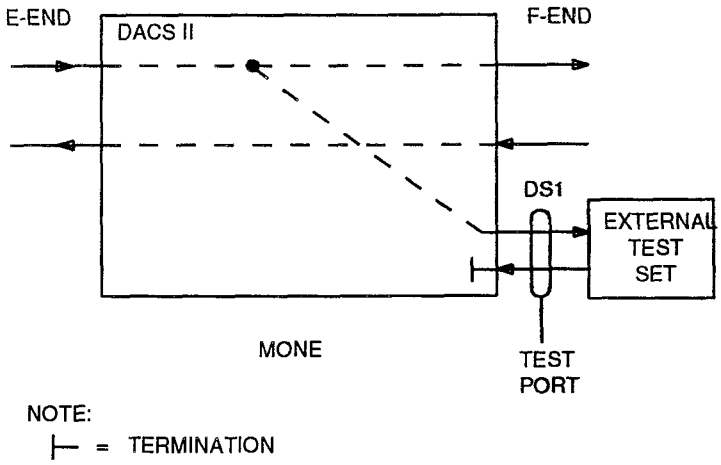


Figure 4-5. MONE Mode

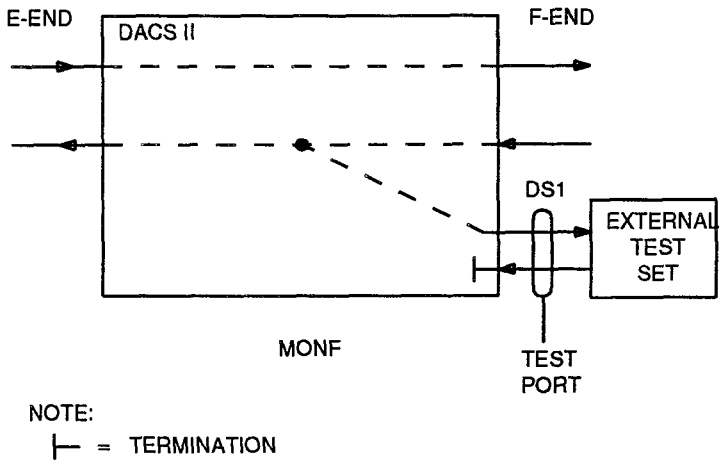


Figure 4-6. MONF Mode

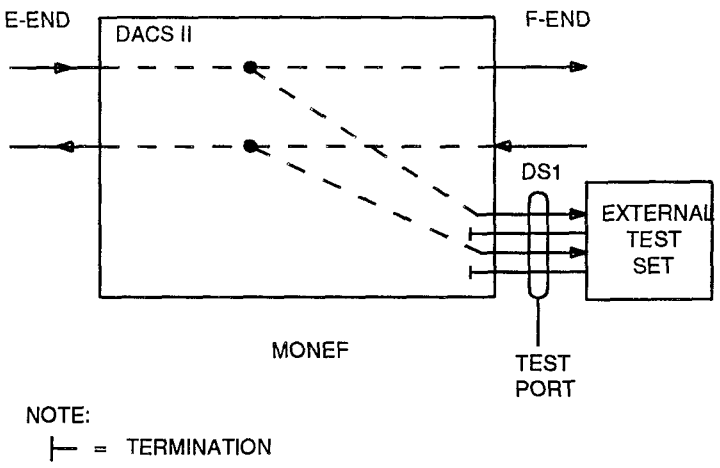


Figure 4-7. MONEF Mode

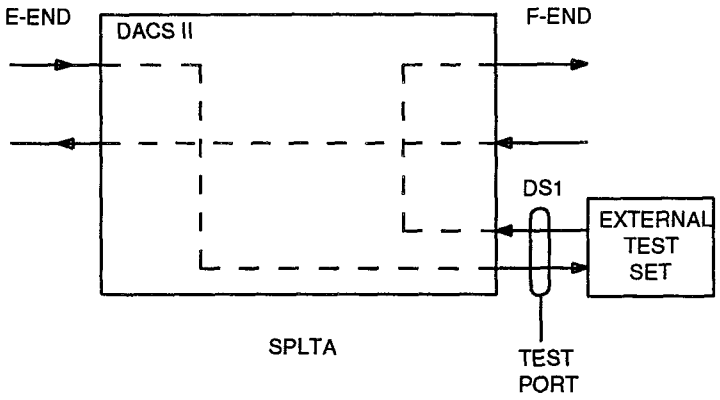


Figure 4-8. SPLTA Mode

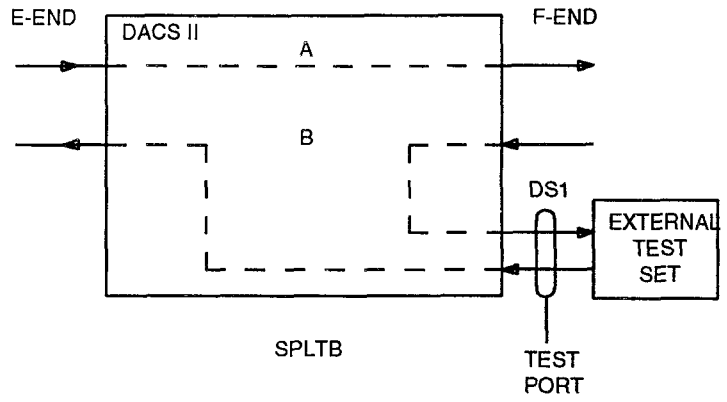


Figure 4-9. SPLTB Mode

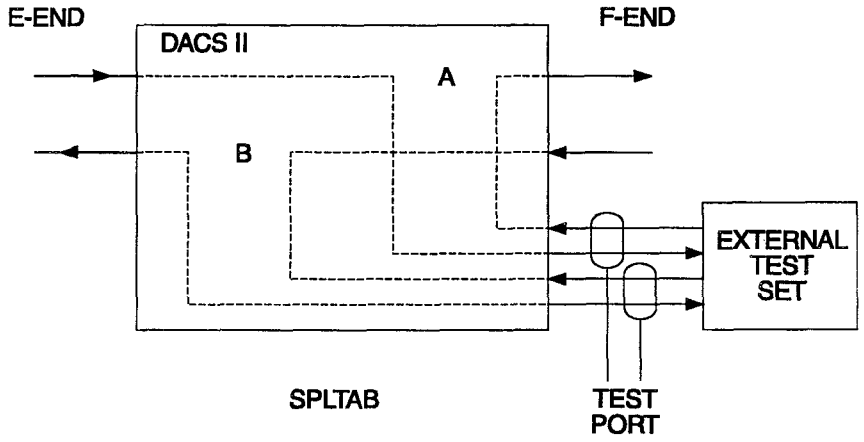


Figure 4-10. SPLTAB Mode

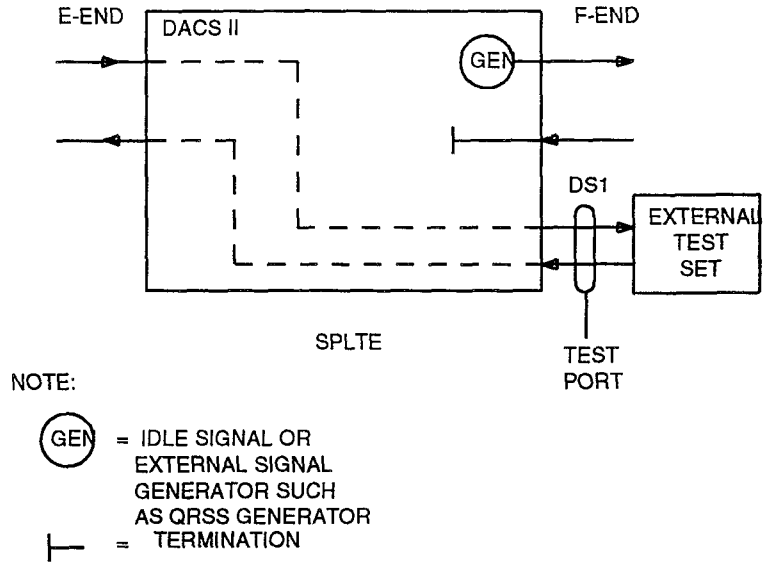


Figure 4-11. SPLTE Mode

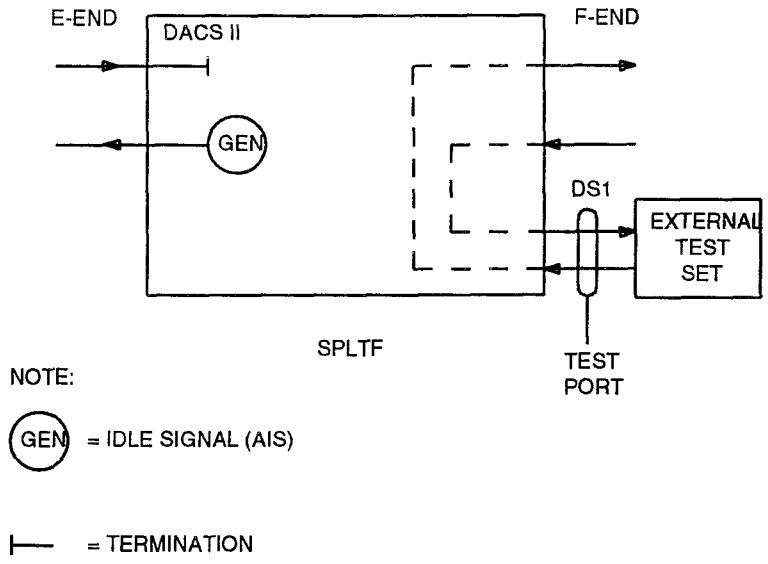


Figure 4-12. SPLTF Mode

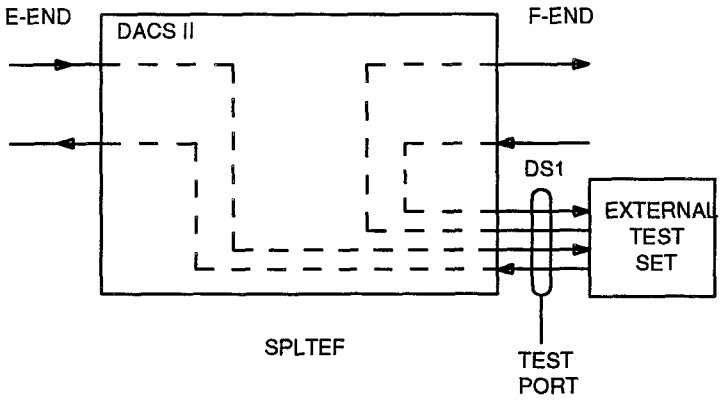


Figure 4-13. SPLTEF Mode

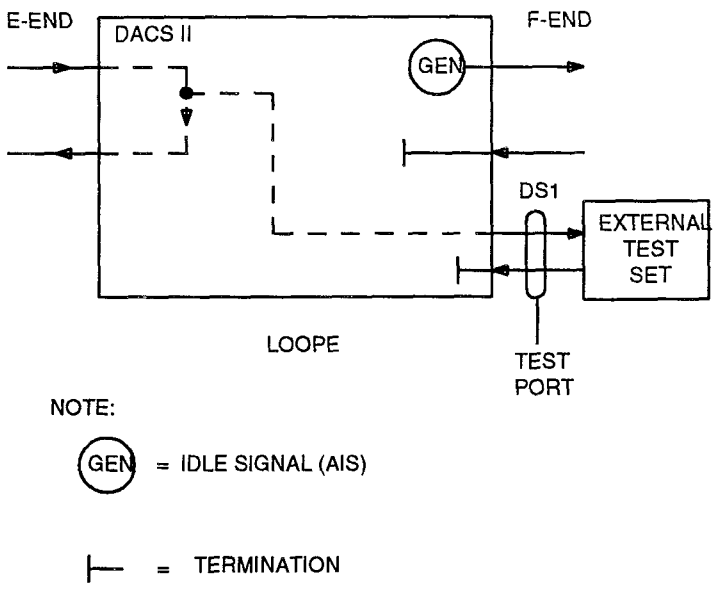
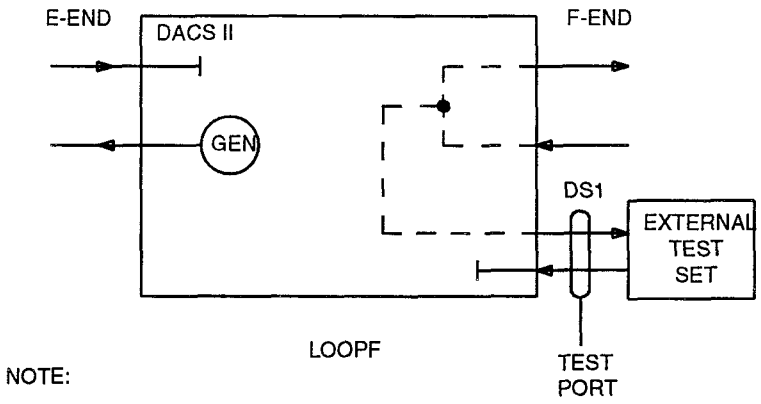


Figure 4-14. LOOPE Mode



NOTE:

GEN = IDLE SIGNAL (AIS)

|— = TERMINATION

Figure 4-15. LOOPF Mode

4.2.2.2 Change Non-channelized Circuit Termination State

1. Familiarize yourself with the termination and termination signal selections in Table 4-5.

Table 4-5. Terminations and Signals

Termination	Meaning
NORM	Normal data of the cross-connection.
TERM	Terminate side with default termination signal (AIS).

2. Consider the following restrictions on making changes:
   - — E-end mode cannot be changed for test session in any of the following modes: SPLTF, SPLTEF, or LOOPF.
   - — F-end mode cannot be changed for test session in any of the following modes: SPLTE, SPLTEF, or LOOPE.
   - — E-end mode cannot be changed on a 1-way circuit under test.

3. Enter following command with the appropriate fields and modes from Table 4-5 to make the required changes:

```
CHG-TACC-T1:[xy]:<npc No.1>[,<npc No.1B>]:\
[ww]:{[:<emode> y][,<fmode y>]}[:INCL];
```

   Where:

   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.1> = NPC number for FAD; with bidirectional access, two NPCs can be entered. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <emode> y = Optional, to select termination mode (y) from Table 4-5 for E-end NPC.
   <fmode> y = Optional, to select termination mode (y) from Table 4-5 for F-end NPC.
   INCL = Optional. Used to make changes to special service or customer controlled circuit.

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.2.3 Establish Clear-DS1 Hub Connection

1. Enter the following command to establish the hub connection:

   `CONN-HUB-T1:[xy]:<npc No.1>,<npc No.2>[:INCL];`

   Where:

   xy = Unique id (target id); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <npc No.1> = NPC number of facility access digroup, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   <npc No.2> = NPC number of TO-side NPC connected to remote FAD.

   INCL = Optional. Used if one or more of the NPCs is marked a special service or customer controlled circuit.

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.2.4 Establish Loopback on Facility Access Digroup

1. Enter the following command to establish the loopback connection:

   `OPR-LPBK-T1:[xy]:<npc No.>:[ww]:LPBKT[:INCL];`

   Where:

   xy = Unique id (target id); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <npc No.> = NPC number of subject facility access digroup, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   INCL = Optional. Used if one or more of the NPCs is marked as special service or customer controlled circuit.

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

NOTE:
While looped, the termination signal is looped to the facility access digroup.

4.2.2.5 Release Test Access

1. If you want to see the test access connection and characteristics of the FAD, enter `RTRV-PRMTR-T0::<npc No.>::TO;`

   Where: <npc No.> = NPC number of facility access digroup.

2. At this point, you can run tests using the external test set connected to the facility access digroup.

3. When testing is completed, enter the following message to release test access.
   `DISC-TACC-T1::[<fad No.>][:ww][:OOS];`

4.2.3 Subrate DS0A or DS0B Circuits

4.2.3.1 Access Two-Point Circuit in Monitor Mode

Overview: This section covers changing a specified test port channel to the monitor mode for a subrate circuit (data transmission in the tested circuit is not interrupted). Although primarily for 2-point circuits, it can be used to access the facility ends of a multipoint circuit (on MJU).

NOTE:
A test port has to be previously established before a channel can be changed to the monitor mode for a subrate circuit. Refer to the Establish Test Connection section for information on establishing a test port.

1. To change a specified test port channel to the monitor mode for a subrate circuit, enter:

   ```
   CONN-TACC-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:kk:
   MON:MJU-ssss:[BRi];
   ```

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = TO channel number within the digroup.

   ff = TO customer number.

   kk = Test port channel number (01 through 96).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

   NOTE:
   The external facility termination is connected to the TO test port channel. The external facility termination can be part of a two-point circuit, the master leg, or the branch termination of a multipoint circuit.

4.2.3.2 Access Multipoint Circuit in Monitor Mode

Overview: This command allows accessing a subrate multipoint circuit in the monitor mode with a test port (data transmission in the tested circuit is not interrupted).

1. Which part of the circuit do you need to access?
   - If branch of MJU, continue with Step **2**.
   - If control leg of MJU, proceed to Step **3**.

2. For test access to a branch of an MJU, enter

   CONN-TACC-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:kk:MON; MJU-ssss:BRi;.

   The TO test port channel faces MJU ssss; the FROM test port channel faces the external facility termination for the specified branch or control leg port of the MJU cascaded from the specified branch (i) of MJU ssss.

   Where:

   xy = DACS II frame number (00 - ZZ) If the command is issued to a remote frame, the frame number must be entered.

   ww = Command sequence number (01 - 49) If the command is issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = channel number within the TO-side digroup.

   ff = TO-side customer number.

   kk = Test port channel number (01 through 96).

   ssss = MJU identification number addressed by this command (1 through 9999).

   i = Branch number of MJU ssss (1 through 4).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3. For test access to a control leg of an MJU, enter

   CONN-TACC-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:kk:
   MON:MJU-ssss;.

   The TO test port channel faces the MJU; the FROM test port channel faces the external facility termination for MJU 1 or toward the branch from which MJU ssss is cascaded if MJU ssss is greater than 1.

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = TO channel number within the digroup.

   ff = TO customer number. Optional when channel is a DS0A.

   kk = Test port channel number (01 through 96).

   ssss = MJU identification number addressed by this command (1 through 9999).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.3.3 Access Multipoint Circuit in Split Mode

Overview: This section explains the method of accessing a subrate multipoint circuit directly in the split testing mode with a test port; the circuit cannot be in the test port monitor mode. This command is primarily for two-point circuits, but it can be used to access the facility ends of a multipoint circuit on the MJU. Data transmission in the tested circuit is not interrupted.

1. Which part of circuit do you need to access?
   - If control leg of MJU, continue with Step **2**.
   - If branch of MJU, proceed to Step **3**.

2. For test access to a CONTROL LEG, enter

   CONN-TACC-TS:[xy]<npc No.>ddd[-ff]:[ww]:kk:SPLT:MJU-ssss;.

   The TO test port channel faces the MJU; the FROM test port channel faces the external facility termination for MJU 1 or toward the branch from which MJU ssss is cascaded if MJU ssss is greater than 1.

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = TO channel number within the digroup.

   ff = TO customer number.

   kk = Test port channel number (01 through 96).

   ssss = MJU identification number addressed by this command (1 through 9999).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3. For test access to a BRANCH, enter

```
CONN-TACC-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:kk:
SPLT:MJU-ssss:[BRi];
```

The TO test port channel faces MJU ssss; the FROM test port channel faces the external facility termination for the specified branch or control leg port of the MJU cascaded from the specified branch (i) of MJU ssss.

Where:

xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

<npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd = TO channel number within the digroup.

ff = TO customer number.

kk = Test port channel number (01 through 96).

ssss = MJU identification number addressed by this command (1 through 9999).

i = Branch number of MJU ssss (1 through 4).

- If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.3.4 Change Access to Split Mode

NOTE:
Split test access to an entire multiplexed DS0B channel (rather than a single DS0B customer) can only be done by first monitoring the channel and then splitting it by use of this command without a digroup and channel number.

1. To change a specified test port channel to the split mode for a subrate circuit, enter

   CONN-TACC-TS:[xy]:<npv No.>ddd[-ff]:[ww]:kk:SPLT;

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = TO channel number within the digroup.

   ff = TO customer number.

   kk = Test port channel number (01 through 96).

   ssss = MJU identification number addressed by this command (1 through 9999).

   i = Branch number of MJU ssss (1 through 4).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.3.5 Change Terminate and Leave Test Access

1. To change the terminate and leave state of the subrate circuit under test on the specified test port channel, enter

```
CHG-TL-TS:[xy]:[ww]:kk:TERM{F|T|B};
```

NOTE:
The TO side is defined as the side of the circuit connected to the even numbered test port channel, and the FROM side is connected to the odd numbered test port channel.

Where:

xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

kk = Test port channel number (01 through 96).

F,T,B = From, to, or both (F, T, or B).

- If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.3.6 Release Subrate Specific Test Port Channel

1. Enter the following command to release a subrate circuit from test access on the specified test port channel and restore the circuit to normal. If the circuit was terminated either before or during test access, it will retain the termination state upon release.

   CONN-TACC-TS:[xy]::[ww]:kk;

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   kk = Test port channel number (01 through 96).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.2.3.7 Release Groups of Subrate Testports

NOTE:
This command will release all test port channels connected to the subrate circuits that were initiated by this link ("ALL" keyword) or all test port channels connected to subrate channels regardless of which administrative link initiated the test access ("LINK" keyword).

1. To release all test port channels from test access connected to subrate channels initiated by this administrative link or by all administrative links, enter

   CONN-TACC-TS:[xy]::[ww]:{ALL|LINKS};

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

4.3 Establish Test Group Connection (Nx64 Kbit/s)

4.3.1 Connect Test Group in Monitor Mode and Split Circuit

Overview: This procedure gives the command and considerations for establishing test access to a range of 64 Kbit/s channels. This initial access is a bridged connection to allow monitoring the circuit for service before it is split for testing. Generally, DACS II test access adopts the characteristics of the accessed circuit, but, for unmapped terminations, there is a trunk conditioning option in the command.

1. Enter `RTRV-TACC-TO:[<xy>]:[TG-mmm[&&-nnn]]:[ww][:ALL-TGS];` to see information on a TG, range of TGs, or ALL TGs. For each TG queried, the NPCTG/NPC number and starting channel number for the east and west bundles are provided along with the TG width and mode.

   Due to the potentially large number of NPCTGs and TGs, enter `RTRV-TACC-TO:[<xy>]:NPCTG-rrr[&&-sss][:ww];` to query an NPCTG or a range of NPCTGs.

2. Familiarize yourself with the monitor command as follows:

   ```
   CONN-TACC-TO:[xy]:<npc No.>-jjj[&&-kkk]\
   [&-lll&...]:[ww]:TG-mmm:[<tc>]:MON;
   ```

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   mmm = Test group number

   <npc No.> = NPC number of termination to be tested. Conference legs must be accessed by entering one of the FTU/DS3U legs in the command. For 1-way circuits, the TO-side entered in the CONN-CRS1 must be entered here.

   jjj,kkk,lll = List or range of channels (Number of channels must match width of TG)

   tc = Allows entering <tc> for test access to unmapped termination; if not entered, the <tc> of GRTH TG command will be used for access to unmapped termination.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

3. If you are going to use the <tc> field in the command, consider the following:
   - — When a mapped circuit is accessed, whatever <tc> is entered here will be overwritten by the <tc> of the mapped circuit.
   - — When an unmapped circuit is accessed, whatever <tc> is entered here will overwrite the <tc> that was specified in the GRTH TG command.
   - — Access to an unmapped circuit will be denied if the <tc> is not entered here and was not entered in the GRTH TG command.

4. Enter the command with the required information. For 1-way circuits, the TO side entered in the CONN-CRS1 must be entered here.
   - If the CONN ...COMPLD message is not received, find the reason for denial in the output message and perform corrective action to obtain command completion.

5. Note the meanings of the following possible output message keywords:
   - — Signaling (SG) type field - T for transparent, R for robbed bit, and C for CAS.
   - — The next three positions are for carrier group alarms, either the alarmed side (F, T, or P for test group NPC) or 0s for no alarms.
   - — The next field is the termination state of the circuit, either the terminated side (F, T, or Both) or R (released/not terminated).
   - — RDLD indicates red, special service circuit.
   - — CUS indicates customer control of channel.
   - — ONEWAY indicates one-way circuit accessed.
   - — BCAST indicates BCON circuit accessed.
   - — UMPD indicates unmapped circuit accessed.

6. To split the circuit for transmission or signaling tests, enter:

```
CHG-TACC-TO:[xy]::[ww]:TG-mmm:SPLT;;
```

NOTE:
If the TG is connected to an unmapped Nx64 Kbit/s termination, this command connects both directions of the unmapped termination to the TG's west bundle.

- If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

7. At this point, you can run tests from the local test panel or test position.
8. To change the mode of a TG currently in split mode to monitor mode, enter `CHG-TACC-T0:[<xy>]:[ww]:TG-mmm,MON;`

4.3.2 Change Circuit Termination State (TERM/RLS)

Overview: This procedure gives the commands for modifying the terminate and leave active (TERM) and terminate and leave released (RLS) states of one or both ends of a Nx64 Kbit/s cross-connection associated with a TG. In the terminated state, the normal transmitted data on the circuit is replaced by the signal pattern according to the circuit's trunk conditioning code, as specified when the cross-connection was set up. In the released state, a terminated circuit is released and normal data transmission is restored in the specified transmission.

NOTE:
The Nx64 Kbit/s circuit must be a mapped one-way or two-way circuit currently under monitor or split test modes, and unterminated to modify the TLA states or terminated to modify the TLR states.

1. To modify the terminate and leave active states, enter:

   `CHG-TL-TO:[xy]::[ww]:TG-mmm:TERM{F|T|B}`

   Where: xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   mmm = TG number
   FITIB = Direction of circuit to be terminated:
   F = terminated toward the FROM side
   T = terminated toward the TO side
   B = BOTH sides are terminated

2. To modify the terminate and leave release states, enter:

   `DISC-TACC-TO:[xy]::[ww]:TG-mmm:RLS{F|T|B}`

   Where: xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   mmm = TG number
   FITIB = Direction of circuit to be released:
   F = released toward the FROM side
   T = released toward the TO side
   B = BOTH sides are released

4.3.3 Connect Test Group in HUB Mode

Overview: This procedure gives the command to set up an Nx64 Kbit/s HUB test access connection via a TG, to a Nx64 Kbit/s TO termination consisting of two Nx64 Kbit/s bundles connected to the TG's east and west bundles. The number of channels in each bundle is the same as the TG's width; and the starting channels are indicated by the TO termination.

1. Enter `CONN-HUB-TO:[xy]:uv-m-np-ddd,wx-k-qr-jjj:\ [ww]:TG-mmm[:<tc>];`

   Where:

   xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   uvmnp = 1st TO NPC number
   wxkqr = 2nd TO NPC number
   ddd = Starting channel number of 1st TO NPC
   jjj = Starting channel number of 2nd TO NPC

4.3.4 Connect Test Group in LOOPED Mode

DACS II provides a loopback test access command to place both bundles of a test-access group (TG) in the looped mode.

The loopback is released using a Test Port release command.

To loop back a bundles of a TG, enter the following command:

`OPR-LPBK-TO::mmm[:<tc>]`

Where:

`mmm` = Test Group number (001 through 400) to loop back.

`tc` = Trunk Conditioning. If the static trunk conditioning was not furnished in the growth TG command, it must be dynamically specified in this command or the test access will be denied. A dynamic tc will override any static tc.

4.3.5 Release and Degrow Test Group

Overview: This procedure gives the commands to release one or a range of currently active TGs, degrow a TG, and degrow an NPCTG. When a TG is released, any circuit under test is restored to its normal, terminated, or unmapped state.

1. If testing is complete, release the test group(s) by entering:

   DISC-TACC-T0:[xy]::[ww]:TG-mmm[&&-nnn][:OOS];

   The OOS keyword must be used if any NPC involved is out of service. This TG is now available to test other circuits or may be degrown.

2. To degrow a TG or a range of TGs, enter:

   DISC-EQPT:[<xy>]:TG-mmm[&&-nnn][:ww];

   If the range mmm-nnn includes some undesignated TG numbers, these numbers will be skipped. The output message will indicate degrown and skipped TGs appropriately.

3. To degrow an NPCTG, enter:

   DISC-EQPT:[<xy>]:NPC-uv-m-np:[ww]:NPCTG-rr[:TGR];

   It is required that all TGs associated with this NPCTG be released before the NPCTG can be degrown. If TGR is specified, all active TGs will be released and degrown before the NPCTG is degrown; and any out-of-service (OOS) condition will be bypassed (i.e., TG will be released as if the OOS keyword was entered above).

Remove and Degrow Equipment

5

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Remove and Degrow Equipment

5

5.1 Remove and Degrow NPC

Overview: This procedure gives the commands to remove NPC(s) (network processing circuit) from service and to degrow the NPC(s) from the data base. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications.

1. To list all plug-ins enter:

   RTRV-STATE-EQPT::[UNIT-[q]q]::EQPD;

   To list common plug-ins (no NPCs) enter:

   RTRV-STATE-COM:[xy]::[ww]:EQPD;.

   After response enter **RTRV-STATE-EQPT::[UNIT-[q]q]::OOS;.**

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which NPC packs are grown and still in-service. The presence of the CP (circuit pack) number itself or the presence of a "1" in the listing indicates that the condition (equipped, out-of-service) exists.

3. See CAUTION. Enter
   RMV-EQPT::NPC-<npc No.>[&&[&]-<range>]::[SIDE-s][:INCL];

   CAUTION:
   Any NPC with cross-connections should only be removed if warranted by trouble clearing because service on all channels of the NPC will be interrupted.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Use only for FTU (facility terminating unit). Three ampersand (&s) are required for hierarchical.
   SIDE s = Use for DSPU (digital signal processing unit) NPC.
   INCL = Use if special service CONNs exist.

   NOTE:
   When the NPC is removed from service, no plug-in or facility alarms will be registered and a predefined insertion word will be sent out on all channels if the plug-in is in the frame.

   NOTE:
   To expedite degrowing DSPU NPCs, the disconnect NPC command removes both NPC sides from service and degrows the NPC; the RMV-EQPT command is not used.

4. If the NPC is going to be degrown, continue with Step **5**.
   - If not, this procedure is completed.

5. Enter `RTRV-CRS-T1::<npc No.>[&&[&-]<range>]::MAP;`

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <range> = Optional; to specify last NPC of continuous range. Three ampersand (&s) and a dash (-) are required for hierarchical.

   - If there are any cross-connections on the NPCs, refer to *Cross-Connections and Disconnections* to disconnect the DS0 channels or clear-DS1s and then continue with this procedure.
   - If there are any test access cross-connections, enter `DISC-TACC-T0:[xy]::[ww]:kk[:OOS];` for test access to make disconnections.

6. If NPC was used for subrate data connections, enter `RTRV-STATE-TS::<npc No.>-ddd[&&-eee];` to see if any channels are established to subrate.
   - If any channels are established to subrate, refer to *Provisioning* to disestablish the channels and then continue with this procedure.

7. If subject NPC is the test port digroup (NPCTP designation), enter `DISC-EQPT::NPC-<npc No.>::NPCTP-n[:TPR];` to remove the TP designation (TPR word releases and degrows any test ports).

8. Enter `DISC-EQPT::NPC-<npc No.>[&&[&]-<range>];`
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5.2 Remove and Degrow IFTU/FTU

Overview: This procedure gives the commands to remove IFTU (integrated facility terminating unit) or FTU (facility terminating unit) plug-ins from service and to degrow the unit. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. To expedite degrowing a unit, the associated ETSIs (expanded time slot interchangers), or CCBs (cross-connect buffers) and TSIs (time slot interchangers) are automatically degrown with the unit UC (unit controller). There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

1. To list all plug-ins enter:

   RTRV-STATE-EQPT::[UNIT-[q]q]::EQPD;

   To list common plug-ins (no NPCs) enter:

   RTRV-STATE-COM:[xy]::[ww]:EQPD;.

   After response enter **RTRV-STATE-EQPT::[UNIT-[q]q]::OOS;**.

   Where: [q]q = Unit number (1 through 16).

   ⇒ **NOTE:**
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which UNIT packs are grown and still in-service. The presence of the CP number itself or the presence of a "1" in the listing indicates that the condition (equipped, out-of-service) exists.

3. Consider the following comments relating to removing service and degrowth:

   — When unit packs are removed from service and the unit UC is degrown, the associated and ETSIs, or CCBs and TSIs, will **automatically** be removed and degrown (disconnected). This occurs only if the associated packs are not supporting cross-connections or other packs (subentities).

4. Enter the following commands to remove the UNIT.

   RMV-EQPT::UNIT-[q]q::FC-sb; (See Note 1.)

   RMV-EQPT::UNIT-[q]q::FTMI-d;

   RMV-EQPT::UNIT-[q]q::UC; (See Note 2.)

   Where:
   [q]q = Unit number (1-16)
   sb = side and format converter (FC) number (1-4)
   d = FTMI (facility terminating module interface) number (1-4).

   NOTE 1:
   If the FTMI is to be degrown, this command does not need to be entered because FCs on both sides will be removed with FTMI degrowth command.

   NOTE 2:
   If the FTMI is to be degrown, do not enter this command now because the unit UC must be in-service to use other commands. This command will be entered after the FTMI is degrown in the next step.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. If the UNIT is to be degrown, enter the following commands. The DISC FTMI command will have to be entered for each FTMI (1-4) that is grown.

   DISC-EQPT::UNIT-[q]q::FTMI-d;

   RMV-EQPT::UNIT-[q]q::UC;

   DISC-EQPT::UNIT-[q]q;

   NOTE:
   The ETSIs, or CCBs and TSIs on both sides of the unit will be removed and degrown when the unit is degrown.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5.3 Remove and Degrow DSPU

Overview: This procedure gives the commands to remove DSPU (digital signal processing unit) plug-ins from service and to degrow the unit. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. To expedite degrowing a unit, the associated ETSIs, or CCBs and TSIs, are automatically degrown with the unit UC. There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

1. To list all plug-ins enter:

   `RTRV-STATE-EQPT::[UNIT-[q]q]::EQPD;`

   To list common plug-ins (no NPCs) enter:

   `RTRV-STATE-COM:[xy]::[ww]:EQPD;`.

   After response enter `RTRV-STATE-EQPT::[UNIT-[q]q]::OOS;`.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which UNIT packs are grown and still in-service. The presence of the CP number itself or the presence of a "1" in the listing indicates that the condition (equipped, out-of-service) exists.
3. Consider the following comments relating to removing service and degrowth:
   - — When a pack in a duplicated circuit group is removed on the active side, service will automatically switch over to the other side (if in-service).
   - — To expedite degrowing DSPU NPCs, the disconnect NPC command removes both NPC sides from service and degrows the NPC; the RMV-EQPT command is not used.

4. Enter the following commands to remove the DSPU.

   ```
   RMV-EQPT::UNIT-[q]q::DSPI;
   RMV-EQPT::UNIT-[q]q::UC;
   ```

   Where: [q]q = Unit number (1-16)

5. If the UNIT is to be degrown, enter the following command.

   ```
   DISC-EQPT::UNIT-[q]q;
   ```

   NOTE:
   The ETSIs, or CCBs and TSIs on both sides of the unit will be degrown when the unit is degrown.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5.4 Remove and Degrow ECCN/CCN

Overview: This procedure gives the commands to remove ECCN (expanded cross-connect network) or CCN (cross-connect network) plug-ins. The ECCN/CCN plug-ins are degrown when the units are degrown. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. This is the main reason for degrowing a unit, and, to expedite this, the associated ETSIs or CCB and TSIs are automatically degrown with the unit UC. There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

1. To list all plug-ins enter:

   `RTRV-STATE-EQPT::[UNIT-[q]q]::EQPD;`

   To list common plug-ins (no NPCs) enter:

   `RTRV-STATE-COM:[xy]::[ww]:EQPD;`.

   After response enter `RTRV-STATE-EQPT::[UNIT-[q]q]::OOS;`.

   Where: [q]q = Unit number (1 through 16).

   ⇒ NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which ECCN/CCN packs are grown and still in-service. The presence of a "1" or the presence of the CP number itself in the listing indicates that the condition (equipped, out-of-service) exists.
3. Consider the following comments relating to removing service and degrowth:
   - — Allowable active-side removals are: ETSIs if no involved CONN maps; CCI if no associated ETSIs in-service; and FC if no associated NPCs in-service.
   - — When a pack in a duplicated circuit group is removed on the active side, service will automatically switch over to the other side (if in-service).
   - — Service cannot be removed from the remaining side if there are any in-service NPCs.
   - — When unit packs are removed from service and the unit UC is degrown, the DS3U FMTs (formatters) and the ETSI will **automatically** be removed and degrown (disconnected). This occurs only if the associated packs are not supporting cross-connections or other packs (subentities).

4. Enter the following command to remove ECCN or CCN plug-ins (see Note).

NOTE:
When UNIT is to be degrown, the ETSI (or CCB and TSIs) on both sides will be removed.

For ECCN:

```
RMV-EQPT::ETSIS,ECCN-s;      (for all ETSIs on Side s)
RMV-EQPT::ETSI-sqq;          (for individual ETSI)
RMV-EQPT::CCI-s;
```

Where: qq = Unit Number 1 through 16.

For CCN:

```
RMV-EQPT::TSIS,CCN-s;        (for all TSIs on Side s)
RMV-EQPT::CCB-sf;
RMV-EQPT::TSI-sft;  (for individual TSI)
RMV-EQPT::CCNI-s;
```

Where:
s = Side 0 or 1
f = CCB number 1 through 6
sft = TSI number consisting of sides (0 or 1) FROM unit (1 through 6) and TO unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

NOTE:
A major alarm will be registered after the ECCN/CCN side has been out of service for more than two minutes.

5. Enter the following commands to degrow the UNIT.

```
DISC-EQPT::UNIT-[q]q;
```

Where: [q]q = Unit number 1 through 16.

NOTE:
The ETSI (or CCB and TSIs) and the FMTs on both sides of the unit will be removed and degrown when the unit is degrown.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5.5 Remove and Degrow DS3U

Overview: This procedure gives the commands to remove DS3U plug-ins from service and to degrow the unit. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. This is the main reason for degrowing a unit, and, to expedite this, the associated ETSIs or CCB and TSIs are automatically degrown with the unit UC. There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

CAUTION:
Performing this procedure incorrectly can interrupt service. Familiarize yourself with the procedure and commands before beginning and perform each step of the procedure in the order given.

1. To list all plug-ins enter:

   `RTRV-STATE-EQPT::[UNIT-[q]q]::EQPD;`

   To list common plug-ins (no NPCs) enter:

   enter `RTRV-STATE-COM:[xy]::[ww]:EQPD;`.

   After response enter `RTRV-STATE-EQPT::[UNIT-[q]q]::OOS;`.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which DS3U unit packs are grown and still in-service. The presence of a "1" or the presence of the CP number itself in the listing indicates that the condition (equipped, out-of-service) exists.

3. Consider the following comments relating to removing service and degrowth:
   - — When unit packs are removed from service and the unit UC is degrown, the associated DS3U FMTs and ETSI or CCB and TSIs will **automatically** be removed and degrown (disconnected). This occurs only if the associated packs are not supporting cross-connections or other packs (subentities).
   - — For DS3 unit, the FRC keyword for the RMV MMFG (MIU-MXR function group) command forces the removal without protection switching (or switchback if MMFG P). The removal would normally be denied if switching did not occur. The FRC must be used to remove more than one MMFG at a time.
   - — For DS3 unit, an unprotected FLI can only be removed when all the following are true: no service MXR is grown, the protection MXR (multiplexer) is not grown, and protection MIU (multiple interface unit) is out-of-service.

4. Enter the following commands to remove the DS3U unit.

NOTE:
If you are going to degrow equipment and there are no service cross-connections on the DS3, the FRC and INCL keywords can be used to remove all NPCs on the MMFG. You can also remove a range of MMFGs to expedite unit degrowth.

If you need to remove the FMT only (that is, not degrowing the DS3U in which case, the FMT will automatically be removed), enter
RMV-EQPT::UNIT-[q]q::FMT-s;

RMV-EQPT::UNIT-[q]q::MMFG-c[&&-d][:FRC[,INCL];
RMV-EQPT::UNIT-[q]q::MMFG-P;
RMV-EQPT::UNIT-[q]q,MIU-P; (if equipped)

Where:
[q]q = Unit number (1-16)
c = (1-6)
s = Side 0 or 1
FRC = forces remove without switching to remove multiple MMFGs or with INCL keyword
INCL = removes all NPCs on MXR.

If you need to specifically remove only the FLI or unit UC, enter
RMV-EQPT::UNIT-[q]q::FLI-k; where: k = S, P (See Note .)
RMV-EQPT::UNIT-[q]q::UC; (See Note.)

NOTE:
If the unit is to be degrown, the remove FLI and remove unit UC commands should be entered with the degrowth commands. The unit UC must be in-service to use commands in degrowth portion.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. If the UNIT is to be degrown, enter the following commands.

```
DISC-EQPT::NPC-<npc No.>[&&[&]-<range>];
DISC-EQPT::UNIT-[q]q::MIU-c[&&-d];   (if equipped)
DISC-EQPT::UNIT-[q]q::MXR-c[&&-d];
```

NOTE:
MXR P (protection) will automatically be degrown when the DS3U is degrown.

```
DISC-EQPT::UNIT-[q]q::MIU-P;
RMV-EQPT::UNIT-[q]q::FLI-k;   where: k = S, P
RMV-EQPT::UNIT-[q]q::UC;
DISC-EQPT::UNIT-[q]q;
```

NOTE:
The ETSI (or CCB and TSIs) and the FMTs on both sides of the unit will be removed and degrown when the unit is degrown. The FLI S and FLI P and MXR P will also be automatically degrown.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Cross-Connections and Disconnections

6

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Cross-Connections and Disconnections

6

6.1 Cross-Connect, Change or Disconnect DS0 (Including *SLC*® Carrier)

6.1.1 Cross-Connect, Change, Disconnect DS0 Signals

6.1.1.1 Two-Point, Two-Way Circuit or One-Way Circuit

1. Familiarize yourself with the commands; the CRS is for a 2-way connection and the CRS1 is for a 1-way connection. The T0 (T zero) keyword indicates a DS0 circuit. The <npc No.1> and <npc No.2> side assignments serve as reference for the CRS1 connection and for test access.

   Two-Way:

   ```
   CONN-CRS-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kkk]: [ww]:<tc>:[RDLD][,{CUS|INCL}]:[AIS]:
   [{NORM,NORM|TERM,TERM}];
   ```

   One-Way:

   ```
   CONN-CRS1-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kkk]: [ww]:<tc>:[RDLD][,{CUS|INCL}][:{NORM|TERM}];
   ```

2. Obtain information needed for command from circuit layout information; see Figure 6-1 for construction of TC field. Four dashes must be entered for the FROM-side in the TC field of a one-way command.

3. Enter cross-connect command. If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

   Where:

   CRS, CRS1 = CRS for 2-way; CRS1 for 1-way.
   <npc No.1> = NPC number of one side (FROM), either extended (for example, [0]001)) or hierarchical (for example, 01-1-01).
   xy = Unique id (target id); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   <range> = Last NPC in a range. For *SLC* carrier, always specify digroup A NPC (see Note 1).
   ddd = Channel number: 01 through 24 or 01 through 96 for *SLC* Carrier NPCs (see Table 6-1). See Notes 2 and 3.
   eee = Optional; last channel of range to be connected.
   <npc No.2> = NPC number of other side (TO); see <npc No.1>.
   jjj = Channel number (01 through 24).
   kkk = Optional; last channel of range to be connected.
   <tc> = Trunk conditioning per circuit layout card; see Figure 6-1.
   RDLD = Optional; to designate red special service circuit.
   CUS = Optional; to designate customer controlled channels.
   INCL = Optional; to remove previous CUS channel designation.
   AIS = Optional; for 24-channel range connection to supply all 1s signal downstream when incoming CGA is received.
   NORMITERM = To specify unterminated, normal (NORM, default) or terminated (TERM), preservice connection.

   - If the command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

Table 6-1. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

NOTE 1:
Channel Numbering - The channel numbers for four digroups at the RT are numbered 01 through 96; the channels at the DACS II are numbered the same and are all considered to be on digroup A NPC. In *SLC* 96 carrier Mode III where only two digroups and odd channels are involved at the RT, the same odd-numbered channels are used at both ends and the channels are considered to be all on digroup A.

NOTE 2:
Mode I - Only channels from the associated RT (same ID) can be cross-connected to a given DCLU. Furthermore, the same channel numbers must be used in both the FROM and TO sides of the command to connect the RT to the DCLU. Channels left vacant by removal of nonswitched specials are not used (no channel packing).

Mode III - Only odd channels corresponding to RT single channels are used.

NOTE 3:
The FDL (facility data link) of the ESF (extended superframe) signal can be cross-connected as channel 00.

4. Familiarize yourself with connection query outputs:

   - Enter `RTRV-PRMTR-T0::<npc No.2>-jjj[&&-kkk]::TO;` to obtain the other end of a connection and to see trunk conditioning for DGA and *SLC* carrier channel numbers.

     Where:

<npc No.2> = NPC number of termination; for *SLC* Carrier System, use NPC for DGA.
jjj = Channel number of circuit; for *SLC* carrier channel, use *SLC* carrier channel number on DGA (Table 6-1).
kkk = Optional, last channel of a range of channels on DGA.

- For all connections on NPC, enter

  RTRV-CRS-T1::<npc No.>[&&[&]-<npc No.2>]::MAP;

  Where: <npc No.> = NPC number; for *SLC* Carrier System, actual RT digroup number (not DGA virtual).

- For all NPCs associated with RT "ffff", enter

  RTRV-CRS-T1:[xy]::[ww]:[ffff]:{RTMAP/DLMAP};.

NOTE:
For *SLC* 96 carrier, the digroup and channel for the QRY TO (or QRY FROM) in Step 4 can be either digroup A and the virtual channel or actual RT digroup and *SLC* carrier channel number.

NOTE:
An asterisk appears alongside OCONs in the CMAP/RTMAP to identify one-way circuits. If *000000 appears, the QRY FROM for OCON circuits can be used to see connection.

5. For 1-way circuits, you can query the connection (if any) in the other direction of the same NPC by entering
   RTRV-PRMTR-T0::<npc No.1>-ddd::FROM;

16-STATE SIGNALING;

Hexadecimal: TC-X-rs,X-tu),IW-X-nn

Binary: TC-efghijkl,mnopqrst,{IW-X-nn/TRB}

X-rs = Hex word for 8-bit pattern to be sent on FROM side
rs = binary abcdabcd

X-tu = Hex word for 8-bit pattern to be sent on TO side
tu = binary abcdabcd

4-STATE SIGNALING (BITS ab)

Binary: TC-ijkl,mnop,{IW-X-nn/TRB}

ijkl = Binary word for 4-bit pattern to be sent on FROM side
The ij is for the first 2.5 seconds; kl is for the remaining time.

mnop = Binary word for 4-bit pattern to be sent on TO side
mn is for the first 2.5 seconds; op is for the remaining time.

NO SIGNALING/TRANSPARENT;

TRSP[,IW-X-nn]

TRSP,{MUX/TRB}

Figure 6-1. Trunk Conditioning Formats

6.1.1.2 Two-Point Gateway Circuit

Overview: This section deals with 1-way or 2-way cross-connections between channels of PBCs (primary block circuits). These channels will either be assembled using CAS (channel associated signaling) or NSA (nonsignaling associated) mode. The 32 time slots in the 2.048-Mb/s signal are normally referred to by telephone channel number in the DACS II commands. With this numbering, channels 00 through 15 correspond to the like-numbered time slots and channels 16 through 30 correspond to time slot 17 through 31. DACS II channel 31 corresponds to time slot 16 which carries signaling in the CAS mode.

1. Before you enter the command, familiarize yourself with the command fields and variations which follow. The order of entering the channel terminations in the command is only meaningful for 1-way circuits, test access, and <tc> and SC command fields.

   Two-Way:
   ```
   CONN-CRS-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kkk]:[ww]:<tc>[,SC-abcd,abcd][,NAM]:[RDLD]
   [,{CUS|INCL}]:[AIS]:[NORM,NORM|TERM,TERM];
   ```

   One-Way:
   ```
   CONN-CRS1-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kk]: [ww]:<tc>[,SC-----,abcd][,NAM]:[RDLD]
   [,{CUS|INCL}]:[NORM|TERM];
   ```

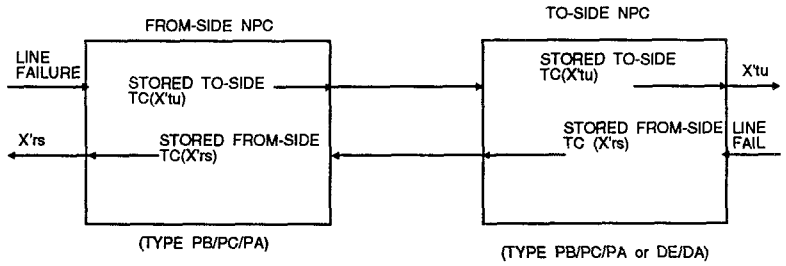
2. If you are going to enter a channel range connection, consider the following:

   — For 2.048-Mb/s Interface and CAS mode, the range is any continuous group of 30 channels or less (01 through 30). CAS channels 00 and 31 (TS16) and NSA channel 00 are not allowed in range connection.

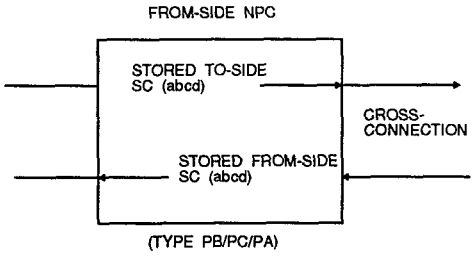
   — For 2.048-Mb/s Interface and NSA mode, the range is any continuous group of 31 channels or less (01 through 31).

   — For connection to DS1, the range is any continuous group of 24 channels or less. These will fall into the 01 through 24 range on the DS1 side and 01 through 30/31 range on the 2.048-Mb/s Interface side.

3. If you need information on the TC (trunk conditioning) field, see Part A of Figure 6-2 and consider the following:
   - — The FROM and TO sides of the TC field correspond to the FROM and TO terminations entered in the command. With the 16-state TC format (for connection to type DE1yz NPC), bits abcd must be entered with ab=cd (for example, hex 5 = 0101) on both the DS1 and 2.048-Mb/s Interface sides.
   - — If one or both sides are transparent (no signaling), the TRSP,IW-X-pq form must be used. The signaling pattern given by X-D is automatically sent on the CAS side.
   - — If specific <tc> is entered for 1-way circuits, dashes must be entered for the FROM side; for example, TC-X--,X-FF).



A. TRUNK CONDITIONING



B SIGNALING CONVERSION

Figure 6-2. Trunk Conditioning and Signaling Conversion Diagrams

4. If you need information on the SC (signaling conversion) field, see Part B of Figure 6-2 and consider the following:
   - — The FROM and TO sides of the SC field correspond to the FROM and TO terminations entered in the command.
   - — The defaults for the <sc> field are: PP01 (Type DE1 NPC), PPPP (Type DE2 or DE3 NPC), and 1101 (with TRSP <tc>).

5. Enter the appropriate command for type of circuit required:

   Two-Way:

   ```
   CONN-CRS-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kkk]:[ww]:<tc>[,SC-abcd,abcd][,NAM]:[RDLD]
   [,{CUS|INCL}]:[AIS]:[NORM,NORM|TERM,TERM];
   ```

   One-Way:

   ```
   CONN-CRS1-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kk]:[ww]:<tc>[,SC-----,abcd][,NAM]:[RDLD]
   [,{CUS|INCL}]:[NORM|TERM];
   ```

   Where:

   <npc No.1> = NPC number of one side (FROM), either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = Channel number; 01 through 24 (00 is data link) for DS1 NPC, 01 through 30/31 (00 is TS0) for type PB/PC NPC.

   eee = Optional, to give the last channel of continuous range of channels to be connected.

   <npc No.2> = NPC number of other side (TO); see <npc No.1>.

   jjj = Channel number; 01 through 24 (00 is data link) for DS1 NPC, 01 through 30/31 (00 is TS0) for type PB/PC NPC.

   kkk = Optional, to give the last channel of same width range as other side.

   <tc> = Trunk conditioning; required for DS1 channel connection (gateway). See Figure 6-2.

   SC(abcd,abcd) = Optional, dictates the use of signaling bits (abcd) in TS16 on the FROM and TO sides. The possibilities for the bits are: 0, 1, P (for pass through), and V (inverted).

   NAM = Only used for digital data (no analog encoding) to disable A-law (2.048-Mb/s Interface) to μ-law encoding conversions.

   RDLD = Optional, designates special service.

   CUS = Optional, customer controlled circuit.

   INCL = To remove previous CUS channel designation.

AIS = **Only for pure DS1 24-channel** connection to supply all 1s downstream when incoming CGA or AIS is received.

NORMITERM = To specify unterminated, normal connection (default) or terminated, preservice connection.

- If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

6. Familiarize yourself with connection query outputs:
   - To obtain the other end of a connection and to see trunk conditioning, enter:

     RTRV-PRMTR-T0::<npc No.>-jjj[&&-kkk]::TO;

     Where:
     <npc No.2> = NPC number and channel number of specific termination.
     kkk = Optional, last channel of a range of channel terminations.

   - For all connections on NPC, enter:

     RTRV-CRS-T1::<npc No.>::MAP;

     Where: <npc No.> = NPC number of one side of the connection.

   - For 1-way circuits, you can query the connection (if any) in the other direction of the same NPC by entering **RTRV-PRMTR-T0::<npc No.1>-ddd::FROM;**.

6.1.1.3 Two-Way Multipoint Circuit

Overview: This section covers both symmetrical and broadcast multipoint configurations that are set up using the DSPU (DMB-type) NPC or virtual NPC. The virtual NPCs are 961 and 962 (99-1-01 and 99-1-02) for non-CEF frames, and [9]961 through [9]966 (99-1-01 through 99-1-06) for CEF frames. For broadcast circuits, the common leg or BBL (backbone leg) is established using the LEG,BBL combination of command keywords and each tributary is connected using the LEG,BRD combination of keywords. For a symmetrical (SYM) bridge, each leg is connected to the DMB bridge using the LEG,SYM combination of keywords. The FTU termination connected to a bridge is called a LEG. The DACS II conferencing provides μ-law companding for DS1 signals; for gateway, the type-PB/PC NPC makes the needed signal conversions.

1. See Figure 6-3 for models of multipoint circuits produced by DMB NPCs. See Figure 6-4 for multipoint circuits produced by specifying virtual NPCs.

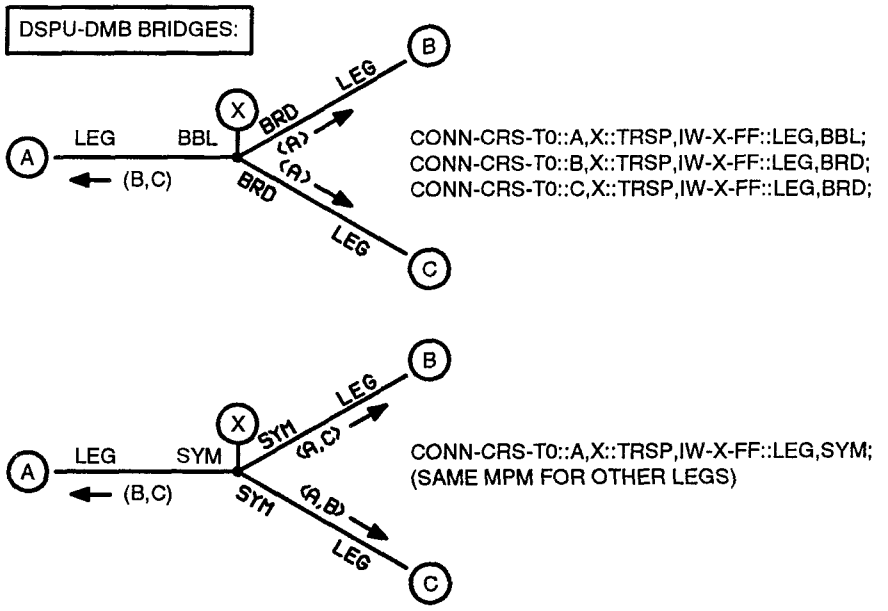


Figure 6-3. DMB Circuit Configurations

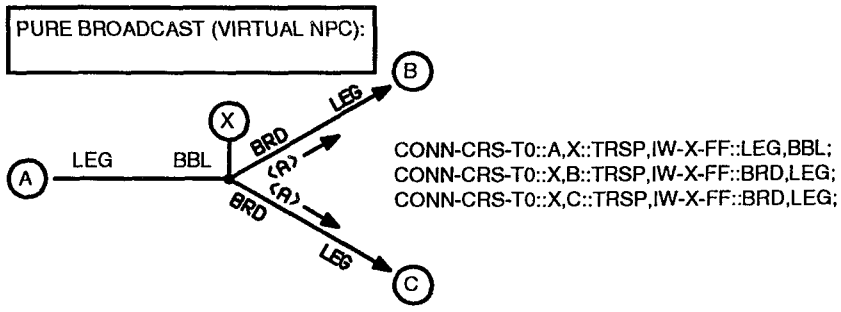


Figure 6-4. Virtual NPC Broadcast

2. Study the following command and obtain needed information:

```
CONN-CRS-TO:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
[&&-kkk]:[ww]:<tc>[,NAM]:[RDLD][,{CUS|INCL}]:fmd,tmd
[:NTR-m][:{NORM,NORM|TERM,TERM}];
```

Where:

xy	=	Unique id (target id); up to 20 characters
ww	=	Command correlation tag; up to 10 characters
CRS	=	CRS is for 2-way,
<npc No.1>	=	NPC number for FROM side. See Table 6-2. For *SLC*® 96 carrier leg, always specify digroup A NPC and channel per Table 6-3.
ddd/jjj	=	Conference number if bridging end or channel number if facility leg end.
<npc No.2>	=	NPC number for TO side; see <npc No. 1>.
eee/kkk	=	Optional, last channel of continuous range to be connected.
<tc>	=	The same trunk conditioning does not have to be entered for each leg/tributary, but each must contain TRSP word.
NAM	=	Optional, no A-law to μ-law conversions; only needed for digital data conferences (no analog encoding).
fmd,tmd	=	Designators for FROM and TO side modes (See Table 6-2). Enter appropriate one for each side: SYM for DMB end of symmetrical, BBL for backbone, bridge end; BRD for nonbackbone, bridge end; or LEG for FTU NPC end. This field determines the direction of data flow of broadcast circuit.
NTR m	=	Optional, shuts off transmission toward FROM (m=F) or TO (m=T) side.
RDLD or CUS	=	Optional, designates red special service (RDLD) or customer control (CUS).
INCL	=	Optional, removes previous channel CUS designation.
NORMITERM	=	To specify normal, unterminated connection (default) or terminated, preservice connection.

NOTE:
TERM,TERM can be used in commands to establish preservice terminated state.

Table 6-2. Multipoint NPC and Channel Numbers

Command Field	Leg-End NPC	Bridge-End DMB NPC	Bridge-End Virtual NPC
<npc No.>	Any facility NPC	DMB NPC (Type MB)	961,962 (or [9]961 - [9]966)
Channel No. (ddd/jjj)	01 - 24 (01 - 96 for *SLC* Carrier)	01 - 85	001 - 500
Mode (fmd,tmd)	LEG	SYM,BBL,BRD	BBL,BRD

Table 6-3. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

3. Enter cross-connect command for segment of multipoint circuit. See Figure 6-5 for construction of <tc>.
   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

NOTE:
The DACS II conferencing provides μ-law companding for DS1 signals; for gateway, the type-PB/PC NPC makes the needed signal conversions unless a data conference (no encoding) is specified by the NAM keyword. The first 2.048-Mb/s Interface connection determines the conference type (μ-law or data).

<tc> = TRSP[,IW-X-nn]
<tc> = TRSP{MUX/TRB}
<tc> = TRSP,IW-X-nn[n]
(Default = TRSP,IW-X-FF)

Figure 6-5. Construction of TRSP Trunk Conditioning

4. Repeat the procedure to connect remaining segments to the bridge; the same trunk conditioning and any special service designations must be entered for each segment.

5. To see all the conference legs, enter

   RTRV-PRMTR-T0::<npc No.>-ddd::TO;

   Where: <npc No.> = NPC number of bridging (DMB) or virtual NPC
   ddd = Conference or channel number.

   NOTE:
   Notice that the NTR directions in the output are in terms of what was entered for the TO-side in the query.

6.1.1.4 Broadcast Circuit

Overview: This section presents the BDCST commands for establishing broadcast circuits through the cross-connect network. Up to eight tributaries can be connected to the broadcast leg at one time by listing them in the command with ampersands (&). Unless the looped or no return keywords are used, the DACS II will designate the first tributary that is entered as the full tributary which is the only one that returns transmission to the broadcast leg. This return path can be subsequently changed using the CHG RPATH command.

1. Familiarize yourself with the commands as follows:

   Multiple tributaries (up to 8):

   ```
   CONN-BDCST-T0:[xy]:<npc No.1>-ddd&&-eee,<npc No.2>-jjj
   [&<npc No.3>-nnn][&<npc No.4>-ppp]:[ww]:<tc>[,NAM][,<sc>]:
   [RDLD][,{CUS|INCL}][:{NTR|LPD|CONV}];
   ```

   Single Tributary:

   ```
   CONN-BDCST-T0:[xy]:<npc No.1>-ddd&&-eee,<npc No.2>-jjj
   :[ww]:<tc>[,NAM][,<sc>]:[RDLD][,{CUS|INCL}][:{NTR|LPD|CONV}];
   ```

   Where:

   - xy = Unique id (target id); up to 20 characters
   - ww = Command correlation tag; up to 10 characters
   - <npc No.1> = Broadcast NPC number, either extended (for example [0]001) or hierarchical (for example, 01-1-01).
   - ddd-eee = Range of channels to be broadcast (for example, 01 through 24).
   - TOX = Up to 8 tributaries can be connected to the broadcast leg at one time.
   - jjj/nnn/ppp = First channel on tributary that is to be connected to; the channel range is set by broadcast leg. For *SLC* carrier channel numbers, see Table 6-4.
   - <npc No.2> = NPC number of first tributary; see <npc No.1>.
   - <npc No.3> = NPC number of second tributary; see <npc No.1>.
   - <npc No.4> = NPC number of third tributary; see <npc No.1>.
   - <tc> = Trunk conditioning; can be either the TC format (signaling) or TRSP,IW-X-mn format. Different values can be used on legs, but same type format required.

<sc> = Optional for gateway to dictate the use of signaling bits (abcd) on FROM and TO sides. The general form is "SC(abcd,abcd)" and the values are: 0, 1, P (pass through), and V (inverted).

NAM = Optional; only needed for digital data conferences (no analog encoding) to disable A-law to μ-law conversions in gateway circuit.

NTR,LPD or CONV = Optional, to designate no return transmission (NTR), to loop the broadcast (LPD), or to convert (CONV) existing 2-way, 2-point connection to BDCST.

RDLD = Optional, to designate red special service.

CUS = Optional, to designate customer control service.

INCL = Needed to remove CUS or special service.

Table 6-4. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

2. Enter the command with the required information.
   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

NOTE:
If the command runs over line length for your screen, you can break the line with a backslash and continue the command on the second line.

3. Repeat this procedure if additional tributaries must be added to complete the broadcast circuit.

6.1.1.5 One-Way Multipoint Circuit

Overview: This section explains a method to establish one-way broadcast circuits using the CRS1 MPM command and virtual NPC [9]961 through [9]966 (or 99-1-01 through 99-1-06). To build such a circuit, you establish the backbone leg to the virtual NPC using the LEG,BBL combination of command keywords and connect each tributary to the backbone using the BRD,LEG combination of keywords. The FTU termination is always called a LEG. A range of channels can be broadcast using the channel range option for the backbone leg; this range is specified once and applies to the entire circuit. The broadcast circuit formed in the virtual NPC cannot be connected to another bridge circuit (concatenated) for further fanout.

1. See Figure 6-6 for a model of the pure broadcast network produced by specifying the first virtual NPC (9961). The commands are only examples.
2. Study the following command and obtain needed information,

   CONN-CRS1-T0:[xy]:<npc No.1>-ddd[&&-eee],<npc No.2>-jjj [&&-kkk]:[ww]:<tc>[,NAM]:[RDLD][,{CUS|INCL}]:fmd,tmd [:{NORM|TERM}];

   Where:

   xy = Unique id (target id); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   <npc No.1> = NPC number for FROM side. For bridging end, use virtual NPC. For leg end, use facility NPC.
   ddd/jjj = Conference number (001 through 500) if bridging end or channel number if facility leg end. The channel numbers run from 01 through 24 for DS1 NPCs and for *SLC* carrier leg, specify digroup A NPC and channel per Table 6-5.
   eee/kkk = Optional, last channel of continuous range to be connected.
   <npc No.2> = TO-side identification; <npc No. 1>.
   fmd,tmd = Designators for the FROM- and TO-side modes; use BBL for bridge end of backbone, BRD for bridge end of tributary, and LEG for FTU NPC end.
   <tc> = Trunk conditioning. If entered, does not have to be same for each leg, but TRSP,IW-X-nn form must be used.
   NAM = Optional; only needed for digital data conferences (no analog encoding) to disable A-law to μ-law conversions in gateway circuit.
   RDLD = Optional, designates special service.
   CUS = Optional, designates customer control circuit.
   INCL = Optional, removes previous CUS channel designation.
   NORMITERM = Selects either normal (NORM), unterminated (default) connections or preservice, terminated (TERM) connections.

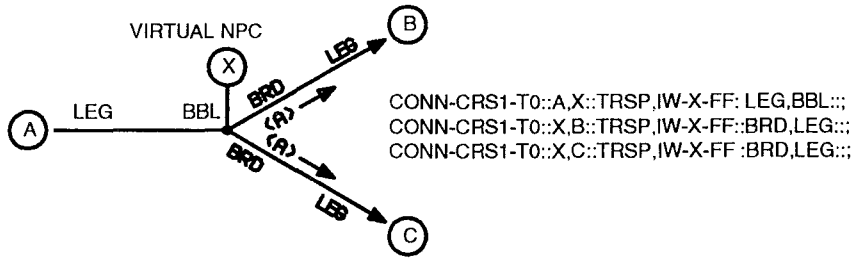


Figure 6-6. Virtual NPC Broadcast

Table 6-5. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

3. Enter cross-connect command for segment of multipoint circuit. See Figure 6-7 for construction of TC-field.
   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
TERM can be added to the command to provide preservice terminated state.

NOTE:
If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

NOTE:
If NOBBL appears in completion message, it indicates that the broadcast backbone connection has not yet been entered.

<tc> = TRSP[,IW-X-nn]
<tc> = TRSP{MUX/TRB}

Figure 6-7. Construction of TRSP Trunk Conditioning

4. Repeat the procedure to connect remaining segments to the bridge.
5. To see all conference legs, enter:

```
RTRV-CRS-T0::<npc No.>-ddd::TO;
```

Where: <npc No.>ddd = NPC number of virtual NPC and "ddd" is conference number.

6.1.2 Change Termination (TLA/TLR) or Conference Bridge Parameters

1. To change the termination state, enter the command listed under TERMINATION STATE in Figure 6-8 to make desired changes. Command options allow changing the state of all the bridge terminations or all except the one named in the NOT field.
   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

NOTE:
The termination state or TLP (transmission level point) of a conference bridge circuit cannot be changed using the command in Figure 6-8 if the T or F side was previously designated as NTR (no transmit) in TLA command.

2. To change to conference bridge parameters, enter the command listed under CONFERENCE BRIDGE PARAMETERS in Figure 6-8.

NOTE:
To make a change, the DMB bridge side of the conference must be entered in the <npc No.2> field of the command.

3. Check completion message for required changes; note the NEW STATE field in the message. The presence of RNG in the termination change message indicates that the states in the range of circuits changed may differ. The RDLD/CUS word will occur if special service circuits were changed.

TERMINATION STATE:

ED-PRMTR-T0:[xy]:<npc No 1>-ddd[&&-eee],<npc No.2>-jjj[&&-kkk]:[ww]:[INCL]:{TERM | RLS}{F/T/B/L/G/A}[:NOT-<npc No.3>-vvv];

CHG-TL-T0:[xy]::[ww]:kk:TERM{F/T/B/L/G/A}[:NOT-<npc No 3>-vvv];

CONFERENCE BRIDGE PARAMETERS

ED-PRMTR-T0:[xy]:<npc No.1>-ddd,<npc No.2>-jjj:[ww]:[INCL]:[TLP-snn-smm,NG-nn,ES-ee];

EXPLANATION OF VARIABLES

<npc No.1>	=	NPC number on FROM side, extended (for example, 001) or hierarchical (for example, 01-1-01). Refer to **DLP-569** for NPC numbering information.
<npc No.2>	=	NPC number on TO side. See <npc No.1>.
-ddd/-jj	=	Channel number on NPC.
-eee/-kk	=	Optional, last channel of range.
TERM|RLS	=	Desired state, terminated or released on circuit as follows: From-Side/abc (F), To-Side/ghi (T), Both (B), all legs toward bridge (G), all legs toward facilities (L), or all legs in both directions (A)-also see "NOT-<npc No.3>-vvv" below.
NOT-<npc No.3>-vvv	=	One leg specified that is NOT to be changed with all others.
kk	=	Testport number (01-48).
INCL	=	Optional, needed if channel in command is red special service circuit.
TLP-snn-smm	=	Signal level adjustment, "snn" is the input level and "smm" is output level; s = sign (+ or -). Range for nn is –9.0 to +8.8 in 0.2 db steps (entered as whole Nos. –90 to +88).
NG-nn	=	Noise guard adjustment in db (00, 06, 12, or 18).
ES-ee	=	Echo suppression in db (00, 06, 12, or 18).

Figure 6-8. Change Commands

6.1.3 Disconnect Cross-Connected Circuit

1. Familiarize yourself with the disconnect circuit command as follows:

```
{DISC-CRS|CRS1|BDCST}-T0:[xy]:<npc No.1>-ddd[&&-eee],
<npc No.2>-jjj [&&-kkk][&<npc No.3>-nnn...]:[ww]:[INCL]:
[OOS][,DCC][,CONV];
```

Where:

CRS = To disconnect 2-way CONN CRS circuit;
CRS1 = To disconnect 1-way CONN CRS1 circuit; and
BDCST = To disconnect broadcast circuit.
xy = Unique ID (target ID); up to 20 characters.
ww = Command correlation tag; up to 10 characters.
<npc No.1> = NPC number on one side (FROM); either extended (for example, [0]001) or hierarchical
ddd = Channel number : 1 through 24 for DE-type, 1-96 for DS-type; 1 through 85 for MB-type; 1-ddd for VI-type NPC). For *SLC* carrier channels, see Table 6-6.
eee = Optional, to name last channel of range.
<npc No.2> = NPC number on other side (TO); see FROM side.
jjj[-kkk] = Channel number or optional range of channels on NPC.
<npc No.3>-nnn = NPC number and first channel on other (up to 8 total) tributaries to be disconnected.
CONV = Optional for BDCST only; entered with next-to-last disconnection to convert the remaining circuit to 2-way CONN circuit.
INCL = Optional, to allow disconnection of circuit with RDLD or CUS designation. The CUS stays with the circuit and NPC and requires use of INCL when reassigned.
OOS = Optional, to disconnect circuits when NPC is out-of-service.
DCC = Optional, to retain previous connection <tc> code instead of NPC not-connected code; not for broadcast.

Table 6-6. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

2. If you are going to use the BDCST command, consider the following comments:
   - — To disconnect up to eight tributaries at one time, add a listing of the NPCs in the form "<npc No.3>-nnn&<npc No.4>-ttt..." where each NPC and the first channel of range is listed with ampersand. The optional listing goes in the field after the "<npc No.2>-jjj" in the command.
   - — When using individual DISC commands for each tributary, the full tributary (one with return path) must be disconnected last.
   - — The CONV option causes the broadcast side and final tributary to be connected as a 2-way circuit.
   - — When using the range and CONV options, the one tributary not included in the range becomes part of the 2-way circuit.

3. If you need to check for RDLD or CUS channel designations, enter one of the following commands:

   For specific channel(s):

   RTRV-PRMTR-T0::<npc No.>-ddd[&&-eee]::MARK;

   For NPC numbers:

   RTRV-PRMTR-T1::<npc No.>[&&[&]-<range>]::MARK;.

4. Enter the appropriate disconnect command. For 1-way circuits, the sides must be entered like the CONN-CRS1 or NOMTH (no match) denial will result; you may need to use **RTRV-PRMTR-T0::<npc No. 1>-ddd::FROM;** to find the sides of a 1-way connection.

NOTE:
If CUS appears in the completion message, it indicates that the CUS designation remains with the circuit and NPC until INCL keyword is used in subsequent cross-connect or remove command.

- If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

5. If a multipoint circuit (conference or broadcast) was disconnected, check the output message for additional information given as follows: MPDIS indicates that bridge has been fully disconnected; NOBBL indicates that there is no backbone leg now; and BRDIS indicates that the BDCST has been fully disconnected, last tributary disconnected.
6. If additional legs of a multipoint circuit must be disconnected, repeat the procedure as needed.

6.1.4 Move Facility End Points

Overview: This procedure presents the alternate cross-connect command. This command moves the facility end points of existing cross-connection(s) from the original facility NPCs to other facility NPCs. These facility end points can be the facility legs of DMBs, but the old and new DMBs must be the same type. This function is accomplished by overwrite operations in the ECCN and does not cause any more than a hit on the moved circuit (10 ms maximum per moved circuit). One application of this command is for equipment cutover where connections must be moved from existing facility terminations to new facility terminations. Disconnecting the old endpoints is included in the command function; so no disconnect command must be entered.

CAUTION:
Performing this procedure incorrectly can interrupt service. Familiarize yourself with the procedure and commands before beginning and perform each step of the procedure in the order given.

1. If you do not know whether the NPCs and unit equipment are in-service and not failed or pested, enter:

   RTRV-STATE-EQPT::UNIT-[q]q::ALL; for the unit(s).

   NOTE:
   The out-of-service, failed, and pested conditions are indicated by the presence of 1s in those columns for each pack. Unequipped packs are indicated by dashes.

2. See Figures 6-9 and 6-10 for two examples of ED-CRS-T0 commands showing the connections after the commands execute.

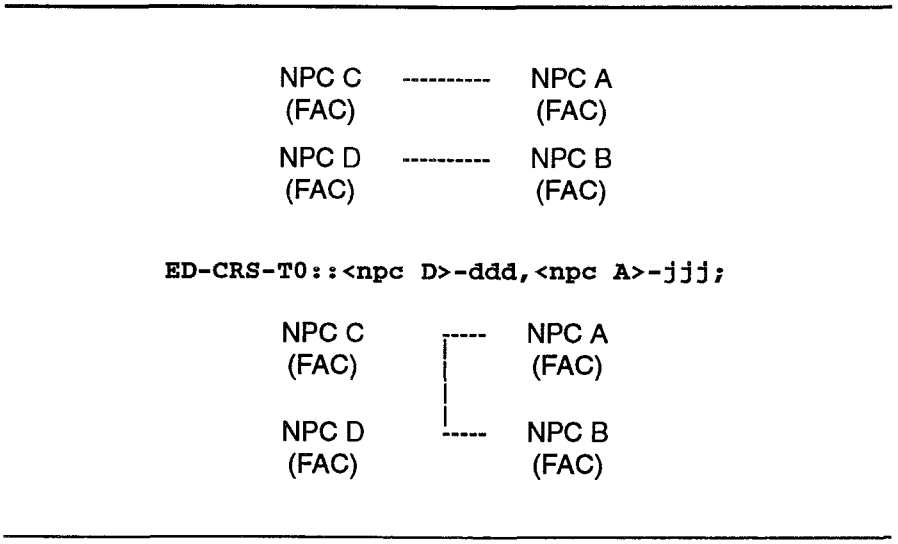


Figure 6-9. Facility-to-Facility Move

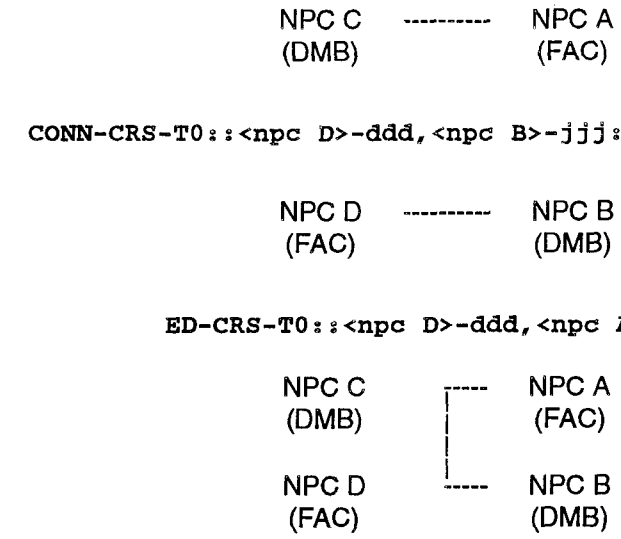


Figure 6-10. Facility Leg-to-DMB Move

3. Examine the following command restrictions:
   - — All the involved NPCs must have in-service (and not failed or pested) status.
   - — The new NPC channel can be currently mapped to a 2-way, 2-point circuit or unmapped.
   - — None of the involved NPCs can be: type PB or PC, *SLC*® carrier type DS, interface unit types IU or TI, or clear-DS1 types (xyz = 9-9).
   - — The TC (trunk conditioning) of the circuit to be moved must be appropriate for the new circuit. A cross-connection with robbed-bit signaling for the D4 bank line format is not appropriate for NPCs grown with the T1DM line format.

4. To move a facility leg to a different DMB using the alternate cross-connection, establish a temporary facility leg connection to the new desired DMB which will be used as the new facility termination in the ED-CRS-T0 command.

5. Enter the command with the required termination information as follows:

   ```
   ED-CRS-T0:[xy]:<npc No.1>-ddd[&&-eee],
   <npc No.2>-jjj[&&-kkk]:[ww]:[INCL];
   ```

   Where:

   xy = Optional, unique id (target id); up to 20 characters.
   ww = Optional, command correlation tag; up to 10 characters.
   <npc No.1> = NPC number of existing type DE or TE termination that is to be moved. Either extended for (example [0]001) or hierarchical (for example, 01-1-01), can be used.
   &&-eee = Optional, for range of channels on virtual NPC broadcast circuit to be moved to 2-point, 2-way circuit.
   <npc No.2> = NPC number of new desired DE or TE termination.
   &&-kkk = Optional, for range of channels on new NPC to be connected from old virtual NPC broadcast circuits.
   INCL = Optional, to override special service designation of existing circuit to allow the move operation.

   - If the ED ...DENY message is received, find the explanation of the denial in the output message and perform corrective action to obtain command completion.

6. Check ED completion message to verify circuit changes.
7. Repeat the procedure as needed to complete required changes.

6.2 Cross-Connect or Disconnect Clear-DS1

6.2.1 Cross-Connect Clear-DS1 Signals

6.2.1.1 Two-Point, Two-Way or One-Way Circuit

Overview: This procedure presents the commands to connect full bandwidth DS1s (with no framing or channels). For full bandwidth connections, the NPCs on both sides must be grown as clear-DS1 types.

1. Familiarize yourself with the commands shown below; the **CRS is for a 2-way connection and the CRS1 is for a 1-way connection**. The T0 (T zero) keyword indicates a DS0 circuit. The <npc No.1> and <npc No.2> side assignments serve as reference for the CRS1 connection and for test access.

   ```
   CONN-CRS-T1:[xy]:<npc No.1>,<npc No.2>:[ww]:[RDLD]
   [,{CUS|INCL}][:{NORM,NORM|TERM,TERM}];
   CONN-CRS1-T1:[xy]:<npc No.1>,<npc No.2>:[ww]:[RDLD]
   [,{CUS|INCL}][:{NORM|TERM}];
   ```

   Where:

   CRS/CRS1 = **CRS** for 2-way; **CRS1** for 1-way.
   <npc No.1> = NPC number of one side (FROM), either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <npc No.2> = NPC number of other side (TO); see <npc No.1>.
   RDLD = Optional; to designate red special service circuit.
   CUS = Optional; to designate customer controlled channels.
   INCL = Optional; to remove previous CUS channel designation.
   NORMITERM = To specify unterminated, normal (NORM, default) or terminated (TERM), preservice connection.

2. Obtain information needed for command from circuit layout information.
3. Enter cross-connect command. If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.
   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

6.2.1.2 Broadcast Circuit

Overview: This section shows the BDCST commands for establishing broadcast circuits through the cross-connect network. Up to eight tributaries can be connected to the broadcast leg at one time by listing them in the command with

ampersands (&s). Unless the looped or no return keywords are used, the DACS II will designate the first tributary that is entered as the full tributary which is the only one that returns transmission to the broadcast leg. This return path can be subsequently changed using the CHG RPATH command.

1. Familiarize yourself with the commands as follows:
   Multiple Tributaries (up to 8):
   ```
   CONN-BDCST-T1:[xy]:<npc No.1>,<npc No.2>[&<npc No.3>]
   [&<npc No.4>]:[ww]:[RDLD][,{CUS|INCL}][:{NTR|LPD|CONV}];
   ```
   Single Tributary:
   ```
   CONN-BDCST-T1:[xy]:<npc No.1>,<npc No.2> :[ww]:
   [RDLD][,{CUS|INCL}][:{NTR|LPD|CONV}];
   ```
   Where:

<npc No.1>	=	Broadcast NPC number, either extended (for for example [0]001) or hierarchical (for example, 01-1-01).
<npc No.2>	=	NPC number of first tributary; see <npc No.1>.
<npc No.3>	=	NPC number of second tributary; see <npc No.1>.
<npc No.4>	=	NPC number of third tributary; see <npc No.1>.
NTR,LPD or CONV	=	Optional, to designate no return transmission (NTR), to loop the broadcast (LPD), or to convert (CONV) existing 2-way, 2-point connection to BDCST.
RDLD	=	Optional, to designate red special service.
CUS	=	Optional, to designate customer control service.
INCL	=	Needed to remove CUS or special service.

2. Enter the command with the required information.
   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

   NOTE:
   If the command runs over length for your screen, you can break the line with a backslash and continue the command on the second line.

3. Repeat this procedure to include all tributaries in the broadcast circuit.

6.2.2 Disconnect Cross-Connected Circuit

1. Familiarize yourself with the commands as follows:

   For Clear-Channel DS1s:

   ```
   {DISC-CRS|CRS1|BDCST}-T1:[xy]:<npc No.1>,<npc No.2>
   [&<npc No.3>...]:[ww]:[INCL]:[OOS][,CONV];
   ```

   Where:

   CRS = To disconnect 2-way CONN CRS circuit;
   CRS1 = To disconnect 1-way CONN CRS1 circuit; and
   BDCST = To disconnect broadcast circuit.
   xy = Unique ID (target ID); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.1> = NPC number on one side (FROM); either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   <npc No.2> = NPC number on other side (TO); see FROM side.
   <npc No.3> = NPC number and first channel on other (up to 8 total) tributaries to be disconnected.
   CONV = Optional for BDCST only; entered with next-to-last disconnection to convert the remaining circuit to 2-way CONN circuit.
   INCL = Optional, to allow disconnect of circuit with RDLD or CUS designation. The CUS stays with the circuit and NPC and requires use of INCL when reassigned.
   OOS = Optional, to disconnect circuits when NPC is out-of-service.
   DCC = Optional, to retain previous connection <tc> code instead of NPC not-connected code; not for broadcast.

2. If you are going to use the BDCST command, consider the following comments:

   — To disconnect up to eight tributaries at one time, add a listing of the NPCs in the form "<npc No.3>&<npc No.4>..." where each NPC and the first channel of range is listed with ampersand. The optional listing goes in the field after the "<npc No.2>" in the command.

   — When using individual DISC commands for each tributary, the full tributary (one with return path) must be disconnected last.

   — The CONV option causes the broadcast side and final tributary to be connected as a 2-way circuit.

   — When using the range and CONV options, the one tributary not included in the range becomes part of the TO side of a 2-way circuit.

3. If you need to check for RDLD or CUS designations, enter the following commands:

   `RTRV-PRMTR-T1::<npc No.>[&&[&]-<range>]::MARK;`

4. Enter the appropriate disconnect command from Step 1.
   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

   NOTE:
   For 1-way circuits, the sides must be entered like the CONN-CRS1 or NOMTH (no match) denial will result; you may need to use `RTRV-PRMTR-TO:[xyz]:<npc No.>-ddd:[ww]:FROM;` to find the sides of a 1-way connection.

5. If additional legs of a multipoint circuit must be disconnected, repeat the procedure as needed.

6.3 Cross-Connect, Change, Disconnect Subrate

6.3.1 Cross-Connect Two-Point Circuit

1. Familiarize yourself with the commands in Step **2** and see Figure 6-11 which is an example showing channels established to the subrate and a subrate cross-connection.

NOTE:
To establish a loopback connection, the same numbers must be entered for the FROM and TO sides; loopback is not allowed with the SCNT command. The terminated connection sends the UMC (unassigned multiplexer code) on both sides of the connection as a preservice or testing condition.

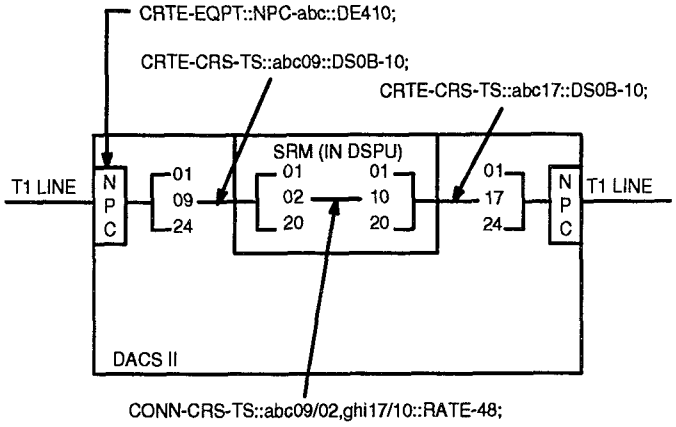


Figure 6-11. Subrate Two-Point Cross-Connection

2. Enter the appropriate command. Although not shown, channel ranges (&&-eee, &&-kkk) are allowed for channels established to subrate as DS0A.

   Normal Connection:

   ```
   CONN-CRS-TS:[xy]:<npc No.>-ddd[-ff[&&-mm]],<npc No.2>-
   jjj[-ll[&&-nn]:RATE-rr;
   ```

   Terminated Connection:

   ```
   CONN-CRS-TS:[xy]:<npc No.>-ddd[-ff[&&-mm]],<npc No.2>-
   jjj[-ll[&&-nn]]:RATE-rr:TERM,TERM;
   ```

   Where:

   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.1> = FROM NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
   <npc No.2> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
   rr = The cross-connect circuit rate 24, 48, 96, or 56 (for 2.4, 4.8, 9.6, or 56 kb/s). This rate must be equal to or lower than the rates of the customer signals.
   TPT = Two-Point (optional). Retained only for DACS/SRDC compatibility.
   ddd = FROM channel number within the digroup.
   ff = The FROM customer number; optional for DS0A channel. See Table 6-7.
   mm = Optional, for last customer number in a continuous range of DS0B customers. Extra ampersand required for hierarchical.
   jjj = The TO channel number within the digroup (being addressed by the command).
   ll = The TO customer number; optional for DS0A channel. See Table 6-7.
   nn = Optional, for last customer number in a continuous range of DS0B customers. Extra ampersand required for hierarchical.

   - If the command is denied, find the reason for the SUBRATE denial in the output message and perform corrective action to obtain command completion.

3. To familiarize yourself with query command, enter the following command for the NPC and channel(s): `RTRV-CRS-TS::,npc No.>-ddd[&&-eee];`.
4. To see which subrate plug-in is used for the cross-connection, enter RTRV-EQPT-TS::<npc No.>-ddd-ff::SRHDW;

Table 6-7. Subrate Customer Numbers

Rate	DS0A Numbers (Note 1)	DS0B Customer Numbers (Note 2)
2.4	01	01 through 20
4.8	01	01 through 10
9.6	01	01 through 05
56	01	01

Notes:

1. Range of channels allowed with DS0A
2. Range of customers allowed with DS0B

6.3.2 Connect Multipoint Circuit (with DSPU)

1. Familiarize yourself with the commands in Step **2** and see Table 6-8 for a summary of the command fields. Figure 6-12 is an example showing channels established to the subrate and tandem MJU connections.

Table 6-8. Command Field Summary

Field	Explanation
MPTM field	Multipoint master - NPC, channel, optional customer connected to the control leg of MJU 1. MJU 1 is always the first MJU in a tandem connection; the MPTM is used to identify the circuit.
MJU ssss	Multipoint junction unit being addressed (1-9999).
MA(tttt,u)	Master leg. Specifies MJU-to-MJU connection. Gives preceding MJU that MJU sss control leg connects to (tttt) and which branch it connects to on MJU tttt.
branch	External facility channel connected to MJU ssss. One of four branches on addressed MJU.

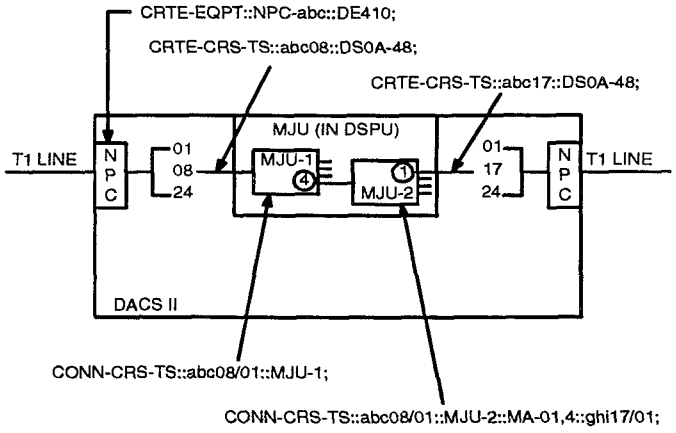


Figure 6-12. Subrate Multipoint Cross-Connection

2. Enter the appropriate command.

   Normal:

   ```
   CONN-CRS-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:MJU-ssss:
   [MA-tttt,u]: [<branch>][,<branch>][,<branch>][,<branch>];
   ```

   Terminated:

   ```
   CONN-CRS-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:MJU-ssss:
   [Rate-rr]:[,MA-tttt,u]:{[<branch>][,<branch>]
   [,<branch>][,<branch>]}:TERM,TERM;
   ```

   NOTE:
   The involved channels from the facility control leg and any branches must already be established to the subrate equipment.

Where:

xy = Unique id (target id); up to 20 characters

ww = Command correlation tag; up to 10 characters

<npc No.> = NPC number of multipoint master (control leg of MJU 1), either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd = Channel number within the NPC digroup.

ff = Customer number; see Table 6-9. Optional for DS0A channel (if used with DS0A, it must be 01).

rr = The cross-connect circuit rate 24, 48, 96, or 56 (2.4, 4.8, 9.6, or 56 kb/s); optional for DS0A. This rate must be equal to or lower than the rates of any connecting leg or branch customer rate.

ssss = MJU number (1-9999) of MJU being addressed.

MA (ttt,u) = Optional, used for tandem MJU connection. The tttt is the MJU number (1-9998) of the preceding MJU, and u is the branch on that MJU which connects to the control leg MJU sss.

<branch> = Optional, to connect branch of MJU sss. Each branch consists of `BRi <npc>jjj[/ll]` which are given by the following definitions.

BRi = Branch number (1 through 4) on MJU ssss.

<npc No.> = NPC number of facility termination of branch.

jjj = Channel number within the digroup.

ll = Customer number; see Table 6-9. Optional for DS0A channel (if used with a DS0A, it must be 01).

- If the command is denied, find the reason for the subrate denial in the output message and perform corrective action to obtain command completion.

3. To see the subrate plug-in used for the connection, enter
   `RTRV-EQPT-TS::<npc No.>-ddd-ff::SRHDW;`

Table 6-9. Subrate Customer Numbers

Rate	DS0A Numbers (Note 1)	DS0B Customer Numbers (Note 2)
2.4	01	01 through 20
4.8	01	01 through 10
9.6	01	01 through 05
56	01	01

Notes:

1. Range of channels allowed with DS0A
2. Range of customers allowed with DS0B

6.3.3 Connect 19.2-kb/s Multipoint Circuit (with External MJU Shelf)

1. Check circuit records to see which channels will be connected to the MJU control and branch legs.

   NOTE:
   To use the external 19.2-kb/s MJU, DS0B customer signals must already be multiplexed into adjacent 9.6-kb/s subrate customer positions of a DS0 channel. This customer signal can then be cross-connected to the control leg of the MJU for bridging to the branches. Other MJUs can be connected in tandem to the first for additional bridging.

2. See Table 6-10 for the channel assignment in the DS1 signal going to the MJU plug-in. The MJU circuits are configured by using DS0 cross-connect commands to access the MJU control leg and branches.

   NOTE:
   Each MJU plug-in connects to the DACS II by a DS1 line and contains the circuitry for four MJUs; these MJU circuits are accessed by the channel assignment in the DS1 signal. Up to 12 MJUs (for 12 DS1s) can be mounted on an MJU shelf.

Table 6-10. External MJU Channel Assignment

Channel	MJU Function	Channel	MJU Function
1	MJU 1 Control Leg	13	MJU 3 Control leg
2	MJU 1 Branch 1	14	MJU 3 Branch 1
3	MJU 1 Branch 2	15	MJU 3 Branch 2
4	MJU 1 Branch 3	16	MJU 3 Branch 3
5	MJU 1 Branch 4	17	MJU 3 Branch 4
6	Unused	18	Unused
7	MJU 2 Control Leg	19	MJU 4 Control leg
8	MJU 2 Branch 1	20	MJU 4 Branch 1
9	MJU 2 Branch 2	21	MJU 4 Branch 2
10	MJU 2 Branch 3	22	MJU 4 Branch 3
11	MJU 2 Branch 4	23	MJU 4 Branch 4
12	Unused	24	T1DM Framing

3. Which type 19.2-kb/s signals are being connected to MJU shelf?

   NOTE:
   With a DS0A signal on the channel, the channel is connected to the channels in the DS1 going to the MJU plug-in using CONN-CRS-T0 commands. With DS0B signals multiplexed on the channel, the channel from the customer facility and the channels from the MJU plug-in must be established to the DACS II DSPU. Once established (refer to *Provisioning*), the subrate customer signals are cross-connected using CONN-CRS-TS commands.

   - If DS0A (single customer), continue with Step **4**.
   - If DS0B (multiple customers), proceed to Step **6**.

DS0A Customer Signal (Continue Here)

4. Enter the appropriate commands to connect facility channels to the appropriate channels going to the MJU plug-in. See Table 6-10 for MJU channel assignments.

   Normal Connection:

   ```
   CONN-CRS-T0:[xy]:<npc No.>-ddd,<npc No.2>-jjj:[ww]:
   <tc>:RDLD;
   ```

   Terminated Connection:

   ```
   CONN-CRS-T0:[xy]:<npc No.>-ddd,<npc No.2>-jjj:[ww]:
   <tc>:RDLD[:TERM,TERM];
   ```

   NOTE:
   The terminated connection sends a UMC (unassigned multiplexer code) toward the facilities for testing or to hold the circuit in a preservice condition.

   Where:

   xy = Unique id (target id); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   <npc No.1> = NPC number for FROM side, either extended (for example, [0]001) or hierarchical (for example, 01-1-01). The side assignments serve as references for test access connections.
   <npc No.2> = NPC number for TO side. See <npc No.1>.
   ddd = Channel number within the FROM digroup.
   jjj = Channel number within the TO digroup.

<tc> = Trunk conditioning to be sent on connecting channels if carrier to NPC fails. **TRSP,MUX** recommended.

RDLD = To designate red lined special circuit; normally used for subrate data circuits.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. Check completion message to verify correct entries.

DS0B Customer Signals (Continue Here)

6. Enter the appropriate command to connect the customer signals (established to DSPU) to channels from the MJU (established to DSPU). See Table 6-10 for MJU channel assignment.

Normal Connection:

```
CONN-CRS-TS:[xy]:<npc No.>-ddd[-ff[&&-mm]],<npc No.2>-
jjj[-ll[&&-nn]:RATE-rr;
```

Terminated Connection:

```
CONN-CRS-TS:[xy]:<npc No.>-ddd[-ff[&&-mm]],<npc No.2>-
jjj[-ll[&&-nn]]:RATE-rr:TERM,TERM;
```

NOTE:
The terminated connection sends a UMC (unassigned multiplexer code) on the channels for testing or to hold the circuit in a preservice condition.

Where:

xy = Unique id (target id); up to 20 characters.
ww = Command correlation tag; up to 10 characters.
<npc No.1> = FROM NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
<npc No.2> = TO NPC number.

rr = The cross-connect circuit rate 96, or 56 (for 9.6, or 56 kb/s). This rate must be equal to or lower than the rates of the customer signals.

TPT = Two-Point (optional). Retained only for DACS/SRDC compatibility.

ddd = FROM channel number within the digroup.

ff = The FROM customer number; see Table 6-11.

mm = Optional, for last customer number in a continuous range of DS0B customers.

jjj = The TO channel number within the digroup (being addressed by the command).

ll = The TO customer number; see Table 6-11.

nn = Optional, for last customer number in a continuous range of DS0B customers.
Extra ampersand required for hierarchical.

- If the command is denied, find the reason for the SUBRATE denial in the output message and perform corrective action to obtain command completion.

7. Check completion message to verify correct entries.

Table 6-11. Subrate Customer Numbers

Rate	DS0A Numbers (Note 1)	DS0B Customer Numbers (Note 2)
9.6	01	01 through 05
56	01	01

Notes:

1. Range of channels allowed with DS0A
2. Range of customers allowed with DS0B

6.3.4 Change Two-Point Terminate and Leave State

1. To request a change in the termination status of a cross-connected circuit (or range of circuits), enter the following command:

```
ED-PMTR-T0:[<xy>]:[s]abc-ddd[&&-eee],[t]ghi-jjj[&&-
kkk]:[ww]:
[INCL]:{TERM|RLS}{F|T|B|L|G|A}:NOT-[u]rst-vvv]
```

Where;

FROM = From

TO = To

[s]abc = The 3 or 4-digit nonhierarchical FROM NPC number.

[t]ghi = The 3 or 4-digit nonhierarchical TO NPC number.

[u]rst = The 3 or 4-digit nonhierarchical NPC number not affected by this.

ddd = FROM channel number.

jjj = TO channel number.

eee = FROM channel number denoting the end of a range.

kkk = TO channel number denoting the end of a range.

vvv = Channel number not affected by this command.

TERM = Terminate.

RLS = Release. The direction of transmission to be terminated or released is given by the letter following the request:

- F Towards the FROM direction
- T Towards the TO direction
- B Towards both terminations
- L Towards the facilities (multipoint connection only)
- G Towards the bridge (multipoint connection only)
- A Towards the facilities and the bridge (multipoint

only)

INCL = Inclusive. To change the parameters on a channel or range of channels including one or more channels marked as a Red Circuit, use the INCL keyword.

NOT = Not. The NPC is not not affected by this command.

2. If COMPLD message is received, check completion message to verify changes.
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

6.3.5 Change Multipoint Terminate and Leave State

1. To change the terminate and leave state of the control leg or branch associated with the addressed MJU in a subrate multipoint circuit, enter

```
ED-PRMTR-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:
MJU-ssss:[BRi]:{TERM|RLS}-m;
```

NOTE:
The TO and BR fields control how the terminate and leave is applied. When BR is not used, the TO side faces the control leg downstream, and the FROM side faces upstream to the external facility termination or branch of cascaded MJU (for MJU other than 0001). When BR is used (for MJU other than 0001), the TO faces upstream to the branch of the specified MJU, and the FROM faces downstream to another MJU or facility termination.

Where:

xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

<npc No.> = TO NPC number of the master leg, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd = TO channel number within the digroup.

ff = TO customer number. Optional when channel is DS0A.

ssss = MJU identification number addressed by this command (1 through 9999).

i = Optional, to change state of branch (1 through 4) on MJU ssss.

m = Direction of terminate and leave change (F, T, B).

- If command is denied, find the reason for denial and perform corrective action to obtain command completion.

2. Check completion message to verify changes.

6.3.6 Change Multipoint Master

1. If you want to see the whole multipoint circuit first, enter the following command using the multipoint master for the NPC and channel:
   `RTRV-PRMTR-TS::<npc No.>-ddd-ff;`
2. To change the external facility termination associated with the multipoint control leg of a subrate multipoint circuit from an existing digroup and channel to a new digroup and channel, enter:
   `ED-CONN-TS:[xy]:<npc No.1>-ddd[-ff]:,<npc No.2>-jjj [-ll]:[ww]:MPTM;`
   Where:
   - xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.
   - ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.
   - ddd = channel number within the digroup of the old control leg external facility termination.
   - ff = Customer number. Optional when channel is a DS0A.
   - <npc No.1> = NPC number (of the old control leg), either extended (for example, [0]001) or hierarchical (for example, 01-1-01)
   - <npc No.2> = NPC number (of the new control leg)
   - jjj = Channel number within the digroup of the new control leg external facility termination.
   - ll = Customer number and is optional when channel is a DS0A.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

   NOTE:
   All branches are left with their existing external and internal connections. The external facility termination associated with the original connections is left established to the subrate feature with a UMC (unassigned multiplexer channel) code inserted towards the old facility.

3. Check completion message to verify changes.

6.3.7 Disconnect Two-Point Circuit

1. To disconnect a subrate circuit in both directions, enter:

   ```
   DISC-CRS-TS:[xy]:<npc No.1>-ddd[-ff],<npc No.2>-jjj
   [-ll]:[ww]:[RAte-rr];
   ```

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   ff = TO customer number.

   <npc No.1> = FROM NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   ddd = FROM channel number within the digroup (being addressed by the command).

   <npc No.2> = TO NPC number

   jjj = TO channel number within the digroup (being addressed by the command).

   ll = TO customer number (optional for DS0A channel).

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

   NOTE:
   The FROM and TO designations enable the addressing of a direction of transmission in a subrate circuit (subrate is connected as a two-way circuit). FROM or TO can be either external facility for any subrate command. The association of FROM or TO to an external facility is valid only for the command it is being used in. The next time you use the same command and external facilities, FROM or TO can be specified as the other external facility.

2. Check completion message to verify changes.

6.3.8 Disconnect Multipoint Branch

NOTE:
The MJU remains connected to the circuit. The command can disconnect up to four branches of one MJU at one time.

1. To disconnect multipoint branch circuits in both directions, enter:

   DISC-CRS-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:MJU-ssss:
   [RATE-rr]:<branch>[,<branch>][,<branch>][,<branch>];

   Where:

   xy = Unique id (target id); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   <npc No.> = Multipoint master (MJU 1) NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)
   ddd = Channel number within the digroup of the multipoint master (MJU 1).
   ff = TO customer number.
   ssss = MJU identification number addressed by this command (1 through 9999).
   <branch> = Branch to be disconnected. Each branch consists of **BRi <npc No.>jjj[/ll]** which is explained by the following definitions:
   BRi = Branch number of MJU ssss (1 through 4).
   <npc No.> = NPC number of the branch
   jjj = Channel number within the digroup (<npc No.>).
   ll = Customer number. Optional for DS0A channel (if used with a DS0A, it must be 01).

   - If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check completion message to verify changes.

6.3.9 Disconnect Multipoint Master

NOTE:
MJU ssss and up to a total of 20 additional MJUs cascaded from MJU ssss can be deleted by this command.

1. To delete MJU(s) and disconnect customers in both directions, enter:

```
DISC-CRS-TS:[xy]:<npc No.>-ddd[-ff]:[ww]:
MJU-ssss:[RATE-rr]:[ALL];
```

Where:

xy = Unique id (target id); up to 20 characters
ww = Command correlation tag; up to 10 characters
<npc No.> = NPC number of multipoint master for the circuit, either extended (for example, [0]001) or hierarchical (for example, 01-1-01)
ddd = Channel number on multipoint master.
ff = Customer number on multipoint master.
ssss = Identification number (1 through 9999) of MJU to be deleted. If multiple MJUs are to be deleted, MJU ssss identifies the MJU at which to start the deletion.
ALL = Optional, to delete cascaded MJUs (up to 20). If the ALL keyword is omitted, only MJU ssss will be deleted provided no branches are connected to that MJU.
rr = Circuit rate (24, 48, 96 or 56).

- If command is denied, find the reason for denial in the output message and perform corrective action to obtain command completion.

2. Check completion message to verify changes.

6.4 Re-Direct Cross-Connections

6.4.1 Re-Direct DS0 Signals

The DS0 "roll" capability allows cross-connected DS0 signals to be redirected onto other (unmapped) DS0 channels with minimal service interruption. Of the three steps in the *roll* process (bridge, roll, and cut), minimum service interrupts only occur during the *roll* step. The DS0 signal being redirected can be part of a circuit of any type. The following four types of cross-connections can be redirected:

- Two point (one-way, two-way)
- Broadcast
- DMB (BBL and BRD legs)
- Subrate
- Virtual

NOTE:
The ROLL command enables you to redirect one DS0 or a range of contiguous mapped DS0s within a DS1 signal.

NOTE:
Circuits under test/testports cannot be re-directed.

The following procedure is for redirecting DS0 signals.

1. Bridge the DS0 signals using the command:

```
SW-BCAST-T0:[xy]:<npc No.1>ddd[&&-eee],<npc
No.2>jjj[&&-kkk]:[ww]:[INCL];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd, jjj = Channel numbers for the beginning of a channel range.

eee, kkk = Optional, channel numbers for the end of a channel range. (Three ampersands (&s) are required for hierarchical.)

<npc No.2> = New NPC number. (See <npc No.1>.)

INCL = Optional, used to force bridging of RDC or CUS channels

2. Redirect the DS0 signal using the command:

```
SW-ROLL-T0:[xy]:<npc No.1>ddd[&&-eee],<npc
No.2>jjj[&&-kkk]:\
[ww]:[INCL][:FRC][:OOS];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd, jjj = Channel numbers for the beginning of a channel range.

eee, kkk = Optional, channel numbers for the end of a channel range. (Three ampersands (&s) are required for hierarchical.)

<npc No.2> = New NPC number. (See <npc No.1>.)

INCL = Optional, used to force roll of RDC or CUS channels (required for subrate).

FRC = Optional, used to force a roll **TO** an NPC which is in CGA.

OOS = Optional, used to force a roll **FROM** an NPC which is OOS.

NOTE:
The size of the range on the OLD and NEW NPC must match, but the starting channel numbers do not have to be identical. A range can not break up the channels in a BDCST or virtual circuit (i.e., all the channels of a BDCST leg must be within the channel range of the ROLL command).

NOTE:
If the OLD NPC contains a 24-channel cross-connect with the AIS option, the ROLL command must have a 24-channel range.

3. Disconnect the bridged circuits using the following command:

NOTE:
The *disconnect* step may also be referred to as *cut*.

```
SW-DISC-T0:[xy]:<npc No.1>-ddd][&&-eee]:[ww]:[OOS];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd = Channel numbers for the beginning of channel range.

eee = Optional, channel numbers for the end of channel range. (Three ampersands (&s) are required for hierarchical.)

OOS = Optional, used to disconnect an NPC that is OOS.

4. Verify that the redirection of DS0 signals has been successful using the following commands:

```
RTRV-ROLL-T0:[<xy>]:{NPC-<npc No.1>[&&-<range> |
ALL[,UNIT-[q]q]}[:w];
RTRV-CRS-T1::MAP;
```

6.4.2 Re-Direct DS1 Signals

The DS1 *roll* capability allows for redirection of all channels from an incoming facility from one DS1 port to another. The following two types of DS1 signals can be redirected:

- Channelized DS1
- Clear DS1

Each channel within a channelized DS1 can be of the following circuit types:

- Two-point (one-way or two-way)
- Virtual conference
- Broadcast circuit
- DMB leg
- Subrate channel

A clear DS1 can be of the following circuit types:

- Two-point (one-way or two-way)
- Broadcast circuit

NOTE:
The ROLL command enables one DS0 or a range of contiguous mapped DS0s within a DS1 signal to be re-directed.

NOTE:
Circuits under test/testports cannot be re-directed.

6.4.2.1 Network Element

The following procedure is for redirecting DS1 signals to a network element:

1. Bridge the DS1 signals using the command:

```
SW-BCAST-T1:[xy]:<npc No.1>ddd[&&-eee],<npc
No.2>jjj[&&-kkk]:[ww]:[INCL];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd, jjj = Channel numbers for the beginning of a channel range.

eee, kkk = Optional, channel numbers for the end of a channel range. (Three ampersands (&s) are required for hierarchical.)

<npc No.2> = New NPC number. (See <npc No.1>.)

INCL = Optional, used to force bridging of RDC or CUS channels.

2. Redirect the DS1 signal using the command:

```
SW-ROLL-T1:[xy]:<npc No.1>ddd[&&-eee],<npc
No.2>jjj[&&-kkk]:\
[ww]:[INCL]:[FRC]:[OOS]:[TWAY];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd, jjj = Channel numbers for the beginning of a channel range.

eee, kkk = Optional, channel numbers for the end of a channel range. (Three ampersands (&s) are required for hierarchical.)

<npc No.2> = New NPC number. (See <npc No.1>.)

TWAY = Optional, used for a two-way roll (bridge and roll combined).

INCL = Optional, used to force roll of RDC or CUS channels.

FRC = Optional, used to force a roll **TO** an NPC which is in CGA.

OOS = Optional, used to force a roll **FROM** an NPC which is OOS.

3 Remove the bridged circuits using the following command:

NOTE:
The *disconnect* step may also be referred to as *cut*.

```
SW-DISC-T1:[xy]:<npc No.1>:[ww]:[OOS];
```

Where:
<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
OOS = Optional, used to disconnect an NPC that is OOS.

4. Verify that the redirection of DS1 signals has been successful using the following commands:

```
RTRV-ROLL-T1:[<xy>]:{NPC-<npc No.1>[&&-<range> |
ALL[,UNIT-[q]q]}[:w];
RTRV-CRS-T1::MAP;
```

6.4.2.2 Non-Network Element

If a spare facility is not available to perform a coordinated roll with another network element, you can redirect an entire traffic carrying DS1 signal from an NPC on one digroup card to an NPC on another digroup card using the DSX-1 patch panel. This capability allows replacement or upgrade of a service carrying digroup card with minimal service interruption.

The following procedure is for redirecting a DS1 signal using the DSX-1 patch panel.

1. Patch the bridging repeater from the incoming facility monitor jack to <npc No.2>.
2. Provision the alternate NPC using the following commands:

```
COPY-T1:[<xy>]:<npc No.1>,<npc No.2>[&&-
<range>][:ww];
RST-EQPT:[<xy>]:NPC-<npc No.2>[&&-
<range>]:[ww]:[SIDE-s];
```

Where:
<npc No.1> = Source NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
<npc No.2> = Destination NPC number. (See <npc No.1>.)
<range> = Optional, NPC range. (See <npc No.1>.)

3. Redirect the DS1 signal using the following command:

```
SW-ROLL-T1:[xy]:<npc No.1>ddd[&&-eee],<npc
No.2>jjj[&&-kkk]:[ww]:\
[INCL]:[FRC]:[OOS]:[TWAY];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd, jjj = Channel numbers for the beginning of a channel range.

eee, kkk = Optional, channel numbers for the end of a channel range. (Three ampersands (&s) are required for hierarchical.)

<npc No.2> = New NPC number. (See <npc No.1>.)

TWAY = Optional, used for two-way roll (bridge and roll combined).

INCL = Optional, used to force roll of RDC or CUS channels.

FRC = Optional, used to force roll **TO** an NPC that is in CGA.

OOS = Optional, used to force roll **FROM** an NPC that is OOS.

4. Patch <npc No.2> XMIT to facility input.

5. Remove <npc No.1> from service so it's digroup card can be removed without alarming using the following command:

```
RMV-EQPT:[<xy>]:NPC-<npc No.1>[&&-
<range>]:[ww]:[SIDE-s]:[INCL];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

<range> = Optional, NPC range. (See <npc No.1>.)

SIDE s = Optional, side of duplicated DSPU circuit to be removed; s = 0 or 1.

INCL = Optional, used to remove RDC or CUS channels (required for subrate).

6. Insert terminator plug into <npc No.1> facility OUT jack.

7. Replace the digroup card and remove the terminator plug from <npc No.1> jack.

8. Restore <npc No.1> to service using the following command:

```
RST-EQPT:[<xy>]:NPC-<npc No.1>[&&-
<range>]:[ww]:[SIDE-s];
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

<range> = Optional, NPC range. (See <npc No.1>.)

SIDE s = Optional, side of duplicated DSPU circuit to be restored; s = 0 or 1.

9. Redirect service back to the original NPC using the following command:

```
SW-ROLL-T1:[xy]:<npc No.2>ddd[&&-eee],<npc
No.1>jjj[&&-kkk]:\
[ww]:[INCL]:[FRC]:[OOS]:[TWAY];
```

Where:

<npc No.2> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

ddd, jjj = Channel numbers for the beginning of a channel range.

eee, kkk = Optional, channel numbers for the end of a channel range. (Three ampersands (&s) are required for hierarchical.)

<npc No.1> = New NPC number. (See <npc No.2>.)

TWAY = Optional, used for two-way roll (bridge and roll combined).

INCL = Optional, used to force roll of RDC or CUS channels.

FRC = Optional, used to force roll **TO** an NPC that is in CGA.

OOS = Optional, used to force roll **FROM** an NPC that is OOS.

10. Disconnect <npc No.2> using the following command:

```
SW-DISC-T1:[xy]:[s]abc:[ww]:[OOS];
```

Where:

<npc No.2> = NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

OOS = Optional, used to disconnect an NPC that is OOS.

11. Remove <npc No.2> from service using the following command:

```
RMV-EQPT:[<xy>]:NPC-<npc No.2>[&&-
<range>]:[ww]:[SIDE-s]:[INCL];
```

Where:

<npc No.2> = NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

<range> = Optional, NPC range. (See <npc No.2>.)

SIDE s = Optional, side of duplicated DSPU circuit to be removed; s = 0 or 1.

INCL = Optional, used to remove RDC or CUS channels (required for subrate).

12. Remove the bridging repeater.

Administration

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Administration

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7.1 Administrator Functions

7.1.1 Add/Delete User

Overview: This procedure contains the commands for the frame administration tasks of adding or deleting users. Command execution priority levels for the user are established during link provisioning. Generally, priority level 1 commands are processed before level 2 commands, and level 2 commands, before level 3. However, if lower priority commands such as queries are received from a user while a higher priority command which requires more processing (for example, DGN TAPE) is underway, the easily completed commands will be executed first. Until set otherwise, all user commands are processed as level 3 by default, and all system administrator commands are processed as level 1. Prioritizing also allows excluding commands from the user. Screening allows blocking groups of messages or including messages associated with other links.

NOTE:
You must be logged in as frame administrator (user DAX) to perform these tasks.

NOTE:
After a user is added to the data base, the user can log in on any designated in-service link.

1. Which system administration activity are you going to perform?
   - If **ADD NEW USER**, then continue with Step **2.**
   - If **DELETE USER/LINK**, then proceed to Step **7.**
2. Note the following considerations concerning the assignment of initial user passwords. A password must have 6 characters: 2 must be alphabetic and 1 must be a number (except for temporary password for new user, any special character can be used instead of a number).
3. Enter the appropriate command to add the user:

   Asynchronous Link:

   To add a new user on an asynchronous link, enter:

   CRTE-LGN:[xy]::[ww]:<user id>,NEW;

   Where: <user id> = User identification of 2 to 8 alphabetic characters.

   When **PASSWD** prompt is received, enter a temporary password. Reenter as instructed; the password will not be echoed.

   Synchronous Link:

   To add a new user on a synchronous link, enter:

   CRTE-LGN:[xy]::[ww]:<user id>,<pswd>,NEW;

   Where: <pswd> = Temporary password for user.
4. Familiarize yourself with the command groupings and RMON option per Table 7-1 and with the output message screening options (1 through 5) per Table 7-2. Option 2 is the default setting.
   - If the output screening options need to be changed for the link, continue with Step **5**.
   - If the output screening options do not need to be changed, check the output message to verify that the correct information was entered. Notify the user that he/she can now log in and change the temporary password to a personal one. You have completed the procedure to add a user.
   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Table 7-1. Command Groupings

a Circuit Provisioning	b Equip Provisioning	c Maintenance
ALW-SW-T1	CRTE-CNFGRN-EQPT	DGN-EQPT
CONN-BDCST-T0	CRTE-EQPT	ED-PRMTR-EQPT
CONN-CRS-T0	CRTE-LGN	ENT-EQPT
CONN-CRS-TS	DLT-LGN	INIT-SYS
CONN-CRS1-T0	DLT-MACRO	RMV-CNFGRN-EQPT
CRTE-CRS-TS	DLT-MAP	RMV-EQPT
DLT-CRS-TS	DLT-PRMTR-EQPT	RST-CNFGRN-EQPT
DISC-BDCST-T0	ED-PRMTR-EQPT	RST-EQPT
DISC-CRS-T0	ED-PRMTR-LINK	SW-DX-EQPT
DISC-CRS-TS	ED-PRMTR-NE	-
DISC-CRS1-T0	DISC-EQPT	-
INH-SW-T1	SET-PRVG-TERM	
SW-TOPROTN-T1	SET-PRVG-USER	
SW-TOWKG-T1		
d **Test Access**	**e** **Monitoring**	**f** **Common**
ALW-LPBK-T1	CPY-MEM	CHG-LGN
CHG-TL-T0	ED-DATE	CHG-RPATH-T0
CHG-TL-TS	INIT-LOG	ED-CNFGRN-EQPT
CONN-HUB-T0	INIT-REG	ED-CONN-TS
CONN-TACC-T0	OPR-ACO-ALL	ED-CRTE-TS
CONN-TACC-TS	RST-PASSWD	ED-OPT-T1
DISC-TACC-T0	SCHED-BKUP-MEM	ED-PRMTR-EQPT
DISC-TACC-TS	SCHED-PMREPT-ALL	ED-PRMTR-MACRO/MAP
INH-LPBK-T1	SET-ATTR-EQPT	ED-PRMTR-NE
OPR-LPBK-T0	STA-LOCL-RST	ED-PRMTR-T0
OPR-LPBK-T1	RTRV	ED-PRMTR-TS
RLS-LPBK-T1		ENT-MACRO/MAP
-	-	EXC-MACRO/MAP
-	-	SET-PRVG-TERM/USER
Restricted Maintenance (RMON Option)		
Restore MC (with TAPE Option) Restore DISK/TAPE (with CLR Option) CPY-MEM Commands **STA-LOCL-RST** **SCHED-BKUP** (00-HR)		

Table 7-2. Screening Options

Screening Option (n)	Definition
1	Only the responses to inputs entered on that particular link and by that user are output.
2	The responses to inputs entered on that particular link and by that user are output as well as all autonomous messages (default).
3	Responses to input messages on that particular link and by that user are output as well as responses from specified groups of action verbs from other links. The selection of message groups is made using the GR (a, b, c, d, e, f) field in the screening command.
4	Responses to input messages on that particular link and by that user, responses from specified groups of action verbs from other links (see above), and autonomous messages are output.
5	All responses to all input messages on all links are output as well as all autonomous messages.

5. Enter the following command:

```
SET-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|<link No.>}
:SCR-n[,GR-a&-b&-c&-d&-e&-f][:MCOFF|MCON];
```

Where:

USER/TERM = Selects either user or link identification. Include <user id> (2 to 8 alphabetic characters) for USER option or include link No. (1 through 6) and virtual circuit (01 through 16) for synchronous link.

n = Screening option 1 through 5 per Table 7-2.

GR = Optional; field used with SCR 3 or 4 to specify the command groups; enter a "1" for each group in Table 7-1 to be enabled and a "0" for each group to be disabled.

MCOFF/MCON = Optional to disable (MCOFF) component command completion messages or to enable (MCON) completion outputs again. DENY messages cannot be disabled.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

6. Check the output message to verify that the correct information was entered. Notify the user that he/she can now log in and change the temporary password to a personal one. You have completed the procedure to add a user.

7. From office records, determine the user identification for the user to be deleted. If needed, enter the following to determine if the user owns any macros and/or maps:

   RTRV-PRMTR-{MACRO|MAP}:[xy]::[ww]:ATTR:[{<user id>|ALL}];

   Where: <user id> = User identification (2 to 8 alphabetic characters).

   ⇒ NOTE:
   Any macro or map files that the user has must also be removed before the user can be deleted from the system (see *Delete Alternate Map From System* and *Delete Macro From System*).

8. Enter **DLT-LGN:[xy]::[ww]:<user id>;** to prevent user identified by **id** (2 to 8 alphabetic characters) from having login access to the frame. Check the output message to verify that the correct information was entered.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.1.2 Recover User DAX Password from Tape

Overview: This procedure shows how a user can help the frame administrator recover the original (default) password from the safe-storage tape to allow the frame administrator to log in if he/she does not know the current password. This tape must be the original delivery tape because the operative command can only recover that password. Once the original password is recovered, the current backup tape can be returned to the frame and the frame administrator can change the password if desired.

1. Obtain the safe-storage copy of the original tapes for the frame that contains the executable programs and the default password for the frame administrator.
2. Verify that the screw switch (write protection tab, Figure 7-1) on the tape is set to SAFE (read only).

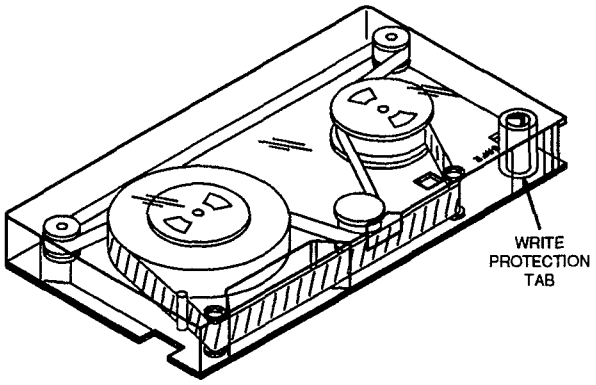

Figure 7-1. Write Protection Tab on Tape Cartridge

3. Enter `RMV-EQPT::TAPE;` and after completion message, substitute tape for resident tape in tape drive. Then enter `RST-EQPT::TAPE;`

4. Enter `RST-PASSWD:[xy]::[ww];`.

   NOTE:
   The recovery operation takes about 4 minutes during which IN PROGRESS messages will be received.

   - If `RST PASSWD ...DENY` message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. Enter `RMV-EQPT::TAPE;`, replace old backup tape with tape which is to remain in the frame, and enter `RST-EQPT::TAPE;`.
6. Notify the frame administrator that he/she can now log on using the default password. After logging in, the frame administrator can change the password to a personal one.

7.1.3 Reinstate a User That Has Forgotten the Password

To reinstate a user that has forgotten the password, do the following:

1. Assign a temporary password by entering the appropriate command:

   Asynchronous Links (Snider Protocol):

   `CRTE-LGN:[xy]::[ww]:<user id>;`.

   Message prompts will instruct you to enter the temporary password.

   Synchronous Links (X.25 Protocol):

   `CRTE-LGN:[xy]::[ww]:<user id>[,<user pswd>];`.

   Where: <user pswd> = Only for synchronous links, to enter temporary password in the command. Passwords must have 6 characters: 2 are alphabetic and 1 is a number or special character.

   <user id> = User Identification (2 to 8 alphabetic characters).

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

2. After assigning the temporary password, the user can assign his/her personal password.

7.1.4 Log Off Other User

NOTE:
To forcibly log off another user, you must be logged in as the frame administrator and logged in on a different link.

1. Enter the following command to log off the system:

```
LGT-{USER|TERM}:[xy]::[ww]:{<user id>|<link No.>};
```

Where: xy = Unique ID (target ID); up to 20 characters.
ww = Command correlation tag; up to 10 characters.
USER/TERM = Selects whether user ID or link number will be specified. Only the frame administrator can use the LINK option to log off a user from another link.
<user id> = User identification (2 to 8 alphabetic characters)
<link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

NOTE:
When trying to log off other users, DACS II does security level checking first. If you are not logged in as frame administrator, you will get a "D7 cannot execute priveledged command" denial message.

7.1.5 Change Input Command Priority and Restricted Maintenance Option

Overview: This procedure describes how to change input command priorities for the user or the link. Commands from a single active link go into a queue and are executed in the order issued. Commands from different links go into separate waiting queues, and the *input command priorities* from these links control the order of execution: priority level 1 commands first, then priority 2, then priority 3. Commands with the same priority from different links are executed alternately. To prevent long waits for all lower priority commands, those that have been waiting in the queue for 2 minutes will be executed while higher priority commands that require more processing, like diagnose tape, are underway. Until set otherwise, the system processes all user commands as level 3 by default, and all system administrator commands as level 1. By setting the priority of the command groups on all LINKS to zero (excluded), the administrator can establish the use of the login mode because each user will have to log in to

access the command set defined for that USER.

When the *restricted maintenance* option is enabled, a link or a specified user can execute the commands listed under *Restricted Maintenance* in Table 7-3.

1. To see the present parameters for any or all links or users, enter the following command and read the **LEV** numbers and the restricted maintenance option from the output:

   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|j[mm][&&p[nn]]|ALL};

   — To read the priority level (LEV) for different commands, relate the level — 0 (excluded group), 1 (lowest), 3 (highest), given after LEV word in the output message to the command groups per Table 7-3.

   — The restricted maintenance option (RMON/RMOFF) determines whether the user has permission to use commands in that category.

2. Enter the following command to change input command priorities and/or the restricted maintenance option:

   SET-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|<link No.>[,INCL]}:
   ::[LEV-a&-b&-c&-d&-e&-f][:{RMON|RMOFF}];

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   USER|TERM = Selects whether user or link identification will be used in command.

   <user id> = User identification (2 to 8 alphabetic characters).

   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).

   INCL = Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.

   LEV Field = To change the priority of the six command groupings shown in Table 7-3; enter priority level 0 (excluded), 1 (highest), 2, or 3 (lowest) for all command groups in Table 7-3.

   {RMON|RMOFF} = Restricted Maintenance Option
   RMON allows the use of the commands listed under *Restricted Maintenance* in Table 7-3.
   RMOFF disallows the use of these commands.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Table 7-3. Command Groupings

a Circuit Provisioning	b Equip Provisioning	c Maintenance
ALW-SW-T1	CRTE-CNFGRN-EQPT	DGN-EQPT
CONN-BDCST-T0	CRTE-EQPT	ED-PRMTR-EQPT
CONN-CRS-T0	CRTE-LGN	ENT-EQPT
CONN-CRS-TS	DLT-LGN	INIT-SYS
CONN-CRS1-T0	DLT-MACRO	RMV-CNFGRN-EQPT
CRTE-CRS-TS	DLT-MAP	RMV-EQPT
DLT-CRS-TS	DLT-PRMTR-EQPT	RST-CNFGRN-EQPT
DISC-BDCST-T0	ED-PRMTR-EQPT	RST-EQPT
DISC-CRS-T0	ED-PRMTR-LINK	SW-DX-EQPT
DISC-CRS-TS	ED-PRMTR-NE	-
DISC-CRS1-T0	DISC-EQPT	-
INH-SW-T1	SET-PRVG-TERM	
SW-TOPROTN-T1	SET-PRVG-USER	
SW-TOWKG-T1		
d **Test Access**	**e** **Monitoring**	**f** **Common**
ALW-LPBK-T1	CPY-MEM	CHG-LGN
CHG-TL-T0	ED-DATE	CHG-RPATH-T0
CHG-TL-TS	INIT-LOG	ED-CNFGRN-EQPT
CONN-HUB-T0	INIT-REG	ED-CONN-TS
CONN-TACC-T0	OPR-ACO-ALL	ED-CRTE-TS
CONN-TACC-TS	RST-PASSWD	ED-OPT-T1
DISC-TACC-T0	SCHED-BKUP-MEM	ED-PRMTR-EQPT
DISC-TACC-TS	SCHED-PMREPT-ALL	ED-PRMTR-MACRO/MAP
INH-LPBK-T1	SET-ATTR-EQPT	ED-PRMTR-NE
OPR-LPBK-T0	STA-LOCL-RST	ED-PRMTR-T0
OPR-LPBK-T1	RTRV	ED-PRMTR-TS
RLS-LPBK-T1		ENT-MACRO/MAP
-	-	EXC-MACRO/MAP
-	-	SET-PRVG-TERM/USER
Restricted Maintenance (RMON Option)		
Restore MC (with TAPE Option) Restore DISK/TAPE (with CLR Option) CPY-MEM Commands **STA-LOCL-RST** **SCHED-BKUP** (00-HR)		

7.1.6 Change Message Language

Overview: DACS II Snider and X.25 links will operate in either PDS or MML message languages. Unless previously changed, the message language for the links and users will default to what is defined in the software load. If you want to use a different message language during your login session, you can change the message language for your user id. For example, if the link defaults to PDS but you work in MML, the link will switch to MML when you log in.

This procedure describes how to change the following:

— The message language of the link

— The message language for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **LANG** type from the output:

   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|j[mm][&&p[nn]]|ALL};.

2. Enter one of the following commands for the appropriate language change:

   Change Message Language of the Link:

   SET-PRVG-TERM:[xy]::[ww]:<link No.>[,INCL]:LANG-{P|M|T};

   Change Message Language for a Specific User:

   SET-PRVG-USER:[xy]::[ww]:<user id>:LANG-{P|M|T};

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Where: xy = Unique ID (target ID); up to 20 characters.
ww = Command correlation tag; up to 10 characters.
<user id> = User identification (2 to 8 alphabetic characters).
<link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).
LANG-{PIMIT} = To change link language as follows:
P for PDS, M for MML, or
T for TABS (Telemetry Async Block Serial)

7.1.7 Change NPC Addressing

Overview: DACS II Snider and X.25 links will operate in one of the following NPC addressing schemes:

— **Extended**. This scheme uses 3 digits to number the NPCs consecutively (for example, **041**). It can only be used on systems of three bays or less.

— **4-Digit Extended**. This scheme uses 4 digits to number the NPCs consecutively (for example, `1041`). The extra digit allows the system to accommodate additional bays.

— **Hierarchical**. This scheme uses a 5-digit number (`uvmnp`). It assigns a number to each NPC according to the unit number (`uv`), module or group number (`m`), and the NPC number within the module (`np`).

Unless previously changed, NPC addressing for the links and users will default to what is defined in the software load. If you want to use a different addressing scheme during your login session, you can change the scheme for your user id. For example, if the link defaults to *extended* but you work in *hierarchical*, the link will switch to hierarchical when you log in. Ensure that the link addressing scheme is allowable as defined in the configuration file.

This procedure describes how to change the following:

— The NPC addressing of the link

— The NPC addressing for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **`NPCAD`** type from the output:

   ```
   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|j[mm][&&p[nn]]|ALL};.
   ```

2. Enter one of the following commands for the appropriate NPC addressing change:

   Change NPC Addressing of the Link:

   ```
   SET-PRVG-{TERM|ALL}:[xy]::[ww]:<link No.>[,INCL]
   ::NPCAD-{E|X|H};
   ```

   Change NPC Addressing for a Specific User:

   ```
   SET-PRVG-{USER|ALL}:[xy]::[ww]:<user id>
   ::NPCAD-{E|X|H};
   ```

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   ALL = Optional, for links 5 and 6. Specifies that the NPCAD option applies to all users, links and virtual circuits.

   INCL = Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.

   <user id> = User identification (2 to 8 alphabetic characters).

   <link No.> = Physical link number (1 through 6) and virtual circuit

(mm = 01 through 16) for synchronous link (links 5 and 6).

NPCAD-{E|X|H} = NPC addressing scheme, either E (default) for extended (for example, 001), X for 4-digit extended, or H for hierarchical (for example, 01-1-01).

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.1.8 Change Output Message Screening

Overview: Output message screening allows you to block groups of messages or include messages associated with other links. Any user can change his/her own message screening.

Unless previously changed, output message screening for the links and users will default to what is defined in the software load. If you want to use a different screening option during your login session, you can change the option for your user id. For example, if the link defaults to option 2 but your user id is set to option 5, the link will switch to option 5 when you log in.

This procedure describes how to change the following:

— The output message screen option of the link

— The output message screen option for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **SCR** field from the output:

   ```
   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|
   j[mm][&&p[nn]]|ALL};.
   ```

2. Enter one of the following commands for the appropriate output message screening option change:

   Change Message Screening Option of the Link:

   ```
   SET-PRVG-TERM:[xy]::[ww]:<link No.>:
   SCR-n[,GR-a&-b&-c&-d&-e&-f][:{MCOFF|MCON}];
   ```

   Change Message Screening Option for a Specific User:

   ```
   SET-PRVG-USER:[xy]::[ww]:<user id>:
   SCR-n[,GR-a&-b&-c&-d&-e&-f][:{MCOFF|MCON}];
   ```

   Where:

   xy = Unique ID (target ID); up to 20 characters.

   ww = Command correlation tag; up to 10 characters.

   <user id> = User identification (2 to 8 alphabetic characters).

link No. = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).

n = Screening option 1 through 5 from Table 7-4

GR = Optional field used with SCR 3 or 4 to specify the command groups; enter a **1** for each group in Table 7-5 to be enabled and a **0** for each group to be disabled.

MCOFF|MCON = Optional, to disable (MCOFF) intermediate completion outputs of macro commands or to enable completion outputs again (MCON - default for users). DENY messages are not disabled.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Table 7-4. Screening Options

Screening Option (n)	Definition
1	Only the responses to inputs entered on that particular link and by that user are output.
2	The responses to inputs entered on that particular link and by that user are output as well as all autonomous messages (default).
3	Responses to input messages on that particular link and by that user are output as well as responses from specified groups of action verbs from other links. The selection of message groups is made using the GR (a, b, c, d, e, f) field in the screening command.
4	Responses to input messages on that particular link and by that user, responses from specified groups of action verbs from other links (see above), and autonomous messages are output.
5	All responses to all input messages on all links are output as well as all autonomous messages.

Table 7-5. Command Groupings

a Circuit Provisioning	b Equip Provisioning	c Maintenance
ALW-SW-T1	CRTE-CNFGRN-EQPT	DGN-EQPT
CONN-BDCST-T0	CRTE-EQPT	ED-PRMTR-EQPT
CONN-CRS-T0	CRTE-LGN	ENT-EQPT
CONN-CRS-TS	DLT-LGN	INIT-SYS
CONN-CRS1-T0	DLT-MACRO	RMV-CNFGRN-EQPT
CRTE-CRS-TS	DLT-MAP	RMV-EQPT
DLT-CRS-TS	DLT-PRMTR-EQPT	RST-CNFGRN-EQPT
DISC-BDCST-T0	ED-PRMTR-EQPT	RST-EQPT
DISC-CRS-T0	ED-PRMTR-LINK	SW-DX-EQPT
DISC-CRS-TS	ED-PRMTR-NE	-
DISC-CRS1-T0	DISC-EQPT	-
INH-SW-T1	SET-PRVG-TERM	
SW-TOPROTN-T1	SET-PRVG-USER	
SW-TOWKG-T1		
d **Test Access**	**e** **Monitoring**	**f** **Common**
ALW-LPBK-T1	CPY-MEM	CHG-LGN
CHG-TL-T0	ED-DATE	CHG-RPATH-T0
CHG-TL-TS	INIT-LOG	ED-CNFGRN-EQPT
CONN-HUB-T0	INIT-REG	ED-CONN-TS
CONN-TACC-T0	OPR-ACO-ALL	ED-CRTE-TS
CONN-TACC-TS	RST-PASSWD	ED-OPT-T1
DISC-TACC-T0	SCHED-BKUP-MEM	ED-PRMTR-EQPT
DISC-TACC-TS	SCHED-PMREPT-ALL	ED-PRMTR-MACRO/MAP
INH-LPBK-T1	SET-ATTR-EQPT	ED-PRMTR-NE
OPR-LPBK-T0	STA-LOCL-RST	ED-PRMTR-T0
OPR-LPBK-T1	RTRV	ED-PRMTR-TS
RLS-LPBK-T1		ENT-MACRO/MAP
-	-	EXC-MACRO/MAP
-	-	SET-PRVG-TERM/USER
Restricted Maintenance (RMON Option)		
Restore MC (with TAPE Option) Restore DISK/TAPE (with CLR Option) CPY-MEM Commands **STA-LOCL-RST** **SCHED-BKUP** (00-HR)		

7.1.9 Change User's Macro/Map Storage Space

Overview: This procedure gives the commands to check and change the user's current macro/map storage space.

1. If you want to check the current storage space assigned to user, either for macro files or alternate maps, enter:

   `RTRV-PRMTR-{MACRO|MAP}:[xy]::[ww]:SPACE:{<user id>|ALL};`.

   Where: <user id> = User identification (2 to 8 alphabetic characters).

   NOTE:
   The space for macros and alternate maps applies to all users; that is, if set at 20 percent, then no user can use over 20 percent of space.

2. To change the space allotted to all the users, enter:

   `ED-PRMTR-{MACRO|MAP}:[xy]::[ww]:<space>;`

   Where: nnn = Percentage (000 through 100) of the total storage space which is available for distribution to users.
   xy = Unique ID (target ID); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.1.10 Change Link Removal Permission Option

Overview: The System Administrator can give both links and a specific user id permission to remove links from service. The administrator can also inhibit both links and specific users from removing links from service. Unless previously changed, link removal permission for both links and users will default to allow link removal. If the administrator wants to either allow or inhibit a specific user's link removal permission during their login session, the permission can be changed for that user id. For example, if the link defaults to allow link removal permission but the administrator does not want a specific user to have removal permission, the link will be inhibited when the user logs in.

This procedure describes how to change the following:

— The link removal permission of the link

— The link removal permission for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the `RLK` type from the output:

   `RTRV-PRVG-{USER|TERM}:[xy]::[ww]:{<user id>|`
   `j[mm][&&p[nn]]|ALL};`.

2. Enter one of the following commands for the appropriate link removal permission change:

   Change Link Removal Permission of the Link:

   ```
   SET-PRVG-TERM:[xy]::[ww]:<link No.>[,INCL]:::RLK-{A|I};
   ```

   Change Link Removal Permission for a Specific User:

   ```
   SET-PRVG-USER:[xy]::[ww]:<user id>:::RLK-{A|I};
   ```

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Where:
- xy = Unique ID (target ID); up to 20 characters.
- ww = Command correlation tag; up to 10 characters.
- <user id> = User identification (2 to 8 alphabetical characters).
- <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).
- INCL = Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.
- RLK-{A|I} = To specify whether users (other than user DAX) and links (for nonlogin mode) are permitted to remove links from service. `A` is to allow and `I` is to inhibit removal.

7.1.11 Upgrade Feature Package

Overview: This procedure describes how to upgrade your current software generic to another feature package within the same generic.

NOTE:
Verify that the feature package on the frame is a subset of the feature package on the tape with the following command: **RTRV-FPKG-NE**

Supplementary Information — Tape Cartridge Installation

If you do not know how to install the tape cartridge, familiarize yourself with the following procedure.

- If the tape is not already out-of-service, enter **RMV-EQPT::TAPE;** to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).
- If a tape is currently in the drive, remove it as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.
  - — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.

- Insert the tape cartridge into the tape drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

    NOTE:
    Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
    Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

  - — **Tape Drive With the Drawer**. Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

    NOTE:
    Metallic side of the cartridge faces down and the door faces to the right.

- Enter `RST-EQPT::TAPE;` to power up tape drive and retension tape.
  - — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.
  - — If other denial message is received, the reason for denial will be in the output message.

Upgrade Procedure

1. Install the tape with the new feature package into the tape drive. (See *Supplementary Information — Tape Cartridge Installation* at the beginning of this procedure.)
2. Login as a user with Restricted Maintenance (RMON) privileges.
3. Enter `RST-EQPT::MC::MCOND;` to enter the maintenance condition.
4. Enter `CPY-MEM:::SEC,PRI:PROG;` to transfer the generic software.

   Answer YES when prompted. Wait for the command to complete before continuing.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE:
   Reset may take up to 30 minutes.

   - If the system returns `COMPLD` **...with error explanation**, refer to *Trouble Identification* in Volume II.
   - If the reset stops, refer to *Trouble Identification* in Volume II.

6. Verify that the upgrade was successful by entering the following command: `RTRV-FPKG-NE`

7.2 Log-On/Log-Off

7.2.1 Log In to the System

Overview: This section provides the commands and explanation to enable a user to log on the frame and to log off the frame after a work session.

Each DACS II link can operate in two modes:

— **Login Security Mode.** This mode requires you to log in to the system with a *user id* and *passwd* before entering a specified set of commands. The frame administrator controls the specific commands that you can enter before you initially log on the system. He/she also sets the priority the system uses to execute your commands (or command groups). The administrator also sets other login characteristics such as output message screening, link language, and NPC numbering scheme. You will also be given a temporary password to use on your initial login. You should change your temporary password to a personal password (using the criteria below) during the initial login session.

— **Nonlogin Mode.** This mode allows anyone to use a specified command set assigned to the link *without logging in.* The link is automatically in this mode when not in the *Login Security Mode.* The frame administrator specifies the command set that can be used when operating in this mode.

If this is your initial login, review the following information about selecting a personal password that you can easily remember:

— A password must contain six to eight characters, at least two of which must be letters and one a number. Think of one that is meaningful to you and can be remembered without writing it down.

— To be effective, passwords should not be shared.

— You can change your passwords when desired. If you forget your password, the frame administrator can enable you to log on by assigning you another temporary password.

1. Enter the following command to log in to the system:

   LGN-USER:[xy]::[ww]:<user id>[,<pswd>];

   Where: xy = Unique ID (target ID); up to 20 characters
   ww = Command correlation tag; up to 10 characters
   <user id> = User identification (2 to 8 alphabetic characters)
   <pswd> = Required for synchronous link to enter password. For asynchronous link, the login routine will prompt you for your password.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

2. If you want to see who is currently logged on, enter:

   RTRV-PRVG-USER:[xy]:LOG:[ww]:[ALL];.

   The ALL option allows the frame administrator to see all users on the frame.

7.2.2 Log Off the System

1. Enter the following command to log off the system:

   LGT-{USER|TERM}:[xy]::[ww]:{<user id>|<link No.>};

   Where: xy = Unique ID (target ID); up to 20 characters.
   ww = Command correlation tag; up to 10 characters.
   USER/TERM = Selects whether user ID or link number will be specified. Only the frame administrator can use the LINK option to log off a user from another link.
   <user id> = User identification (2 to 8 alphabetic characters)
   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

NOTE:
To forcibly log off another user, you must be logged in as the frame administrator and logged in on a different link. When trying to log off other users, DACS II does security level checking first. If you are not logged in as frame administrator, you will get a "D7 cannot execute priveledged command" denial message.

7.2.3 Change Password

Overview: This procedure shows how users can change their passwords. When changing your password over a synchronous link, you can enter both the old and new passwords in the command; whereas, when changing your password over an asynchronous link, you must initiate a change routine and enter the old and new passwords when prompted.

1. After determining the type of link you are connected to, enter one of the following commands to change the password on that link:

   Synchronous Link (X.25 Protocol):

   If you are on a synchronous link (X.25 protocol), enter:

   CHG-LGN:[xy]::[ww]:<old pswd>:<new pswd>;

   giving the old and new passwords in the command.

   Asynchronous Link (Snider Protocol):

   If you are on an asynchronous link (Snider protocol), enter:

   CHG-LGN:[xy]::[ww];

   and respond to system prompts to enter old and new passwords.

2. If the command does not complete (**CHG LGN ...COMPLD** message received), find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.3 Alternate Maps

the alternate map feature provides a way to quickly change customer cross-connections on the DACS II. the alternate map itself is a software file containing 2-way, 2-point cross-connections only. When you activate an alternate map, the system simultaneously implements all the cross-connections defined by the map. This saves typing and speeds up the connections for quicker service switching.

The PIC option of the ED PRMTR MAP command allows you to make an alternate map by "taking a picture" of a defined group or set of the cross-connections that are currently active on the frame without entering each individual cross-connect command into the map.

7.3.1 Create Alternate Map

Overview: This procedure demonstrates how to create an alternate map.

NOTE:
Only users with USER IDs who access the system via a login can use the alternate map feature.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   ```
   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:<user id>|<link No.>;
   ```

   Where: USER|TERM = Selects whether user or link identification will be used in the command
   <user id> = User identification (2 to 8 alphabetic characters)
   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening* and enter the SET PRVG command.

2. Decide on a name for the alternate map. It can have up to seven alphanumeric characters, the first of which must be a letter; all letters must be capitalized.

3. Enter the following command to begin the alternate map session:

   ED-MAP::::<map name>;

   Where: <name> = Name of new alternate map, consisting of up to seven alphanumeric characters starting with a letter.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

4. Enter CONN-CRS commands. You will receive an OK acknowledgment for each allowable entry. See Figure 7-2 for an example of map construction.

   - If NOT ALLOWED is received, the command is not allowed as an entry in an alternate map.

NOTE:
If you recognize an input error, you can delete the line (explained later) and enter another CONN CRS. Similarly, if an error is indicated by the condition code after you end the session, you can open the file for editing and then delete and add CONNs.

NOTE:
When editing an existing map, you will not see previous entries.

```
ENT-MAP:[xy]::[ww]:NEWMAP;
CONN-CRS-T0::01-1-01-01,01-1-02-01::TRSP;
CONN-CRS-T0::01-1-03-01,01-1-04-01::TRSP;
CONN-CRS-T0::01-1-05-01&&-24,01-1-06-01&&-24::TRSP;
END
```

Figure 7-2. Example of Alternate Map

5. To terminate the create session, enter **END**. To abort the creation of the map, enter **QTEND**.
   - If you do not receive a COND 00 response to the END command, study the conflicting CONN messages that accompany the completion message to determine what changes are needed and refer to *Edit an Existing Alternate/Reference Map* to make changes. The terminations for those CONNs may already be involved in other connections.
   - If you want to see the contents of the alternate map, enter the appropriate command:

     For CONNs:
     RTRV-MAP-COM:::<name>[:<user id>];

     For NPCs:
     RTRV-MAP-EQPT::NPC::<name>[:<user id>];.

7.3.2 Create Alternate Map Using the Picture Option

Overview: This procedure demonstrates how to create an alternate map using the picture option. To use the picture option, you must first create a *reference map*. This reference map identifies which of the active cross-connections on the frame are to be reproduced (pictured). These cross-connections are defined by using the ED-ADD-MAP command to list the NPCs in the reference map. After creating your reference map, create the new alternate map using the ED PRMTR MAP command with the PIC option.

NOTE:
Only users with USER IDs who access the system via a login can use the alternate map feature.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:<user id>|<link No.>;

   Where: USER\|TERM = Selects whether user or link identification will be used in command
   <user id> = User identification (2 to 8 alphabetic characters)
   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

- If you want to change output screening, see *Change Output Message Screening* and enter the SET PRVG command.

2. Decide on a name for the reference map. It can have up to seven alphanumeric characters, the first of which must be a letter; all letters must be capitalized.
3. Enter the following command to begin the reference map creation session:

   ED-MAP::::<map name>;

   Where: <name> = Name of new reference map, consisting of up to seven alphanumeric characters starting with a letter.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

4. Enter the NPCs into the reference map using the following command:

   ED ADD NPC

   See Figure 7-3 for an example of map construction. When "OK" is received, enter the next component command (if any).

   NOTE:
   If you recognize an input error, you can delete the line (explained later) and enter another ED-ADD-MAP command. Similarly, if an error is indicated by the condition code after you end the session, you can open the file for editing and then delete and add ED-ADD-MAP command.

```
ENT-MAP:[xy]::[ww]:NEWMAP;
ED-ADD-MAP::NPC-01-1-07&&&-01-1-12;
END
```

Figure 7-3. Example of a Reference Map

5. To terminate the create session, enter **END**. To abort the creation of the reference map, enter **QTEND**.

   - If you do not receive a COND 00 response to the END command, study the conflicting ED-ADD-MAP commands that accompany the completion message to determine what changes are needed and refer to the EDIT MAP part of this chapter to make changes. The NPC for the other side of the connection may not have been added.

6. Enter the following command to create the new alternate map from the reference map:

   `ED-PRMTR-MAP::::<new name>,<refmap>;`

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
   - If the system returns **COMPLD with no conditions**, the new map contains all circuits that are currently in place in the system for the NPCs in the reference map.
   - If the system returns **COMPLD with condition**, some of the circuits could not be included in the new map (for example, could be multipoint).

7. If you want to see the contents of the alternate map, enter the appropriate command:

   For CONNs:

   `RTRV-MAP-COM::::<name>[:<user id>];`

   For NPCs:

   `RTRV-MAP-EQPT::NPC::<name>[:<user id>];`.

   NOTE:
   Once the new map is created, it can be changed as described in *Edit an Existing Alternate/Reference Map*. The picture feature only picks up cross-connections defined by the reference map that are currently on the frame. It does not simply copy what is in the reference map. If you want two copies (one to keep unchanged and one to modify), you will have to use the picture option twice to create two different new maps.

7.3.3 Edit an Existing Alternate/Reference Map

Overview: This procedure demonstrates how to edit an existing alternate map or reference map.

NOTE:
Only users with USER IDs who access the system via a login can use the alternate map feature. User DAX can edit the maps owned by other users.

NOTE:
When editing an existing map, you will not see the previous entries. To view the contents of a map, use the command `UTL::QRY,LIST,MAP <name>!`, where <name> is the name of the map.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   ```
   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:<user id>|<link No.>;
   ```

   Where: USER\|TERM = Selects whether user or link identification will be used in command
   <user id> = User identification (2 to 8 alphabetic characters)
   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening* and enter the SET PRVG command.

2. Enter the following command to begin the editing session:

   ```
   ED-MAP::::<map name>;
   ```

   Where: <name> = Name of map to be edited; the map must already exist (must have been created).

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

3. Use the following items to change the alternate map as required:

   — **Add New Cross-Connections.** Enter the complete CONN CRS commands (which are appended to the map).

   — **Remove Cross-Connections.** Enter the following to remove CONNs from an alternate map:

   ```
   CONN-CRS-TO::<npc No.1>-ddd[&&-eee],<npc No.2>-jjj
   [&&-kkk]::::::DEL;
   ```

   Where:

   <npc No.1> = NPC number on the FROM side of connection to be deleted.
   <npc No.2> = NPC number on the TO side of connection to be deleted.
   ddd/jjj = Channel number.
   eee/kkk = Optional, last channel number in a range of channels.

   — **Add NPCs to Reference Map.** Enter the ED ADD NPC command to add NPCs to a reference map.

— **Remove NPCs from a Reference Map**. Enter the following command to remove NPCs from a reference map:

```
ED-DLT-MAP::NPC-{<npc No.>&&[&]-<range>|<npc No.1>
&-<npc No.2>};
```

Where: range = Continuous range of NPCs entered with ampersands (&&) and a dash or a listing of up to 10 NPCs with a &- separating each one. Three ampersands are required for hierarchical range.

NOTE:
Only NPCs that were explicitly added via the ED ADD NPC can be deleted via the ED DLT NPC. If the subject map is currently active on the frame, the changes will not be implemented in the network until the map is activated again.

4. To terminate the edit session, either enter **END** to write the changes into the map or enter **QTEND** to disregard all the changes and quit the edit mode. The QTEND occurs automatically if the link fails or if you are forced off the system.
   - If you do not receive a COND 00 response to the END command, study the conflicting CONN messages that accompany the completion message to determine what changes are needed. The terminations for those CONNs may already be involved in other connections or the NPC for the other side of the connection may not have been added.
   - Enter the appropriate command to see the contents of the alternate map:

     For CONNs:
     ```
     RTRV-MAP-COM::::<name>[:<user id>];
     ```

     For NPCs:
     ```
     RTRV-MAP-EQPT::NPC::<name>[:<user id>];.
     ```

7.3.4 Activate Alternate Map Package

Overview: This procedure is used to activate an alternate map. The alternate map is a set of 2-way, 2-point cross-connections that are quickly implemented when the map is activated. Activating the alternate map will not affect the existing cross-connections that are not involved in the alternate map. However, activating the new map will overwrite the cross-connection of all involved terminations.

To make sure that only the cross-connections listed in the alternate map are established on the involved NPCs you can activate the map with the CLR option. This option causes the system to disconnect existing connections on the involved NPCs before making the cross-connections listed in the map.

CAUTION:
Performing this procedure incorrectly can interrupt service. Perform each step of the procedure in the order given. Also, read all supplementary information (such as Notes) before executing commands.

1. Enter the following command if you want to see the contents of the alternate map first:

   RTRV-MAP-COM::::<name>:[user id];

   or enter the following to list NPCs:

   RTRV-MAP-EQPT::NPC::<name>:[user id];

   Where:

   <name> = Map name
   <user id> = Optional, to allow frame administrator to see another user's (given by user ID) map.

2. Enter the following command to activate the map (see note before using the CLR option):

   EXC-MAP::::<name>:[CLR][,INCL];

   Where:

   <name> = Alternate map name
   CLR = Optional, to cause all connections associated with the NPCs of the named map to be disconnected before the map is implemented (see Note)
   INCL = Optional, to overwrite CUS or RDLD circuits along with the other connections.

NOTE:
Note the following considerations concerning the CLR option for the activate map command:

— The CLR (and the map itself) only affects 2-way, 2-point cross-connections (CONNs); other types of connections will not be disconnected.

— Care should be taken with the CLR option because it will cause all cross-connections on NPCs involved in the alternate map to be disconnected. Connections on NPCs not involved

in the alternate map will not be affected (the whole frame will not be cleared).

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
- If the system returns a nonzero COND code in the completion message, a connection other than a 2-way type cross-connection exists on the involved NPCs, and this connection was not cleared. The named NPC is the first one that contains such connections.

3. Watch for DENY messages while the map is being executed. You can reenter the denied connections using the cross-connect command. After the cause of the denial is found, you can edit the alternate map to correct the cross-connections for the next time the map is activated.
4. Enter the following command to see the alternate map connections for the involved NPCs:

   RTRV-CRS-T1::<npc No.>[&&[&]-<range>]::MAP;

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   <range> = Optional, last NPC of a continuous range. Three ampersands (&s) are required for hierarchical range.

7.3.5 Enter Command to Query User Map Information

Overview: This procedure shows how to retrieve alternate map information from the system.

1. Enter the appropriate command for the information you are looking for:

   — **Filename List and Execution Attributes:**

   RTRV-PRMTR-MAP:[xy]::[ww]:ATTR:[{<user id>|ALL|<name>}];

   — **Contents of the Map**:

   RTRV-MAP-COM:[xy]::[ww]:<name>[:<user id>];

   — **Listing of NPCs in the Map**:

   RTRV-MAP-EQPT:[xy]:NPC:[ww][:<user id>];.

   — **Allotted Map File Storage Space**:

   RTRV-PRMTR-MAP:[xy]::[ww]:SPACE[:{<user id>|ALL|SYSTEM}];

Where:

<user id> = User identification (2 to 8 alphabetic characters).

<name> = Name of the map file.

ALL = Allows the frame administrator to see all files on the frame.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.3.6 Delete Alternate Map from System

Overview: This procedure gives the command to delete an alternate map package from the system. If you have already activated the alternate map, the delete command will not disconnect the component connection; it only removes the map name and definition. Only the system administrator can delete maps created by other users. Users can only delete their packages; the command will not affect a map with the same name that belongs to another user.

1. Enter the following command if you want to examine the alternate map before deleting:

   RTRV-MAP-COM:[xy]::[ww]:<name>:[user id];

   Where:

   <name> = Name of the map file

   <user id> = Optional, to allow frame administrator to address other users (given by user ID) package.

2. Enter the following command to delete the file:

   DLT-MAP:[xy]::[ww]:<name>[:user id];.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.4 Macros

A *macro* is a package of component commands that are executed in sequence when the macro command is executed. they save typing time because you can execute the same macro time and again. Also, the frame administrator can create public macros for the benfit of all users.

You can also create *universal* macros. With the use of universal macros, the same macro can be used to perform similar jobs on different equipment without changing the macro itself. Universal macros use variables in the component commands within the macro. You then specify the values of the variables within the command that executes the macro.

the system executes each component command within the macro according to its priority compared to commands from other users.

7.4.1 Create/Edit Macro

Overview: This procedure demonstrates how to create a macro and how to edit a macro.

⇒ NOTE:
You must use login access to the frame to create or edit a macro because the ownership of the macro is established by user ID.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   RTRV-PRVG-{USER|TERM}:[xy]::[ww]:<user id>|<link No.>;

   Where: USER|TERM = Selects whether user or link identification will be used in command
   <user id> = User identification (2 to 8 alphabetic characters)
   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening*. Users can change their own message screening. Messages entered during the macro session do not appear on other links.
   - If you want to change message language, see *Change Message Language*.
   - If you want to change NPC addressing, see *Change NPC Addressing*.

2. If you are editing an existing macro, go to Step **4**.
3. Decide on a name for the macro using the following rules:
   — Names can have up to seven alphanumeric characters, the first of which must be a letter.
   — All letters must be capitalized.
   — For *public-use* macros, the first letter must be an upper-case "P". (Only the frame administrator—user DAX—can create a public macro.)
4. Enter the following command to begin creating or editing a macro:

   ED-MACRO:[xy]::[ww]:<name>;

   where: <name> is the macro name.

   ⇒ NOTE:
   Before editing the macro, wait for the message giving the number of lines; with large macros (around 8,000 lines), entries can be lost while the DACS II is verifying the number of existing lines.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5. Use the following *macro package editing commands* to create or modify your macro package. See Example 1 at the end of this procedure for help. Example 2 shows how to create a *universal macro*. (For new macros, you can simply enter the required command lines.)
   — **APPEND Command**. This command allows you to "append" new lines *after* the line specified. When beginning a new macro, append after line 0.

   APPEND::<line number>;

   — **DELETE Command**. This command allows you to delete the line specified.

   DELETE::<line number>;

   ⇒ NOTE:
   After deleting a line, the remaining line numbers after the deleted line will change. For example, if you have 5 lines and delete line 4, line 5 will become line 4. Use the **LIST** command to see the contents of macro.

   — **MOVE Command.** This command allows you to move a line (or group of lines) to a place *after* a specified line.

```
MOVE::{<starting line>|END}[-{<ending line>|END}],
{<destination line>|END};
```

<starting line> - Starting component command line number indicating the beginning of a component command line range to be moved. This can also be a single line number for moving single lines.

<ending line> - Ending component command line number indicating the end of a component command line range to be moved.

END - Last line in the macro file. End cannot be used in both parts of the command (starting line and the ending line or destination line).

<destination line> - Component command line after which the component commands are moved. Use 0 to move lines *before* line 1.

— **LIST Command**. This command lists the lines or range or lines specified. To list all the lines in the macro, enter **LIST;**.

```
LIST:{<starting line>|END}[-{<ending line>|END}];
```

NOTE:
Consider the following when constructing macros:

— SET PRVG commands can be included in a macro to shut off (MCOFF) macro component COMPLD messages.

— A STOP keyword can be included in component RMV/RST, CONN, and DISC commands to stop the macro if a component command fails.

- If BAD SYNTAX or other denial is received, reenter corrected command. If NOT ALLOWED is received, the command is not allowed either because it has to do with macros itself (for example, ED, EXC), or users (for example, LGT), or link/user authorization.
- When "OK" is received, make next addition or move to different line and make any other changes. The system appends ;OK to each valid command line in the macro.
- To store changes without quitting the session, enter **SAVE;**. To abort the macro session without storing changes, enter **QTEND;**.

NOTE:
As usual, the on-line help can be invoked while entering a component line to the macro using the "?".

6. After all components have been entered, enter **END;** to terminate the session. The DACS II should respond with MACRO ...COMPLD message with COND 00 exceptions.

Example 1: This example shows how to create a macro. Figure 7-4 shows the component commands in the macro that do the following:

— **Line 1.** This command disconnects channel 01 of NPC 001 from channel 01 or NPC 003. If the command fails, the macro stops.

— **Line 2.** This command cross-connects channel 01 of NPC 001 to channel 01 or NPC 005. (The connection uses transparent trunk conditioning.)

— **Line 3.** This command cross-connects channel 02 of NPC 001 to channel 02 or NPC 005. (The connection uses transparent trunk conditioning.)

— **Line 4.** This command cross-connects channel 03 of NPC 001 to channel 03 or NPC 005. (The connection uses transparent trunk conditioning.)

— **Line 5.** This line outputs all connections on NPC 001.

```
DISC-CRS-T0::001-01,003-01::::STOP;OK
CONN-CRS-T0::001-01,005-01::TRSP;OK
CONN-CRS-T0::001-02,005-02::TRSP;OK
CONN-CRS-T0::001-03,005-03::TRSP;OK
RTRV-CRS-T1::001::MAP;OK
```

Figure 7-4. Example of Macro (Extended NPC Numbering)

Example 2: Figure 7-5 shows a universal macro that, when executed with the variable values, does the same thing as the macro in Example 1. There may be as many as ten variables listed in one macro. The variables are entered as #01 through #10 in the message. Variables may be used for any parameter except action verbs and punctuation, and includes user ids, NPCs, channel numbers, trunk conditioning codes, etc. Variables are unique to a macro, that is, variable #01 may be used more than once in a macro to repeat the same value several times. Variable #01 may be used in another macro with an entirely different meaning.

NOTE:
To represent hierarchical NPC numbers, a variable must be used for each part of the number. For example, if variables #01, #02, and #03 were used to represent NPC 01-1-01, the last line entered in the example would be: **RTRV-CRS-T1::#01-#02-#03::MAP;**.

The following command (with extended NPC number values 001 and 005) would be entered to execute the macro in the example:

```
EXC-MACRO:[xy]::[ww]:QWKCON:(001&005);
```

```
DISC-CRS-T0::#01-#01-#01-#01,#01-#01-#02-#01::::STOP;OK
CONN-CRS-T0::#01-01,#02-01::TRSP;OK
CONN-CRS-T0::#01-02,#02-02::TRSP;OK
CONN-CRS-T0::#01-03,#02-03::TRSP;OK
RTRV-CRS-T1::#01::MAP;OK
```

Figure 7-5. Example of Macro (Extended NPC Numbering)

7.4.2 Execute Macro Package

Overview: This procedure is used to execute a macro package. If the frame administrator has established the priority of command execution, the component commands of the macro will determine when a macro is executed relative to other macros. The overall success of the macro execution is indicated by a final COMPLD or DENY message. Macros can include a STOP keyword on the component line to stop the macro if critical components fail. Macros can also be aborted by entering the STOP command after the macro is running.

1. Enter the following command if you want to see the contents of the macro before executing:

   ```
   RTRV-MACRO-COM:[xy]::[ww]:<name>:[<user id>];
   ```

   Where:

   <name> = Macro name
   <user id> = Optional, to allow frame administrator to see another user's macro.

   - If SET MCOFF and SET MCON commands are not included in the macro and you want to shut off component command completion messages, enter:

     ```
     SET-PRVG-{USER|TERM}::::{<user id>|<link No.>}::MCOFF;
     ```

     Where:

     USER\|TERM = Selects whether user or link identification will be used in command
     <user id> = User identification (2 to 8 alphabetic characters)
     <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

- If you want to stop the execution of the macro after it has started (in the next step), enter:

  ABT-PROC::::<link No.>;.

  Where: <link No.> = Required by user to stop execution on link being used. Frame administrator can stop the execution of the macro on any link.

2. Enter the following command to execute the macro:

   EXC-MACRO:[xy]::[ww]:<name>:[p1&p2&p3,...&10];

   Where: p1,p2,p3 = Values for variables identified by numbers in the component commands; can also include special keyword "NULL" for variable and "STOP" at end of line.

   The following example shows how NPC numbers (extended numbering) and the STOP keyword would be entered for variables used in the macros:

   EXC-MACRO::::QWKCON2:641,001,002,003,STOP;

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.
   - If SET MCOFF was entered before executing the macro, enter:

     SET-PRVG-{USER|LINK}::::<user id>|
     <link No.>::MCON;

     to allow completion messages again.

7.4.3 Enter Command to Query User Macro Information

Overview: This procedure shows how to retrieve macro information from the system.

1. Enter the appropriate command for the information you are looking for:

   — **Filename List:**

   ```
   RTRV-PRMTR-MACRO:[xy]::[ww]:ATTR:[{<user id>|ALL}];
   ```

   — **Contents of the Macro:**

   ```
   RTRV-MACRO-COM:[xy]::[ww]:<name>[:<user id>];
   ```

   — **Allotted Map/Macro File Storage Space:**

   ```
   RTRV-PRMTR-MACRO:[xy]::[ww]:SPACE[:{<user
   id>|ALL|SYSTEM}];
   ```

   Where:

   <user id> = User identification (2 to 8 alphabetic characters).

   <name> = Name of the macro file.

   ALL = Allows the frame administrator to see all files on the frame.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

7.4.4 Delete Macro from System

Overview: This procedure gives the command to delete a macro package from the system. Only the system administrator can delete macros created by other users. Users can only delete their packages; the command will not affect a macro with the same name that belongs to another user.

1. Enter the following command if you want to examine the macro file before deleting it:

   RTRV-MACRO-COM:[xy]:[ww]:<name>:[user id];

   Where:
   <name> = Name of the macro file
   <user id> = Optional, to allow frame administrator to address other users (given by user ID) package.

2. Enter the following command to delete the file:

   DLT-MACRO:[xy]::[ww]:<name>[:user id];.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

Maintenance

8

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Maintenance

8

8.1 Routine Maintenance

The DACS II system requires only two routine maintenance procedures:

- **Cleaning the Tape Drive Head and Capstan.** Perform this procedure once a month (or more often during heavy usage such as initial testing or when operating in an especially dusty environment). Use the *Tape Drive Cleaning Kit* provided by AT&T.
- **Copying Data from the Disk to the Tape Cartridge.** Perform this procedure daily. You can provision the system to do this automatically. Be sure to have the correct tape in the tape drive.

8.1.1 Clean Tape Head and Capstan Using the AT&T Tape Drive Cleaning Kit

Overview: AT&T recommends the use of the *Tape Drive Cleaning Kit* to clean the tape head and capstan. You should clean the tape drive monthly or after every 60 hours of tape use. This requirement is based on the normal daily usage to update the information stored on tape. More frequent cleanings are needed if the system operates in an unusually dusty environment.

DACS II software contains a **`RST-EQPT::TAPE::CLEAN;`** command. This command causes the tape drive to begin a 30-second cleaning cycle, then prompts you when the cleaning cycle has completed. Upon completion of the command, the tape drive is in the powered-off state.

Supplementary Information — Tape Cartridge Replacement

For tape head cleaning procedure you will need to know how to remove and install tape cartridge. Familiarize yourself with the following procedure for removing and installing the tape cartridge:

Removing Tape Cartridge from the Tape Drive:

— **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.

— **Tape Drive With the Drawer**. Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.

Installing Tape Cartridge into the Tape Drive:

— **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

NOTE:
Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

— **Tape Drive With the Drawer**. Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

NOTE:
Metallic side of the cartridge faces down and the door faces to the right.

Tape Head and Capstan Cleaning Procedure

This procedure gives the steps for the proper use of the cleaning kit. Familiarize yourself with the procedure before beginning.

CAUTION:
Use only the cleaning solution provided with the AT&T Tape Drive Cleaning Kit *(or cleaning kit refills). Never use alcohol based solutions for cleaning the tape heads.*

1. Enter the following command to power down the tape drive (tape drive may already be out-of-service):

   ```
   RMV-EQPT::TAPE;
   ```

   NOTE:
   If you receive a **RMV IN PROGRESS** message, the tape may be rewinding. DO NOT remove the tape until you receive the **RMV COMPLD** message.

   - If the drive contains a tape cartridge, remove it by following the appropriate procedure discussed in the beginning of this section under *Removing Tape Cartridge from the Tape Drive.*

2. Remove the cleaning cartridge from the kit. Verify that the slide switch is in the **ON** position and that the drive gear holder (holder containing no foam pad) is in place (Figure 8-1).

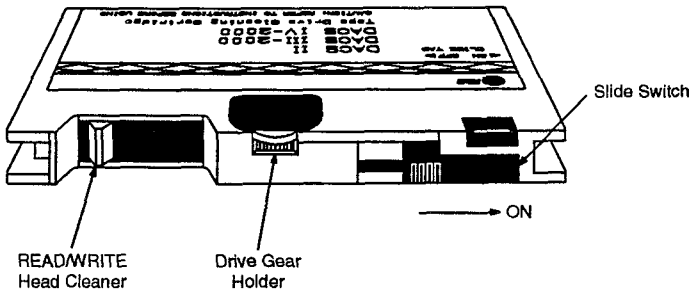


Figure 8-1. Tape Head Cleaning Cartridge—Head View

3. Verify that the READ/WRITE head cleaner contains a clean pad. If needed, replace the pad as follows: With the tweezers provided, pull the used pad out of its holder and firmly push a new pad in its place (Figure 8-2). Be sure the beveled edge of the pad face outwards. Dispose of the used pad.

NOTE:
The READ/WRITE cleaning pad is the larger of the two types of pads provided with the kit.

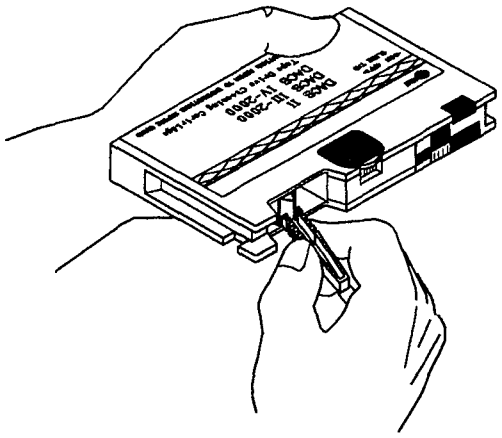


Figure 8-2. Replacing the READ/WRITE Head Cleaning Pad

4. See Note. Familiarize yourself with the procedure for installing tape cartridge as discussed in the beginning of this section under *Installing Tape Cartridge into the Tape Drive.* Using the cleaning fluid provided, thoroughly soak the cleaning pad (Figure 8-3) and quickly install the cleaning cartridge into the tape drive.

NOTE:
After soaking the pad with cleaning solution, insert the cartridge and perform the next step quickly. The solution evaporates rapidly.

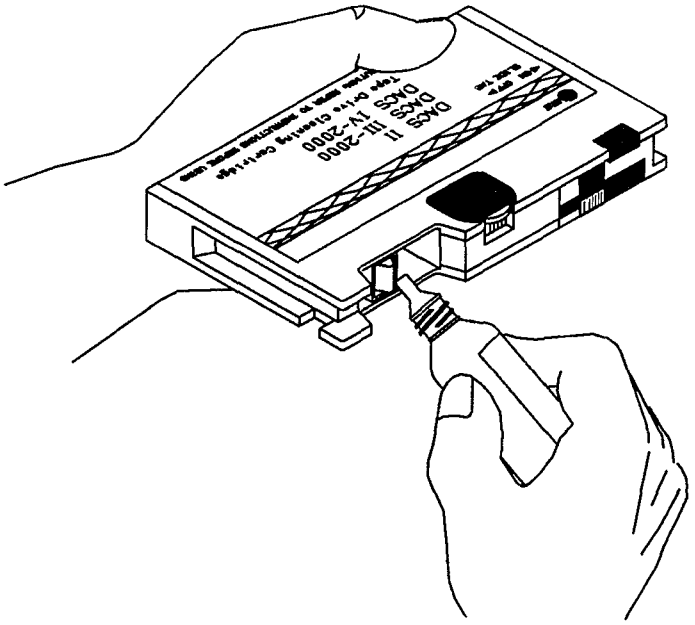


Figure 8-3. Applying Cleaning Solution to Pad

5. Begin the cleaning process by entering the following command (see Note):

   ```
   RST-EQPT::TAPE::CLEAN;
   ```

   Remove the tape after receiving the COMPLD message.

NOTE:
It is normal for the cleaning cartridge to make a load shifting gear noise during the cleaning process.

6. Remove the gear drive holder by doing the following (see Figure 8-4):
   a. Turn cartridge upside down.
   b. With one hand underneath to catch the gear holder, push the holder button forward and down as shown in Figure 8-4.

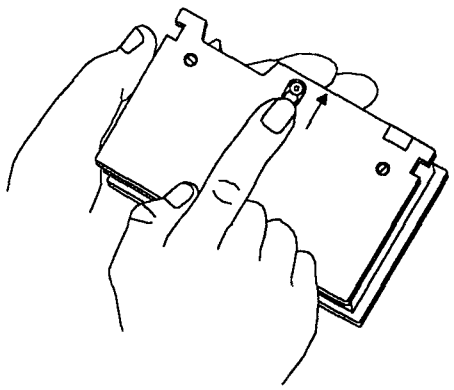


Figure 8-4. Removing Gear Drive Holder

7. Obtain the capstan cleaning pad holder from the kit. Verify that the holder contains a clean pad. If needed, replace the pad as follows: with the tweezers provided, pull the used pad out of its holder and firmly push a new pad in its place (Figure 8-5). Dispose of the used pad.

NOTE:
The capstan cleaning pad is the smaller of the two types of pads provided with the kit. This cleaning pad can be used for two cleanings by turning it around.

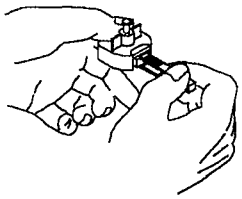


Figure 8-5. Replacing the Capstan Cleaning Pad

8. Insert the capstan cleaning pad holder into the cartridge by doing the following:
   a. Hold the cleaning cartridge with the label side up.
   b. Carefully lower the pad holder into the opening at the angle shown in Figure 8-6.
   c. Push down firmly while at the same time exerting pressure rearwards until the pad holder snaps into place.

   NOTE:
   Make sure the top of the pad holder is flush with the top of the cartridge. Also make sure that the round portion of the pad holder has entered the keyhole properly and is in its rearmost position.

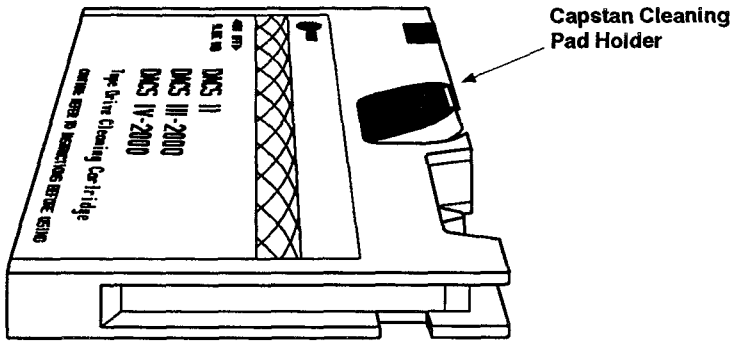


Figure 8-6. Inserting the Capstan Cleaning Pad Holder

9. Using the cleaning fluid provided, thoroughly soak the capstan cleaning pad only (not the READ/WRITE pad) and quickly install the cleaning cartridge into the tape drive.

   NOTE:
   After soaking the pad with cleaning solution, insert the cartridge and perform the next step quickly. The solution evaporates rapidly.

10. Begin the cleaning process by entering the following command:

    ```
    RST-EQPT::TAPE::CLEAN;
    ```

    Remove the tape after receiving the **COMPLD** message.

NOTE:
It is normal for the cleaning cartridge to make a load shifting gear noise during the cleaning process.

11. Remove the capstan cleaning pad holder by doing the following:
    a. Turn cartridge upside down.
    b. With one hand underneath to catch the holder, push the holder button forward and down.

12. Insert the gear holder by doing the following:
    a. Hold the cleaning cartridge with the label side up.
    b. Carefully lower the gear holder into the opening at the angle shown in Figure 8-6.
    c. Push down firmly while at the same time exerting pressure rearwards until the holder snaps into place.

    NOTE:
    Make sure the top of the gear holder is flush with the top of the cartridge. Also make sure that the round portion of the gear holder has entered the keyhole properly and is in its rearmost position.

13. Obtain the cleaning record card (Figure 8-7) contained in the cleaning kit. Record the date of the tape drive cleaning.

CLEANING RECORD

10/14 ff												
Sample	PAD 1	2	3	4	5	6	7	8	9	10 *	11	12

REPLACE PAD AFTER EVERY CLEANING

* *TIME TO ORDER REFILL - ORDERING INSTRUCTIONS ON BACK OF THIS CARD*

Figure 8-7. Cleaning Record

8.1.2 Copy Data From Disk to Tape

Overview: Two of the tapes supplied with the frame are specially formatted for use with DACS II and contain copies of the software. Both tapes are alike and the data bases (provisioning and cross-connections) on those (and other backup tapes) must be kept updated. One of these tapes must be kept in or near the frame to serve as the source for data bases in case the hard disk is unusable, and the other is intended for safe storage. A formatted tape with no executables is also shipped for use as a database backup tape. Additional backup tapes should also be used for safe storage. The backup tapes should be alternated to distribute the wear and prevent having an overused backup tape. Additional formatted tapes can be ordered for use as backup tapes; these do not contain the software executables (EXCT).

With the larger amount of software storage required for Release 6.0, only one copy of the data base is now stored on the original software tapes. As a precaution, it is recommended that at least 3 backup tapes be used at the frame on a alternate basis (3-day cycle). The data base on the frame backup tape must be updated once every day. The reduced recovery effort (no need to reprovision the frame) if the frame data base is lost more than offsets the investment to maintain these backup tapes.

CAUTION:
If a data base problem occurs, never use all the backup tapes to attempt the recovery. If the disk and one tape is corrupted in the process, contact technical consultant.

NOTE:
Check the status of the frame before transferring the data base. Clear any failures before performing the procedure.

1. Locate the tape drive mounted on the main controller shelf.

   - If the backup tape is not already in the tape drive, perform one of the following procedures for the appropriate drive:

     Tape Drive WITHOUT the Drawer:

     a. Enter the following command to power down the drive:

        ```
        RMV-EQPT::TAPE;
        ```

        IN PROGRESS messages will be received every 20 seconds. Wait for RMV ...COMPLD before continuing.

     b. Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.

     c. Insert the backup cartridge into the tape drive. Push the tape into the drive to allow the tape to return to latched position (latch comes up over bottom of tape).

        ⇒ NOTE:
        Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
        Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

     Tape Drive WITH the Drawer:

     a. Enter the following command to power down the drive:

        ```
        RMV-EQPT::TAPE;
        ```

        IN PROGRESS messages will be received every 20 seconds. Wait for RMV ...COMPLD before continuing.

     b. Turn the front latch clockwise (out of the way).

     c. Slide the drawer that holds the tape to the open position.

     d. Remove the tape from the drawer.

     e. Install the backup tape in the drawer. Return the drawer and latch to the in-service position.

        ⇒ NOTE:
        The metallic side of the cartridge faces down and the plastic door faces to the right.

2. Enter the following command to power up the tape drive and retension the tape:

   RST-EQPT::TAPE;

   IN PROGRESS messages will be received every 20 seconds. Wait for COMPLD before continuing.

3. Enter the following command to transfer data base information from RAM to disk:

   CPY-MEM:[xy]::[ww]:WKG,PRI[:DBASE];

4. Enter the following command to transfer data base information from disk to tape: **CPY-MEM:[xy]::[ww]:PRI,SEC[:DBASE];**

   NOTE:
   The LED on the drive lights when the tape is being read or written.

   NOTE:
   A CPY IN PROGRESS message will occur every 20 seconds until the transfer is complete, which may take as long as 60 minutes.

   - If the command is denied, go to *Data Base Troubles* in Volume II.
   - If you want the DACS II to update the tape automatically (data bases only) every day, enter the following command:

     SCHED-BKUP-MEM:[xy]:SEC:[ww]:DATA:24-HR:hr-mn-sc;

     Where:
     hr = hour (00 through 23)
     mn = minutes (00 through 59)
     sc = seconds (00 through 59).

     NOTE:
     The tape cartridge must be kept in the tape drive, and the drive must remain restored to service if the automatic backup is set.

5. If you want to cancel the automatic transfer, enter:
   SCHED-BKUP-MEM:[xy]:SEC:[ww]:DATA:00-HR;.

   Answer **YES** to: Are you sure (YES/NO)?

   NOTE:
   To enter this command, the user must have RMON (restricted maintenance enabled) via the SET PRVG command.

6. If the updated tape is not going to be kept in the drive, enter:
   RMV-EQPT::TAPE; to power down the drive, and then remove the tape.

   NOTE:
   An IN-PROGRESS message will be received every 20 seconds; wait for the RMV TAPE COMPLD message before withdrawing the tape.

8.2 Repair and Replacement

8.2.1 Replace Disk Drive Unit

Overview: The hard disk drive is a plug-in unit mounted on the main controller shelf. Relays in the drive unit remove power from the drive when the command to remove the disk from service is executed. When the disk is powered, a characteristic operating sound and vibration are detectable.

NOTE:
Use a 40MB disk drive (ED-2C876-30 G2) for non-CEF systems. For CEF systems, use a 40MB disk drive (ED-9C015-30 G1).

NOTE:
You must have restricted maintenance privilege or be logged on as the frame administrator to make transfers from tape to disk in this procedure.

Supplementary Information — Tape Cartridge Replacement

If you do not know how to replace the tape cartridge, familiarize yourself with the following procedure.

- If the tape is not already out-of-service, enter **RMV-EQPT::TAPE;** to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).
- Remove tape cartridge from the drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.
  - — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.
- Insert tape cartridge into the tape drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

    NOTE:
    Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
    Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

  - — **Tape Drive With the Drawer.** Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

    NOTE:
    Metallic side of the cartridge faces down and the door faces to the right.

- Enter **RST-EQPT::TAPE;** to power up tape drive and retension tape.
  - — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.
  - — If other denial message is received, the reason for denial will be in the output message.

1. On the main controller shelf, locate the disk drive plug-in to be replaced.
   - If the DACS II is executing commands (not disabled by trouble), place the main controller in the maintenance condition by entering `RST-EQPT::MC::MCOND;`. Then remove the disk from service by entering `RMV-EQPT::DISK;`.
   - If the DACS II is not executing commands, then disconnect SSC plug-in from MC to remove power from disk. The disk will stop spinning in about 30 seconds.

2. See Caution. For the CEF configuration, open the latch on the disk drive and unplug it. Then, withdraw the disk drive from its slot and place it out of the way to prevent accidental damage to it. For the non-CEF configuration, turn the thumbscrew counter-clockwise to loosen. Then, withdraw the disk drive from its slot and place it out of the way to prevent accidental damage to it.

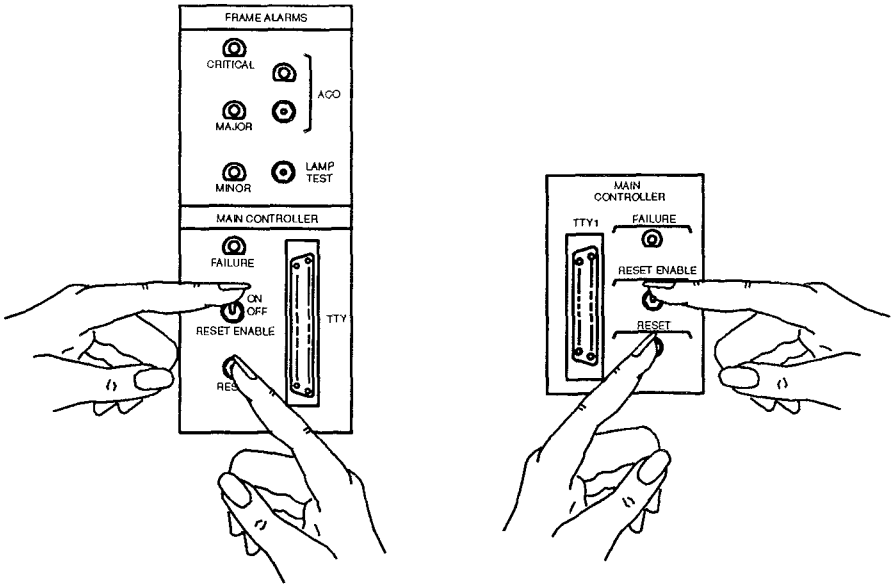
   CAUTION:
   Do not allow the mounting assembly or drive unit to drop. The drive unit is sensitive to shock damage and can be damaged by a 1-inch fall.

3. Insert a tape cartridge into tape drive containing the current executables. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure). If the SCC was disconnected, insert the SSC plug-in that was previously disconnected.

4. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button (Figure 8-8).

   NOTE:
   Without the disk in the frame, the reset will cause a boot from tape. The reset may take up to 40 minutes.

   - If `COMPLD` **...with error explanation**, message is received, refer to *Trouble Identification* in Volume II.
   - If the reset stops, refer to *Trouble Identification* in Volume II.



A. CEF Status Panel **B. Non-CEF Status Panel**

Figure 8-8. Performing a Reset

NOTE:
Please be aware that there are several versions of the Non-CEF status panel. The Non-CEF Status Panel shown above is only an example.

5. Verify that the edge protector is removed from the disk plug-in connector. Install the disk drive as follows:

   CEF Configuration:

   Align the new disk plug-in with the guides on the right side of the slot and insert the new disk plug-in into the slot. Be sure the plug-in is securely seated.

   Non-CEF Configuration:

   Insert the new drive into the slot and screw in the thumb-screw to take up the slack. Push in again to be sure it is seated. Finally, hand tighten the screw to secure.

6. Log in to the system as user DAX.

7. Enter the following command to power up and initialize the new disk:

   ```
   RST-EQPT::DISK::CLR;
   ```

   Answer YES when prompted to answer if you want to enter the command to clear the disk.

   NOTE:
   This command may take up to 30 minutes to complete.

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

8. Enter the following command to copy the software onto the disk:

   ```
   CPY-MEM:[xy]::[ww]:SEC,PRI:PROG;
   ```

   Answer YES when prompted. Wait for the command to complete before continuing.

   NOTE:
   Formatted tapes (without executables) can be ordered for use as backup tapes. One of the generic tapes (or backup tape with executables) is required as source for executables (PROG)

   - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

9. Verify that the most current back-up tape is in the tape drive. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure).

10. Enter the following command to copy the data base information onto the disk:

    `CPY-MEM:[xy]::[ww]:SEC,PRI;`

    Answer YES when prompted. Wait for the command to complete before continuing.

    - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

11. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    ⇒ NOTE:
    Reset may take up to 30 minutes.

    - If the system returns `COMPLD` **...with error explanation**, refer to *Trouble Identification* in Volume II.
    - If the reset stops, refer to *Trouble Identification* in Volume II.

12. Enter the following command to run diagnostics on the new disk:

    `DGN-EQPT::DISK;`.

    - If diagnostics fail, refer to *Clear Failed Disk Diagnostics* in Volume II.

8.2.2 Replace Tape Drive Unit

Overview: The tape drive is a plug-in unit mounted on the main controller shelf. Relays in the drive unit remove power to the drive when the respective drive is removed from service.

1. On the main controller shelf, locate the tape drive unit.
2. Enter `RMV-EQPT::TAPE;`. Go to the next step even if the command is denied (MC out-of-service). An IN-PROGRESS message will be received every 20 seconds; wait for RMV ...COMPLD (2- to 3-minute completion).

3. Remove the tape from the drive by doing the following for the appropriate drive:

   Tape Drive WITHOUT the Drawer:

   Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.

   Tape Drive WITH the Drawer:

   Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.

4. Replace the tape drive unit as follows:

   CEF Configuration:

   a. Open the latch on the tape drive and unplug it. Remove the tape drive by pulling the unit straight out.

   b. Align new drive circuit board with guides on right side of the slot and install new tape drive unit.

   Non-CEF Configuration:

   a. Unscrew the thumb screw on the front of the mounting assembly to withdraw it from the slot.

   b. Remove the tape drive assembly and replace it.

5. Insert the tape into the drive by doing the following for the appropriate drive:

   Tape Drive WITHOUT the Drawer:

   Insert the tape cartridge into the tape drive. Push the tape into the drive to allow the tape to return to latched position (latch comes up over bottom of tape).

   ⇒ NOTE:
   Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
   Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

   Tape Drive WITH the Drawer:

   Install the backup tape in the drawer. Return the drawer and latch to the in-service position.

   ⇒ NOTE:
   Metallic side of the cartridge faces down and the door faces to the right.

6. Enter `RST-EQPT::TAPE;` to power up the tape drive and retension the tape.
   - If "Boot Failed" denial is received, remove the tape cartridge from the tape drive, move the cartridge door flap and see if the tape is no longer stretched across the front of the cartridge. If the tape has despooled, contact technical consultant.
   - If any other denial is received, find the reason for denial in the output message and perform corrective action to obtain command completion.

8.2.3 Remove and Install Plug-Ins

The DACS II contains 4-, 8-, 12-, and 16-inch plug-ins. These plug-ins have the following design:

— **Single Latch:** These are the 4- and 8-inch plug-ins. Most of the plug-ins contained in the system are of this design.

— **Double Latch:** These are the 12-inch DS3U and 16-inch ECCN plug-ins. Each plug-in has two latches; one on the top and one on the bottom.

You can easily damage plug-ins and other hardware by improperly removing and installing them in the frame. Read Cautions before beginning.

⚠ CAUTION:
Before touching any part of the equipment frame including the tape or disk drive, any plug-in, reset switches, ACO or LED TEST buttons, ALWAYS ground yourself to the frame with a WRIST STRAP provided with the equipment.

⚠ CAUTION:
Never install or remove more than one plug-in at a time. This could cause irreparable damage to each plug-in.

The following sections explain how to remove and install the two different types of plug-in designs.

8.2.3.1 Remove and Install Single-Latch Plug-Ins

The following procedures describe how to correctly remove and install 4- and 8-inch plug-ins with a single latch:

NOTE:
Main controller packs should only be physically removed/replaced when the frame is either Out Of Service (OOS) or in Maintenance Condition (MCOND). Both NPCs associated with a DDC or EDDC should be out of service before the pack can be physically removed/replaced. Entities such as UCs, FTMIs, and FCs should be OOS before they are physically removed/replaced.

— **To Remove a Plug-In:**

1. Unseat the plug-in from the slot by carefully operating the latch.
2. Then remove the plug-in with one continuous motion. DO NOT ROCK THE PLUG-IN BACK AND FORTH.

— **To Install a Plug-In:**

1. Remove the plastic shipping protector from the contacts of new plug-ins.
2. Insert the plug-in into the slot. DO NOT ROCK THE PLUG-IN BACK AND FORTH.
3. Raise the latch. Push on the bottom part of the plug-in until the latch engages the slot. DO NOT push with the latch.
4. After the latch engages the slot, close the latch (push down) to seat the plug-in.
5. After closing the latch, with one thumb on the latch and the other thumb at the bottom of the plug-in, press firmly to ensure that the plug-in is fully seated.

8.2.3.2 Remove and Install Double-Latch Plug-Ins

The following procedures describe how to correctly remove and install 12-inch DS3U and 16-inch ECCN plug-ins with double latches:

NOTE:
Main controller packs should only be physically removed/replaced when the frame is either Out Of Service (OOS) or in Maintenance Condition (MCOND). Both NPCs associated with a DDC or EDDC should be out of service before the pack can be physically removed/replaced. Entities such as UCs, FTMIs, and FCs should be OOS before they are physically removed/replaced.

— **To Remove a Plug-In:**

1. Unseat the plug-in from the slot by carefully operating both the top and bottom latch together.
2. Then remove the plug-in with one continuous motion. DO NOT ROCK THE PLUG-IN BACK AND FORTH.

— **To Install a Plug-In:**

1. Remove the plastic shipping protector from the contacts of new plug-ins.
2. Insert the plug-in into the slot and ensure that the latches are positioned to allow insertion. DO NOT ROCK THE PLUG-IN BACK AND FORTH. Open both latches (Top - push up, Bottom - push down).
3. Push on the bottom part of the plug-in until both latches engage the slot. DO NOT push with the latches.
4. After the latches engage the slot, close the latches (push down top latch, push up lower latch) together to seat the plug-in.
5. After closing the latches, with one thumb on the top latch and the other thumb at the bottom latch, press firmly to ensure that the plug-in is fully seated.

8.3 Upgrade Circuit Packs

8.3.1 Upgrading From a CI to a ECI/HECI

Overview: This procedure is used to upgrade from a Communication Interface (CI) circuit pack to either an Enhanced Communication Interface (ECI) circuit pack or a High-speed Enhanced Communication Interface (HECI) circuit pack. This procedure assumes that links 1 through 6 are all provisioned. For a CI circuit pack, links 1 through 6 can only be Snider links. For a ECI/HECI, links 1 and 2 can only be Snider, links 3 and 4 can either be Snider or TABS, and links 5 and 6 can only be X.25.

1. Remove links 3,4,5, and 6 using the following command:

   ```
   RMV-EQPT::LINK-j
   ```

   Where:

   `LINK` = Link

`j` = Link number. (1 through 6)

2. Change links 5 and 6 to X.25 protocol (change links 3 and 4 to TABS if necessary) using the following command:

```
ED-PMTR-LINK::j::PTCOL {S|X|T|M}[,BAUD bb]
```

Where:

`LINK` = Link

`j` = Administrative link number (1 through 6).

`PTCOL` = Protocol.

`S` = SSCSAI (Snider protocol)

`X` = X.25 Synchronous protocol

`T` = TABS (Telementary Asynchronous Block Serial protocol)

`M` = Modified Snider protocol. Requires a baud rate of 1200.

`BAUD` = Baud

`bb` = Baud rate.

bb	Rate
03	300
06	600
12	1200
24	2400
48	4800
96	9600

3. Enter **RST-EQPT::MC::MCOND** to place the frame in maintenance condition.
4. Replace the CI circuit pack with an ECI/HECI circuit pack.
5. Enter **RST-EQPT::MC.**
6. Enter the following command to restore the links:

   RST-EQPT::LINK

   Where:

   LINK = Link

   j = Link number (1 through 6).

8.3.2 Replacing a ECI/HECI With a CI

Overview: This procedure is used to replace an Enhanced Communication Interface (ECI) circuit pack or a High-speed Enhanced Communication Interface (HECI) circuit pack with a Communication Interface (CI) circuit pack. This procedure assumes that links 1 through 6 are all provisioned. For a CI circuit pack, links 1 through 6 can only be Snider links. For a ECI/HECI, links 1 and 2 can only be Snider, links 3 and 4 can either be Snider or TABS, and links 5 and 6 can only be X.25.

1. Remove links 3,4,5, and 6 using the following command:

   ```
   RMV-EQPT::LINK-j
   ```

   Where:

   LINK = Link

   j = Lin number. (1 through 6)

2. Change links 5 and 6 to Snider protocol (change links 3 and 4 to Snider protocol if necessary) using the following command:

   ```
   ED-PRMTR-LINK::j::PTCOL-{S|X|T|M}[,BAUD bb]
   ```

   Where:

   LINK = Link

   j = Administrative link number (1 through 6).

   PTCOL = Protocol.

   S = SSCSAI (Snider protocol)

   X = X.25 Synchronous protocol

   T = TABS (Telementary Asynchronous Block Serial protocol)

   M = Modified Snider protocol. Requires a baud rate of 1200.

   BAUD = Baud

`bb` = Baud rate.

bb	Rate
03	300
06	600
12	1200
24	2400
48	4800
96	9600

3. Enter `RST-EQPT::MC::MCOND` to place the frame in maintenance condition.
4. Replace the ECI/HECI circuit pack with a CI circuit pack.
5. Enter `RST-EQPT::MC`.
6. Enter the following command to restore the links:

   ```
   RST-EQPT::LINK
   ```

   Where:

   `LINK` = Link

   `j` = Link number (1 through 6).

8.3.3 Upgrading From an EMTC to an EMTC2

Overview: This procedure is used to replace the UM56 Enhanced Maintenanace (EMTC) circuit pack to a UM75 Enhanced Maintenance (EMTC2) circuit pack.

1. Enter `RST-EQPT::MC::MCOND` to place the main controller in maintenance condition.
2. Replace the UM56 circuit pack with a UM75 circuit pack.
3. Enter `RST-EQPT::MC` to restore the main controller.
4. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

Performance Monitoring

9

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Performance Monitoring

9

9.1 DS1 Line Performance

The following DS1 line performance parameters are monitored by DACS II.

- **Line Coding Violations (CV)** – A count of CVs based on the DS1 line format. For AMI line coding, this is a count of bipolar violations (BPV). For B8ZS line coding, it is a count of BPVs that are not part of the zero substitution pattern. For B8ZS-coded lines, unexpected bit sequences such as 8 or more consecutive zeros are also a BPV.
- **Line Errored Seconds (ES)** – A count of seconds during which at least one CV has occurred.
- **Line Severely Errored Seconds (SES)** – A count of seconds during which at least 1544 line CVs have occurred.

9.2 DS1 Path Performance

The following DS1 path performance parameters are monitored by DACS II.

- **Path Coding Violations (CV)** – For ESF framing, this is a count of detected CRC-6 CVs. For D4 framing, this is a count of detected framing bit errors.
- **Path Errored Seconds (ES)** – A count of seconds during which at least one of the following has occurred:
  - — Path CV
  - — Controlled slip
  - — SEF event
- **Path Severely Errored Seconds (SES)** – For ESF framing, this parameter is a count of seconds which either 320 or more CRC-6 CVs or an SEF event has occurred. For D4 framing, this parameter is a count of seconds during which either 8 or more framing bit errors or an SEF event has occurred.
- **Path Severely Errored Framing Seconds (SEFS)** – A count of seconds during which at least one SEF event has occurred.
- **Path Controlled Slip Seconds (CSSP)** – A count of seconds during which a controlled slip has occurred.
- **Path Unavailable Seconds (UASP)** – A count of seconds from the onset of the condition that causes an Unavailable Signal Status to be declared to the onset of the condition that causes it to be cleared.

9.3 Change Performance Parameter Thresholds

Table 9-1 lists the default performance parameter thresholds.

Table 9-1. Default Performance Parameter Thresholds

Parameter	Number/Day	Number/15 Minutes
Line CVs (BPVs)	133,400	13,340
Path CVs (CRCs)	132,960	13,296
Path CVs (FEs in D4)	691	72
CSSP	4	1
SEFS	17	2
Line/Path ES	648	65
Line/Path SES	100	10
UASP	10	10

These default values can be changed by using the following command:

```
ED-OPT-T1:[<xy>]:NPC:[ww]:{TYPE-mn|ALL}:rr:a,b,c;
```

Where:

rr = Designates the parameter to be changed (see the following table for valid values).

set1,set2,set3 = User-programmable threshold values for the parameter.

rr	Parameter
41	Daily near-end path coding violations
42	Daily near-end path errored seconds
43	Daily near-end path severely errored seconds
44	Daily near-end severely errored framing seconds
45	Daily near-end path controlled slip seconds
46	Daily near-end path unavailable seconds
47	Daily near-end line coding violations
48	Daily near-end line errored seconds
49	Daily near-end line severely errored seconds
50	Daily far-end path coding violations
51	Daily far-end path errored seconds
52	Daily far-end path severely errored seconds
53	Daily far-end severely errored framing seconds
54	Daily far-end path controlled slip seconds
55	Daily far-end path unavailable seconds
56	Daily far-end line errored seconds
57	15-minute near-end path coding violations
58	15-minute near-end path errored seconds
59	15-minute near-end path severely errored seconds
60	15-minute near-end severely errored framing seconds
61	15-minute near-end path controlled slip seconds
62	15-minute near-end path unavailable seconds
63	15-minute near-end line coding violations
64	15-minute near-end line errored seconds
65	15-minute near-end line severely errored seconds
66	15-minute far-end path coding violations
67	15-minute far-end path errored seconds
68	15-minute far-end path severely errored seconds
69	15-minute far-end severely errored framing seconds
70	15-minute far-end path controlled slip seconds
71	15-minute far-end path unavailable seconds
72	15-minute far-end line errored seconds

9.4 Scheduling a Performance Monitoring Report

1. To schedule a performance monitoring report, issue the following command:

```
SCHED-PMREPT-T1:[<xy>]:NPC-<npc No.1>[&&-<range>]:\
[ww]:rrrrr,ssss,nn,mml <parameter>,1111111111,locn,\
aaaaa,ttttt[&&-ooooo][:p[vv][&q[vv]]];
```

Where:

<npc No.1> = The 3- or 4-digit nonhierarchical starting NPC number.

<range> = The 3- or 4-digit nonhierarchical ending NPC number.

rrrrr = The interval between performance monitoring reports. The following table lists valid intervals.

rrrrr	Explanation
{0001-1440}M	Report interval in minutes
{0001-0024}H	Report interval in hours
{0001-0007}D	Report interval in days

ssss = The starting time for the performance monitoring reporting schedule. {00-23}{00-59} is the Hour of day/Minute of Hour Format, while CURT is the value for the current time of day.

nn = The number of intervals over which performance monitoring is reported.

<parameter> = The parameter for which reporting is being scheduled. The following table lists valid parameters.

Parameter	Explanation
CVP	Path Coding Violations
CVL	Line Coding Violations
ESP	Path Errored Seconds
ESL	Line Errored Seconds
SESP	Path Severely Errored Seconds
SESL	Line Severely Errored Seconds
SESF	Path Severely Errored Framing Seconds
CSSP	Path Controlled Slip Seconds
UASP	Path Unavailable Seconds
ALLPAR	All listed parameters

1111111111 = The discriminating level for the requested parameter. This parameter is used to restrict report output to include only values that are above/below a defined level. The following table illustrates examples.

1111111111	Explanation
{000000000-134217728}U	Discriminating Level-Up Direction
{000000000-134217728}D	Discriminating Level-Down Direction

Up = Parameters with values equal to or greater than the specified level.

Down = Parameters with values equal to or less than the specified level.

locn = The location being performance monitored. Either NEND for Near-end or FEND for Far-end.

aaaaa = The accumulation time period for the specified parameter. The following table shows examples.

aaaaa	Explanation
15MIN	15 minute accumulator
DAILY	Daily accumulator

ttttt = The age of the requested data registers at the reporting time.

ooooo = This parameter may be entered as a range to specify up to four historical data registers. The following scenario shows a valid example.

If:

start time = 1205
report interval = 0001H
Number of intervals = 03
accumulation interval = 15MIN

Then:

time offset = 00015-00060

9.5 Checking Performance Monitoring Data

Overview: This procedure describes the command to check DS1 performance monitoring data for DA and TA type NPCs.

1. To check performance monitoring data, enter the following command:

NOTE:
When the ALL option is used with this command, only the data of one performance parameter may be queried.

```
RTRV-PM-T1::{NPC-<npc No.1>[&&-<range>] | ALL}::\
<parameter>,aaaaa,[lllllllll],[locn],[dddd],[tttt];
```

Where:

<npc No.1> = The 3- or 4-digit nonhierarchical starting NPC number.

<range> = Optional, the 3- or 4-digit nonhierarchical ending NPC number

ALL = Used to request parameter counts for all NPCs of type DA or TA.
If this option is selected, only one performance parameter may be queried.

<parameter> = The performance parameter requested. One of:

CVP	Path Coding Violations
CVL	Line Coding Violations
ESP	Path Errored Seconds
ESL	Line Errored Seconds
SESP	Path Severely Errored Seconds
SESL	Line Severely Errored Seconds
SEFS	Path Severely Errored Framing Seconds
CSSP	Path Controlled Slip Seconds
UASP	Path Unavailable Seconds
ALLPAR	All parameters

NOTE:
If the value ALLPAR is selected, a single NPC must be specified, the MONTIM and MONDAT parameters may not have a value of ALL, and the LV option cannot be used.

aaaaa = The accumulation time period for the specified parameter:

either 15MIN for parameter count from a 15-minute accumulator, or DAILY for parameter count from a daily accumulator.

1111111111 = Optional, the discriminating level for the requested parameter: 0000000000 - 134217728 followed by "U" (parameters with values equal to or greater than the discriminating level are reported) or "D" (parameters with values equal to or less than the discriminating value are reported).
If not specified, default is 1U. Cannot be specified when the ALL option is selected; then the default is 0U.

locn = The location being performance monitored: FEND for far-end or NEND for near-end (default).

dddd = The beginning date of the performance monitoring period. Specified in the format MMDD, where MM is the month (01-12) and DD is the day (01-31). The current date can be specified by making dddd = CURD (default). All daily accumulation registers can be retrieved by making dddd = ALL.

NOTE:
If the value ALL is selected, only one NPC can be specified in the command, aaaaa must equal DAILY, MONTIM cannot be selected, and ALLPAR cannot be selected for <parameter>.

tttt = The beginning time of day of the performance monitoring period. Specified in the format HHMM, where HH is the hour (00-24) and MM is the minute (00, 15, 30, 45). The current time can be set by making tttt = CURT (default). All 15-minute accumulation registers can be retrieved by making tttt = ALL.

NOTE:
If the value ALL is selected, only one NPC can be specified in the command, aaaaa must equal 15MIN, and ALLPAR cannot be selected for <parameter>.

2. The output of this command is handled as follows:
   - If a single NPC is specified, the data requested is output for that NPC.
   - If a range of NPCs is specified, the NPCs within the range that do not support the requested <parameter> will be skipped.
   - If the ALL option is requested, the data for all NPCs that support the requested <parameter> is output and NPCs that do not support the requested <parameter> are skipped.
3. If the command is denied, find the reason for denial in the output message and perform corrective action to obtain completion.

9.6 Clearing Performance Monitoring Counts

Overview: This procedure describes the command to clear facility performance monitoring parameters for DA and TA type NPCs in Facility Terminating Units (FTUs) or DS3 Units.

1. To clear performance monitoring parameters, enter the following command:

   ⇒ **NOTE:**
   When the ALL option is used with this command, only a single facility parameter may be cleared.

   ```
   INIT-REG-T1::{NPC-<npc No.1>[&&-<range>] | ALL}::\
   <parameter>,[aaaaa],[locn],[dddd],[tttt];
   ```

   Where:

   <npc No.1> = The 3- or 4-digit nonhierarchical starting NPC number.

   <range> = Optional, the 3- or 4-digit nonhierarchical ending NPC number

   ALL = Used to clear a single parameter for all NPCs of type DA or TA. **If this option is selected, only one facility parameter may be cleared.**

   <parameter> = The monitored parameter accumulation register to be reset. One of:

CVP	Path Coding Violations
CVL	Line Coding Violations
ESP	Path Errored Seconds
ESL	Line Errored Seconds
SESP	Path Severely Errored Seconds
SESL	Line Severely Errored Seconds
SEFS	Path Severely Errored Framing Seconds
CSSP	Path Controlled Slip Seconds
UASP	Path Unavailable Seconds
ALLPAR	All parameters
ALLL	All line parameters
ALLP	All path parameters

NOTE:
If the value ALLPAR, ALLL, or ALLP is selected, a single NPC must be specified and the MONTIM and MONDAT parameters may not have a value of ALL.

aaaaa = The accumulation time period for the specified parameter: either 15MIN to clear a 15-minute accumulator, or DAILY to clear a daily accumulator. Optional if MONDAT and MONTIM are set to HIST.

locn = The facility location corresponding to the set of performance monitor registers to be reset: FEND for far-end, NEND for near-end (default), or ALL for both far-end and near-end.

dddd = The beginning date of the performance monitoring period to reset. Specified in the format MMDD, where MM is the month (01-12) and DD is the day (01-31). The current date can be specified by making dddd = CURD (default). All near-end/far-end daily and 15-minute registers can be reset by making dddd = HIST (tttt must also be set to HIST).

tttt = The beginning time of day of the performance monitoring period to reset. Specified in the format HHMM, where HH is the hour (00-24) and MM is the minute (00, 15, 30, 45). The current time can be set by making tttt = CURT (default). All near-end/far-end 15-minute and daily accumulation registers can be reset by making tttt = HIST (dddd must also be set to HIST).

2. The output of this command is handled as follows:
   - If a single NPC is specified, the count for the requested parameter for that NPC is cleared.
   - If a range of NPCs is specified, the NPCs within the range that do not support the requested <parameter> will be skipped.
   - If the ALL option is requested, the counts for all NPCs that support the requested <parameter> are cleared and NPCs that do not support the requested <parameter> are skipped.
3. If the command is denied, find the reason for denial in the output message and perform corrective action to obtain completion.

9.7 Facility Test Signals

DACS II provides the following "command and leave" test signals:

- Yellow Signal
- High Density Test Signal
- Low Density Test Signal
- Quasi-Random Test Signal
- In-Band Loopback Activate Signal
- In-Band Loopback Deactivate Signal
- Loopback Retention Signal

These signals support network maintenance activities.

9.7.1 Activate Facility Test Signals

1. To activate a facility test signal, input the following command:

   OPR-TSIG-T1:[<xy>:<npc No.1>:[ww]:test;

   Where:
   <npc No.1> = NPC number.

   test = Test signal type. The following table lists valid test signals.

test	Explanation
YELT	Yellow test signal
HDTS	High density test signal
LDTS	Low density test signal
QRTS	Quasi-random test signal
ILBA	In-band loopback activate signal
ILBD	In-band loopback deactivate signal
LRET	Loopback retention signal

NOTE:
The loopback retention signal is only applicable to NPCs grown with ESF framing.

9.7.2 Deactivate Facility Test Signals

1. To deactivate a facility test signal, input the following command:

   ```
   RLS-TSIG-T1:[<xy>]:<npc No.1>:[ww]:test;
   ```

   Where:
   <npc No.1> = NPC number.
   test = Test signal type. The following list contains valid test signal types.

   - ALLP – All Payload Test Signals. Including high density test signal, low density test signal, quasi-random test signal, in-band loopback activate signal, in-band loopback deactivate signal, and yellow test signal in D4/T1DM mode.
   - ALLD – All Data Link Test Signals. Including yellow test signal in ESF mode, loopback retention signal, and ANSI bit-oriented far-end loopback activate/deactivate sequences.
   - ALL – All Test Signals in both the payload and data link.

9.8 Facility Loopback

DACS II executes a near-end (at the DACS II) payload loopback by transmitting the received information bits of each frame back onto the DS1 facility. The framing bit position is regenerated by DACS II during a payload loopback. DACS II also sends payload, line, and network loopback commands on the ESF data link to far-end (at the terminal on the other end of the DS1 facility) equipment, ordering the equipment on the other end of the DS1 facility to execute the respective loopbacks.

9.8.1 Activate a Facility Loopback

1. To activate a facility loopback, input the following command:

```
OPR-LPBK-T1:[<xy>]:<npc No.1>:[ww]:loop:locn;
```

Where:
<npc No.1> = NPC number.
locn = Loopback location. Either NEND for near-end or FEND for far-end.
loop = Loopback type. The following table lists valid loopback types.

loop	Explanation
LINE	Line
PYLD	Payload
NTWK	Network

NOTE:
LINE and NTWK loopbacks are only applicable to FEND. Commands to activate/deactivate LINE/NTWK LPBK with NEND will be denied.

9.8.2 Deactivate a Facility Loopback

1. To deactivate a facility loopback, input the following command:

```
RLS-LPBK-T1:[<xy>]:<npc No.1>:[ww]:loop:locn;
```

Where:

<npc No.1> = NPC number.

locn = Loopback location. Either NEND for near-end or FEND for far-end.

loop = Loopback type. The following table lists valid loopback types.

loop	Explanation
LINE	Line
PYLD	Payload
NTWK	Network

Command Denials

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10.1 Clear Command Denials 10-1

Command Denials

10

10.1 Clear Command Denials

1. If you have one of the following word strings in the denial message, read the associated information and perform corrective action to obtain command completion.
   - **INACT** - The INACT message indicates that the command is invalid with the feature package being used.
   - **BAD SYNTAX** - Determine the portion of the command that was in error from the designator (BAD VERB/FRM ERR/SEQ ERR) in the message and reenter the command with the correct information. If you do not understand how to correctly construct the command, you can get on-screen help using the help routine (initiated by entering a question mark, ?).

     NOTE:
     The DACS II indicates where the input error occurred, by placing = signs around the word or portion in the echoed command.

   - **ERR, ABT** - Reenter the command; a transient frame condition may have caused the command to be aborted. If the command is aborted again, check the printout to find associated trouble messages.
   - **MC OOS** - The MC (main controller) must be restored to service to execute the command.

- **MCOND** - The MC is in the maintenance condition, and only commands which are considered frame maintenance commands can be used.
- **MC INSERVICE** - The MC must be in the maintenance condition to execute certain disk and tape commands.
- **MPDBASE** - The main processor data base is not loaded.
- **RESTRICTED, STOPPED** - Only users who have been assigned the use of restricted maintenance commands can use the command. The use of this set of commands is enabled by the frame administrator who enters the SET-PRVG command with option RMON for the user.

2. Examine the DENY output message and notice the 4-digit error code which appears on a line by itself and the remaining lines which give the explanation of the error code.

   ⇒ NOTE:
   Error codes starting with the same letter are in the same general category; for example, I for input, E for equipage, S for service. The code is taken from letters of the key words that constitute the meaning of the code.

3. If you received a subrate data denial message string, check Table 10-1 for additional information.
4. Command denials can be categorized under common causes. Check the following descriptions and, if applicable, perform corrective action to obtain command completion.
   - **Input Error** - Check each field of the command entry on the screen or printout against the documented command to find the error.
   - **Not Equipped, Not In-Service, or Failed** - The named equipment is not grown (equipped) or in-service to support the execution of the command. The commands to create and restore the plug-in to service are covered in provisioning in Volume 1, and procedures to clear failed plug-in and trouble messages are in this trouble-clearing volume.
   - **Incorrect NPC/Channel Number** - Check each side of the cross-connect command to find incorrect numbers that are already assigned or assigned differently. There are retrieve commands in the cross-connect procedures to obtain information about existing connections on the frame.
   - **Invalid Parameters** - Check each field of the command entry against the documented command to determine which keyword is incorrectly used.

- **Boot Failed** - This is a specific restore command denial. Reenter the restore plug-in command and subsequent diagnose command in an effort to get a DGN ...STF message for which there is trouble clearing in the respective trouble-clearing chapter. If no DGN ...STF message is obtained but the denial persists, replace the plug-in to be restored.

Table 10-1. Subrate Denial Strings

Message String	Corrective Action
Exceeds Limit of 21	Only 21 MJUs can be disconnected at one time. Split the MJUs to be disconnected into smaller groups.
INCL Required for All Subrate Circuits	This is a precaution to ensure that data customers are informed of maintenance action. Verify that you are addressing the correct channel and notify customers if you are going to remove service.
OLD Channel Not Established to Subrate Feature	The addressed channel has not been established to subrate with CRTE-CRS-TS command.
OLD Channel Has Associated Parity Channel	The PCH [ppp] option must be used to indicate the next or particular parity channel.
New Channel Not Same As Old	The new channel was established to Subrate differently (DS0A or DS0B). Check channel entries.
Exceeds EC/SRM/MJU Capacity	For EC, use ECLOC query to find which is being used (SRM or MJU); enter command to change ECLOC. For SRM/MJU, the next plug-in is required for more capacity.
MPTM Keyword Disallowed	The MPTB keyword is only valid for multipoint junction unit circuit.
MA Field Does Not Exist	The MJU entered in the MA field does not exist.
ALL Keyword Is Not Specified	The ALL must be used when there are branches. Verify command entry.
Associated with RT Digroups	An NPC entered in the command is associated with *SLC*® Carrier System; channels for these are entered as virtual channels on the DGA NPC, which allows channels 1 through 96 to be addressed on one NPC.

Glossary

A

ABT
Abort

ACO
Alarm Cutoff

Active
The entity is in service, not protected. If it is a traffic-carrying entity, it is carrying traffic.

AIS
Alarm Indication Signal (also known as all 1s signal)

Alarm Delay
Specifies the alarm delay (in seconds) for software-detected alarm conditions. Initial value is 20 seconds.

Alarm Indication Signal (AIS)
A signal transmitted downstream if the incoming signal is defective.

All Ones Signal
Signal which is defined to contain all ones in the terminal-to-terminal mode.

ALM
Alarm

Alphanumeric Characters
Letters and digits.

Alternate Mark Inversion
A DS1 line code in which alternate one bits are positive and negative, but zero substitution is not used.

AMI
Alternate Mark Inversion

AS&C
Alarm Surveillance and Control

ASCII Characters
Letters, digits, and symbols used in the American Standard Code for Information Interchange.

ATAG
Autonomous Message Tag

ATP
All Tests Passed

Attribute
Alarm indication level: major, minor, or no alarm.

AUD
Audit

Autolock
When the system autolocks an entity, it switches to protection and forbids return to the working entity even if the trouble clears. This is usually caused by multiple protection switches on that entity in a short time period.

Autolock Number of Switches
This parameter is the number of times that the system restores an entity to service (after intermittent failures) in a given autolock switching interval before the entity is autolocked.

Autolock Release Time
The number of hours between times when the system automatically releases autolock.

Autolock Switching Interval
An interval in minutes (see autolock number of switches).

Autonomous
Done by the system without direction by you.

Autoprovisioned
Put into the provisioned state automatically by the system.

B

B3Zs
Bipolar with 3-zero substitution, a DS3 line code.

B8ZS
Bipolar with 8-zero substitution.

Baud Rate
Transmission rate (bits per second) on a link.

BBL
Backbone Leg

BC
Bus Controller

BCON
Broadcast Cross-Connect

BER
Bit Error Rate

BER Metric
Specifies the metric for calculating bit error rate at a DS3 interface port. Options are bipolar variations (BPV) or parity (PTY). (Initial value is BPV).

Bipolar Variation
A variation of the alternating +1, -1 pattern in a 3-level code.

Bit error Rate Threshold
3 stands for 0.001, 6 stands for 0.000001.

Blue Code
Same as AIS

BMTR
Back-up Memory Transfer

Boot
To transfer contents of backup memory into the system's working memory.

BOS
Bit Oriented Signaling

BPV
Bipolar Violation

BRD
Broadcast

Broadcast
Form a bridge connection.

BSRF
Basic Synchronization Reference Frequency

BT
Bus Terminator

BX
Bus Extender

Byte
Usually refers to a group of eight consecutive binary digits, but sometimes used for bit groups or other sizes.

C

CAS
Channel Associated Signaling

CATP
Condition All Tests Passed

CBIT
A DS3 line code in which parity checks on blocks of data are used to detect bits in error.

CCB
Cross-Connect Buffer

CCI
Clock and Control Interface

CCITT
International Telephone and Telegraph Consultative Committee

CCN
Cross-Connect Network

CCNI
Cross-Connect Network Interface

CEF
Capacity expansion Frame

CFA
Carrier Failure Alarm

CFR
Synchronizer Configuration

CGA
Carrier Group Alarm

CHG
Change

CI
Communications Interface

CIU
Craft Interface Unit

Clear (CL)
An alarm condition no longer exists.

CLF
Carrier Line Failure

CMAP
Channel Map

COFA
Chang-of-Frame-Alignment

Condition
The type of alarm indication.

CP
Circuit Pack

CPR
C-Bit Processor

CPU
Central Processing Unit

CRC
Cyclic Redundancy Check

CRO
Clock Reference Oscillator

Cross-Connect
A piece of hardware used to interconnect line-terminating equipment, multiplexers, and other equipment.

Crosstalk
A signal induced into one transmission line from another transmission line.

CRT
Cathode Ray Tube

CSS
Controlled Slip Seconds

CTAG
Correlation Tag

Current Value
In the dialog mode, it indicates that the current value of a parameter is used by the system unless you direct otherwise.

CV
Coding Violations

D

DACS
Digital Access and Cross-Connect System

DATS
Digital Access Test Set

Data Base
A record of cross-connections, status of entities and facilities, and other data.

DC
Digroup Circuit

DCC
Disconnect Code"

DCLU
Digital Carrier Line Unit

DDC
Dual Digroup Circuit

DDS
Digital Data system

Default
A value the system automatically uses for a parameter if you do not specify a value.

Delimiter
A punctuation mark (colon or comma) used to separate two parameters in an input message.

Demultiplexer
A device used with a multiplexed signal for recovering signals combined within it and restoring the distinct individual channels of these signals.

DFB
Dual Fuse Boards

Diagnose
Test an entity; also a trouble condition in which a diagnostic test is in progress.

DL
Data Link

DLC
Digital Loop Carrier

DM
Dual Multiplexer

DMA
Deferred Maintenance Alarm

DMAP
Digroup Map

DMB
Digital Multipoint Bridge

DMI
Digital Multiplex Interface

DMM
Digital Multimeter

DPC
Dual Primary Circuit

DPLL
Digital-Phase Locked Loop

Driven
A driven port is being monitored, and a good signal is expected.

DS0
Digital Signal Level 0 (64-kb/s)

DS1
Digital Signal Level 1 (1.544-Mb/s)

DS1 Port
A DS1 port in either a DS1 interface module or a DS3 interface module.

DS3
Digital Signal Level 3

DS3U
DS3 Unit

DSP
Digital Signal Processor

DSPC
Digital Signal Processor Circuit

DSPI
Digital Signal Processor Interface

DSPU
Digital Signal Processing Unit

DSU
Data Service Unit

DSX
Digital Signal Cross-Connect

Duplex Entity
A pair of entities in which one is active and the other is in hot standby (clock generators).

E

EBX
Expanded Bus Extender

ECCN
Expanded Cross-Connect Network

Echo
Display an input at a terminal (a user is echoed, but a password is not).

ECI
Enhanced Communications Interface

EFC
Expanded Frame Controller

EID
Entity Identification

EMIU
Expanded Multiple Interface Unit

EMTC
Expanded Maintenance Circuit

Enter
Provision an entity by a command, not automatically by the system.

Entity
A specific piece of hardware (such as circuit pack, memory device, or link) that has been assigned a name and recognized by the system.

Entity Identifier
The name used by the system to refer to an entity.

Equalizer
A circuit adjustment used to maintain signal strength between desired limits.

Equipped
The entity is in the system data base and physically in the frame, but is not yet provisioned.

ER
Error Rate

ERS
Errored Seconds

ES Errored Seconds

ESD
Electrostatic Discharge

ESF
Extended Superframe

ESR
Error Source Register

ESR1
Error Source Register 1

ESR2
Error Source Register 2

ETSI
Expanded Time-Slot Interchanger

F

FAL
Fuse Alarm Lamp

FC
Format Converter

FDL
Facility Data Link

Fe
Extended Superframe Format

FEBE
Far-End Block Error

FELP
Far-End Loopback

FES
Far-End Errored Seconds

FLI
Facility Line Interface

FMT
Formatter

FPB
Feature Package B

FPC
Feature Package C

Forced
A traffic-carrying entity (either service or protection) has been deliberately locked into a service-providing state by a manual command despite being bad.

FRADT
Frame Audit

FRER
Framing Bit Error

Fs
Fs Framing Format

FSES
Far-End Severely Errored Seconds

FTM
Facility Terminating Module

FTU
Facility Terminating Unit

FUAS
Far-End Unavailable Seconds

FW
Frame Word

G

Grooming
Rearrangement of DS1 signals in DS3 signals.

H

Header
The first line of a message.

Header Date
Specifies the current date as YYMMDD, where YY is the last two digits of the year, MM is the month, and DD is the day of the month.

Header Time
Specifies the current time of day as HHMMSS, where HH is the hour (00 to 23), MM is the minutes, and SS is the seconds.

HECI
High-Speed Enhanced Communications Interface

Hierarchy
An orderly ranking or sequence of elements, such as that of menus presented at a terminal.

Hit
A disruption of service that lasts for less than 1 second. See Outage.

Hot Standby
An entity ready for fast, automatic placement into operation to replace an active entity.

HUBID
Hub Identifier

I

IDLD
Idled

Idle
An output port is idle if it is not cross-connected to an input port.

IFTU
Integrated Facility Terminating Unit

In Service
The entity is performing normal service functions, either active or standby.

J

Jitter
Short term variations in the property of a digital signal.

K

Kbit
Kilobit

Kbit/s
Kilobits per second

L

LAN
Local Area Network

LBO
Line Build-Out

LBRV
Low Bit Rate Voice

LED
Light-Emitting Diode

LILB
Line Interface Loopback

Link ID
The location and type of a user interface link.

LLB
Line Loopback

LMA
Loss of Multiframe Alignment

Location
The specific entity involved.

Loopback
A circuit arrangement that causes a received signal to be returned to its source.

LOS
Loss of Signal

M

M13
A standard format used for DS3 signals.

Maintenance
The entity has been locked into a non-service providing state by a manual command.

Maintenance Condition
An entity state in which some normal service functions are suspended, either because of a problem or in order to perform special functions (copy memory) that cannot be performed while normal service is being provided.

Mapped
Cross-connected.

Mb
Megabit

Mb/s
Megabits per second

MBER
Minor Bit Error Rate

MC
Main Controller

MCP
Main Controller Power

Memory Location
Specifies the equipment, DS1 interace port, or DS3 MUX port location associated with a memory type.

MER
Multiframe Error

MI
Maintenance Information

MIU
Multiple Interface Unit

MJU
Multipoint Junction Unit

MMFG
Multiplexer-MIU Function Group

MML
Man-Machine Language

MP
Main Processor

MPDIS
Multipoint Disconnect

MPM
Multipoint Mode

MTC
Maintenance Circuit

MXR
Multiplexer

N

NA
No Acknowledgement

NDL
No Data Link

NEBS
Network Equipment Building Systems

Network Element
A DACS II frame is a network element.

NFW
Non-Framing Word

NG
No Good

NOBBL
No Backbone Leg

Notification Code
The notification code for alarm and status conditions, which include: MJ - major alarm; MN - minor alarm; NA - indicates no alarm (status only); or CL - cleared alarm.

NPC
Network Processing Circuit

NPCTG
NPC Test Group

NPCTP
NPC Test Port

NSA
Nonsignaling Associated

NZCS
No Zero code Suppression

O

OCNT
One-Way Cross-Connect, Terminated

OCON
One-Way Cross-Connect

ODIS
One-Way Disconnect

OFS
Out-of-Frame Seconds

OOS
Out-of-Service

OS
Operations Systems

Out-Of-Service (OOS)
The entity is not providing its normal service function (removed from service or protected) either because of a system problem or because it has been removed from service manually.

Outage
A disruption of service that lasts for more than one second. See Hit.

P

Parity Check
To determine whether a block of digital data has been corrupted in transmission, you can use an even-parity format in which an extra bit is added to the block at the transmitter if necessary so that the block always contain an even number of one bits. A parity-checking circuit at the receiving end can determine whether an error has occurred in transmission. An odd-parity format can also be used for the same purpose.

PBS
Primary Block Alarm

PBC
Primary Block Circuit

PBF
Primary Block Failure

PBX
Private Branch Exchange

PCM
Pulse Code Modulation

PDS
Program Documentation Standards (Language)

PF
Printout Follows

PFW
Pseudo-Frame Word

PMA
Prompt Maintenance Alarm

POTS
Plain Old Telephone Service

Primary Line
The second line in an output message.

Program
The software that directs the operation of the main controller and other frame elements.

Protocol
Detailed format and procedures used for transmitting digital data.

Protocol Type
Indicates the protocol supported on an interface link.

Provisioned
The entity is ready to perform its intended function.

Pulse Code Modulation (PCM)
The process by which analog signals are sampled, quantized, and coded into a digital bit stream.

R

R16
Remote Alarm Indication in TS16

RAI
Remote Alarm Indication

RAIS
Remote Alarm Indication Signal

RAM
Random-Access Memory

RBER
Remote Bit Error Rate

RDC
Red Circuit

REER
Remote Excessive Error Rate

Released
If an input port, it is not under test access; if an output port, it is not cross-connected to an input port under test access.

RL
Retry Later

RMS-D
Remote Measurement System, Digital

Rollover
Operation used when the transmission facility between the system and an upstream system is to be replaced.

RT
Remote Terminal

RTS
Remote Test System

RTS-5A
Remote Test System 5a

S

SARTS
Switched Access Remote Test System

SCC
Subrate Cross-Connect

SECH
Subrate Establish Command

SERS
Severely Errored Seconds

SES
Severely Errored Seconds

SID
Source Identifier

SNIDER
Protocol (message format) used on administrative links.

Software ID
Gives the software version information for the system: g - is a one-digit number giving the software release; i - is a two-digit number giving the issue; r - is a one-digit number giving the point release.

SPU
Synchronizer Power Unit

SRM
Subrate Multiplexer

SSC
Secondary Storage Controller

SSP
Select Synchronization Port

Standby
The entity is in service but is not providing service functions. It is ready to be used to replace a similar entity either by protection or by duplex switching.

State
The state of an entity indicates whether it is defective or normal, whether it is ready for normal use, etc.

Subrate
In the Digital Data System, a data bit rate that is either 2.4, 4.8, or 9.6 kb/s.

SYNC
Synchronizer

T

T1DM
T1 Data Multiplexer

TABS
Telemetry Asynchronous Block Serial

TAD
Test Access Digroup

TB
Time Base

TC
Trunk Conditioning

TCNT
Two-Way Cross-Connection, Terminated

TCON
Two-Way Cross-Connection

TD
Timing Distributor

TDIS
Two-Way Disconnection

Test Mode
Specifies the test access mode.

TG
Test Group

TID
Target Identifier

TLA
Terminate and Leave Active

TLI
Timing Link Interface

TLP
Transmission Level Point

TLR
Terminate and Leave Release

TP
Test Port

TPR
Test Port Release

TSI
Time Slot Interchange

TTY
Teletypewriter Terminal

U

UAC
Unassigned Channel Code

UAS
Unavailable Seconds

UATC
Unavailable Time Count

UBX
Unit Bus Extender

UC
Unit Controller

UMC
Unassigned Multiplexer Code

Z

ZBTSI
Zero Byte Time Slot Interchange

ZCS
Zero Code Suppression

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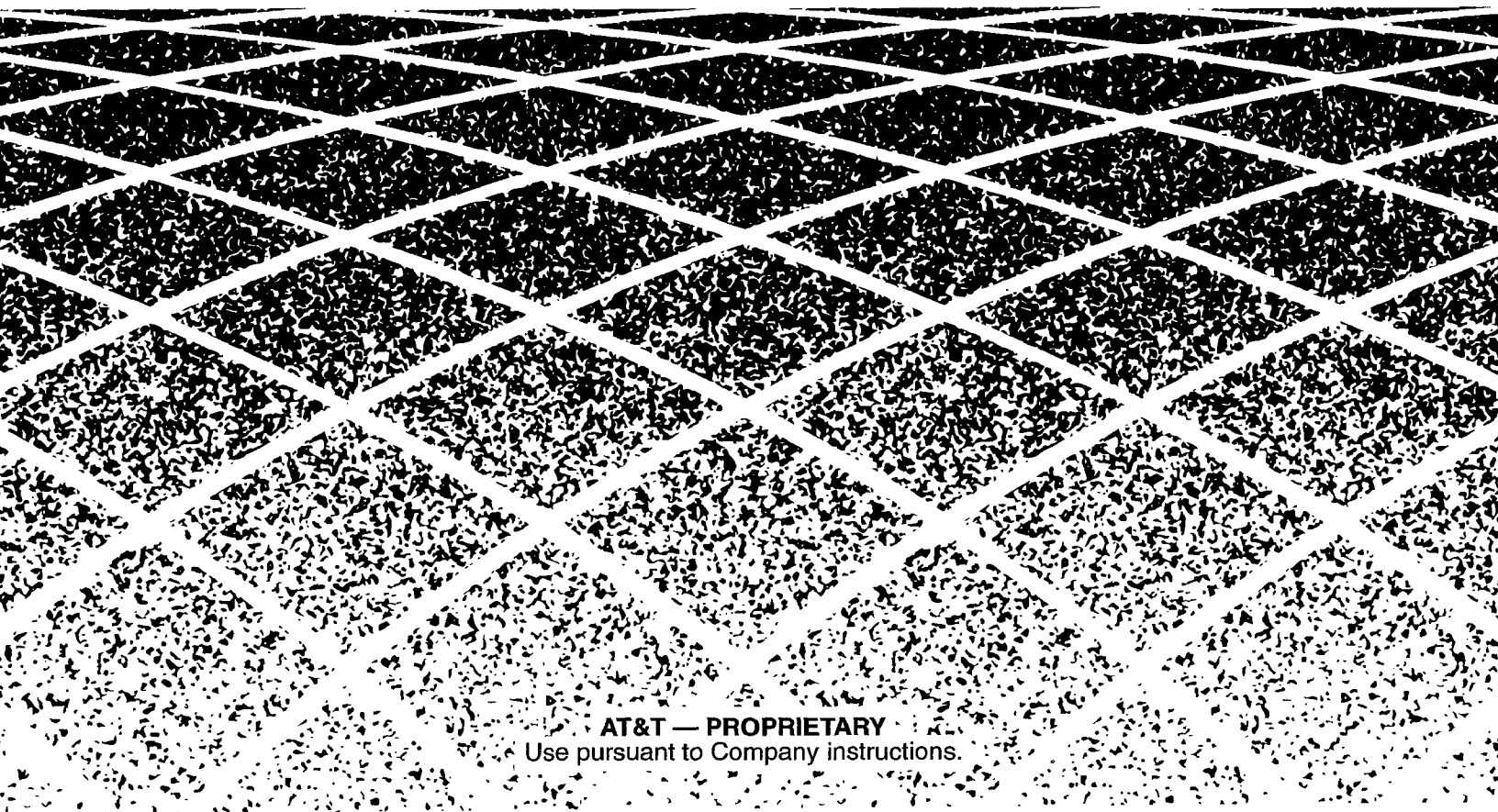
AT&T 365-353-011
Issue 2
October 1993

DACS II
Release 6.0, MML
Operation and Maintenance Manual

Volume II - Trouble Clearing



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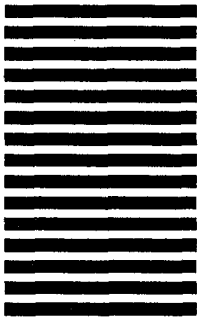

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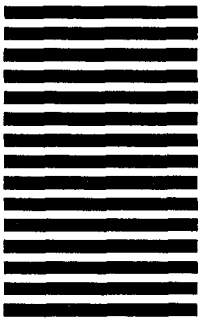

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About This Document

Purpose

This document provides procedural information required to support the craft personnel activities involved in the daily operation and maintenance of the DACS II (Digital Access and Cross-Connect System II). It also includes an overview that describes the physical and functional attributes of the DACS II. This volume contains the procedures to isolate and clear troubles.

Intended Audiences

This document is for individuals who are responsible for the acceptance, provisioning, operation, and maintenance of the DACS II system, Release 6.0.

How to Use This Document

Before you attempt to use the procedures in this document you should become familiar with its contents. The contents are described below.

The document is divided into two volumes:

Volume I - Operation and Maintenance and Reference Information
Volume II - Trouble Clearing

With the exception of the reference information contained in Volume I, each of the volumes stands on its own. The reference information applies to both volumes.

There are three ways to access the information in this document:

- The index in the back of each volume
- The tabs and the table of contents in the front of each tab
- The overall table of contents in the front of each volume.

Before you use the procedures in this document, you should have completed the DACS II Operation and Maintenance course (TR3421). If you were not able to take the training course, you should carefully study the information in Chapter 1 and the *Command Denials* section (found in each volume).

The procedures are arranged to be performed in the sequence in which they are presented. If you perform a procedure out of sequence, you may have trouble performing that procedure and the subsequent procedures.

Always start the trouble-clearing process by performing the procedures in Chapter 1 *Trouble Identification* of Volume II. The sections in Volume II are functional groupings of troubles. It is not always obvious from the message or alarm which of the trouble sections provides the procedure or procedures for clearing the trouble. If you begin with Chapter 1, you will be directed from procedure to procedure until the trouble is cleared.

Contents

Volume I

- **Chapter 1 - Introduction**

  This chapter provides an overview of the DACS II. It describes the DACS II hardware arrangements, functional operation, and command and message set. This chapter contains reference information required to operate and maintain the DACS II.

- **Chapter 2 - Acceptance**

  This chapter contains all the procedures required to accept a DACS II frame after it has been installed.

- **Chapter 3 - Provisioning**

  This chapter provides the procedures to install circuit packs and to grow and enable the common equipment (frame, synchronizer, and cross-connect network) and Units (FTU, DS3U, and DSPU).

  Included are the procedures to install circuit packs and to grow and enable the NPCs (FTU with or without *SLC*® Carrier, DS3U, and DSPU, Subrate, or DMB).

  Also included are the procedures to make the DSX connections and perform tests to establish DS1 facilities with or without *SLC* Carrier, DS3 facilities, and Subrate channels.

- **Chapter 4 - Test Access**

  This chapter contains the procedures to establish the test ports, make the DS0 and Clear-DS1 test connections, and establish and test-subrate channels.

- **Chapter 5 - Remove and Degrow Equipment**

  This chapter contains the procedures to remove and degrow NPCs, units, and cross-connect networks.

- **Chapter 6 - Cross-Connections and Disconnections**

  This chapter contains the procedures to make DS0, Clear-DS1, and Subrate cross-connections and to disconnect the cross-connections.

- **Chapter 7 - Administration**

  This chapter contains the procedures to log on or log off the DACS II; create, change, and delete alternate maps; and create, activate, and delete macros.

- **Chapter 8 - Maintenance**

  This chapter contains the procedures for routine tape and disk drive maintenance, tape and disk drive removal, and plug-in removal and replacement.

- **Chapter 9 - Performance Monitoring**

  The procedures in this chapter tell you how to schedule and retrieve reports that monitor various DS1 performance parameters.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II. You should be familiar with the contents of this chapter before you attempt any of the other procedures.

Volume II

- **Chapter 1 - Trouble Identification**

  This chapter contains the procedures for interpreting the alarms and messages that identify troubles. ***All trouble clearing starts here. You are directed from here to a procedure in one of the following chapters. That procedure may direct you to a procedure in a chapter that follows it. The process continues until you isolate the fault.***

- **Chapter 2 - Power Failures**

  This chapter contains the procedures for isolating power troubles.

- **Chapter 3 - Facility Alarms**

  This chapter contains the procedures for isolating troubles in the facilities that connect to DACS II.

- **Chapter 4 - Hardware Failures**

  This chapter contains procedures for locating internal DACS II troubles. The messages associated with these troubles usually identify one or more possible faulty plug-ins.

- **Chapter 5 - Manual Diagnostic Failures**

  This chapter contains the procedures for clearing troubles identified when you run manual diagnostics.

- **Chapter 6 - Controller and Link Troubles**

  The procedures in this chapter are used to isolate troubles in the controller or the link connecting the controller to a terminal or operating system. These troubles are usually associated with a reset.

- **Chapter 7 - Data Base Troubles**

  The procedures in this chapter are used to isolate a conditional reset or back-up memory trouble.

- **Chapter 8 - Frame Audits**

  The procedures in this chapter are used to isolate faults detected when frame audits are run.

- **Chapter 9 - Software Error**

  The procedures in this chapter are used to isolate troubles indicated by a software trouble message.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II.

Conventions Used

This manual uses special fonts in order for the user to differentiate computer input/output. The constant width font indicates message formats, keywords, letter representations of parameters, parameter values, and messages as they would appear on a DACS II terminal screen.

Related Documentation

The following documents support the DACS II system:

- DACS II Release 6.0 Installation Manual:

  Audience: Customers planning to install the equipment

  Content: Customer installation instructions.

- DACS II Release 1 through 6.0 Customer Reference Manual; document number AT&T 365-352-000

  Audience: Network planners, engineers, and others that need to know how the DACS II works and fits into the network

  Content: Features, applications, and description and other reference information.

- DACS II Release 6.0 Operation and Maintenance Manuals; document numbers AT&T 365-353: -001 (PDS), -011 (MML), -021 (PDS 2.048-Mb/s Interface) -031 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Contents: Procedures to operate and maintain the DACS II.

- DACS II Release 6.0 Command and Message Manuals; document numbers AT&T 365-353: -002 (PDS), -012 (MML), -022 (PDS 2.048-Mb/s Interface), -032 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Content: Description of each software input message and its response along with a description of each system output report.

- DACS II Releases 3.0 through 6.0 Quick Reference Guides; document numbers AT&T 365-352:-003 (PDS), -013 (MML), -023 (PDS 2.048-Mb/s Interface), -033 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Content: Abbreviated list of system commands and parameters.

- DACS II Release 6.0, Software Release Description; document number AT&T 365-352-005 (1.544 Mb/s), -105 (1.544 Mb/s BSS), -025 (2.048 Mb/s)

  Audience: End-user maintenance personnel

  Content: Upgrade procedures for the new software release, status of problems fixed in previous releases, and operating issues for the specified software release.

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Trouble Identification

1

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Trouble Identification

1

1.1 Select Trouble-Clearing Procedure

This chapter offers three paths for finding the appropriate trouble-clearing information in this volume. The path you take depends on the amount of trouble isolation that is needed to identify the trouble.

- If you are looking for a procedure to direct you through the evaluation of troubles in the trouble printout, refer to Section 1.2, *Isolate Frame Trouble.*

  NOTE:
  If you are not sure which message in the trouble report to respond to first, use Section 1.2 to identify the troubles.

- If you are looking for a summary of trouble types and indications so that you can isolate the trouble yourself, refer to Table 1-1 to find the appropriate chapter in this volume. This path would be used if you have some experience with the DACS II and you know the priority of handling multiple trouble messages.
- If you are looking for a direct reference to the procedure to clear a particular trouble message, refer to Table 1-3 at the end of Section 1.2 to find the appropriate section of this volume. This path would be used if you have a single trouble or you have already isolated the trouble.

Table 1-1. Trouble Summary and Chapter References

Trouble Indication/ Trouble Messages	Consequence Action	Trouble Cause	Trouble Section
Fuse bead extended (48V fuse & alarm panel) LED lighted on fuse board	Plug-ins removed from service	Blown fuse: (1) Aged fuse failed, (2) Shorted backplane or plug-in.	2.1
PWR:TN-X-dddd,ERR	Major alarm: backup supplies the load Critical alarm: plug-ins removed from service	(1) Power unit failed, (2) Short on load	2.2
ALM T3 ...DS3 {LOSI BERIOOF} COMPL	Service interruption; AIS sent.	DS3 line failure	3.1
AR01,MISC ALM ...MJ, CGA	Service interruption; trunk conditioning	(1) Failed DS1 line, (2) Transmit/receive plug-in	3.3
ALM ...<npc>:{MJIMN}, <parameter>	Service interruption (with MJ alarm); trunk conditioning	(1) Line degradation, (2) Transmit-end equipment	3.5
ALM ...<npc>:{15MEI24HR} <parameter>	Transmission impaired	(1) Line degradation, (2) Transmit equipment	3.5
REPT EVT <entity> ESR ANALYSIS REPORT ESR REPT RMV EQPT	Plug-in service removed; service switched to other side or protection	(1) Failed plug-in, (2) Wiring problem	4.2
REPT EVT <entity> ERR RMV <entity> DENY	Critical alarm: service interruption	(1) Multiple DS3 plug-ins failed, (2) Protection switching inhibited.	4.3
ALM EQPT ...<side> OOS	Side failed; no duplex switching	Failed plug-in	4.1
RTRV-ALM-EQPT; (input)	Frame alarm	Power failed, plug-in failed, CCN/ECCN plug-in removed, etc.	1.2
DGN <entity> STF	Diagnostic failed; Restore command denied	Failed plug-in	5.0
FAILURE lighted on status panel	Frame controller inoperative or in MCOND	(1) Reset needed, (2) Failed plug-in	6.1

Continued on next page

Table 1-1. *Continued*

Trouble Indication/ Trouble Messages	Consequence Action	Trouble Cause	Trouble Section
RESET-STOPPED	Frame controller inoperative	(1) Incorrect MC plug-in code, (2) Failed plug-in	6.2
BOOT FAILED:BAD BOOT DEVICE	Frame controller inoperative	(1) Incorrect MC plug-in code, (2) Failed plug-in	6.4
Inoperative terminal (Frame Hung)	Can't enter commands	(1) Terminal setup, (2) Incorrect link provisioning, (3) Failed CI plug-in, (4) Link adapter or connections.	6.6
{MPICI},OVERLOAD	Frame controller can't process commands; reset operated.	(1) Failed controller plug-in	6.5
UNIT-qq UC, OVERLOAD	Unit controller can't process commands; UC restored.	(1) Failed controller plug-in	6.5
CP MEM ...DENY BMTR:TAPE:MN	Backup transfer failed; tape will not be current	(1) Tape problem, (2) Frame controller trouble	7.1
MC:RESET (COND cc) COMPLD	Frame controller inoperative or in MCOND	(1) Can't access disk/tape, (2) Failed plug-in	7.2
DGNDET Message O.82002	Frame audit messages	Equipage/provisioning disagreement in memories.	8.1
DGNDET Message O.82001	Plug-in removed from service	Failed plug-in	8.2
DGNDET Message O.82003	Frame audit messages	Disagreement in RAM RAM and DISK	8.3
ERR MSGS TO LOG DISCARDED	Transient errors being recorded	Errors detected at plug-in	4.6
ERR,HARDWARE	Plug-in removed from service or identified for maintenance	Error detected at plug-in	4.8
ERR,SOFTWARE	Command aborted; autonomous maintenance action		9.1

1.2 Isolate Frame Trouble

1. If alarm cutoff is needed, enter **OPR-ACO-ALL**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check for blown fuses (see Note). If whole units of packs have failed, check the fuse and alarm panel for lighted **FA** lamp and a blown 48-volt feeder fuse. In the unit and other circuit groups, check for lighted LED indicator on or above fuse boards.

   ⇒ NOTE:
   Depending on the type of fuse, a blown fuse is indicated by one of the following: (1) extended color bead on indicator fuse, (2) lighted LED on LED-fuse, or (3) lighted LED for group of fuses on fuse block.

   - If there is a blown fuse at the frame, go to Section 2.1 to clear blown fuse trouble.

3. Check printout for ERR PWR message.
   - If ERR PWR message occurs in printout, go to Section 2.2 to clear power unit failure.
4. Enter **RTRV-ALM-EQPT: [xy] : : [ww] ;** for an alarm summary and use the following to interpret the output:
   - — The frame and power alarm summaries occur early in the printout. The left-to-right assignment for the PWR line is: 1-6 for peripheral units, 7 and 8 for sync sides 0 and 1, 9 and 10 for CCN/ECCN sides 0 and 1, and 11-20 for other peripheral units.
   - — Pack alarms are indicated by an "a" (for auto removal) or M (for major) in the message where the pack is listed. Unequipped packs are shown by dashes.
   - — Alarms on DS1 terminations are indicated by an M (major), * (minor), I (INFO for type PB/PC NPC), or dash (no alarm) for the NPC.
   - — DS3 facility alarms are indicated by a C* (critical) in the DS3 Alarm portion of the printout; dashes mean no alarms.
   - — DS1 alarms (embedded in DS3) are indicated by an M (major) in the NPC-xxxx, MXR r of Unit portion of the printout.
   - — Figure 1-1 shows how to read the common equipment line in the output. Alarms are indicated by M (for major).

   - If the DACS II does not execute the command, refer to Step **16**.

"ALMS:a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s"

a = MC (Main Controller)
b = MP (Main Processor)
c = CI (Communications Interface)
d = SSC (Secondary Storage Controller)
e = Hard Disk
f = Tape
g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-connect Side 0
n = Cross-connect Side 1
o = CCI 0 /CCNI 0
p = CCI 1 /CCNI 1
q = TOD Reset
r = DATE Reset
s = CPY MEM failed

Figure 1-1. Common Equipment Alarms

5. Check printout for any of the messages in Table 1-2.
   - If you have any of the messages in Table 1-2, go to the reference listed for the message.

Table 1-2. Facility Alarm Messages

Message Keywords	Reference
REPT ALM T3 -UNIT-qq:DS3-c:{AIS/BER/LOS/OOF}	Section 3.1
REPT ALM EQPT -AR01 MISC ALM MJ,CGA (DS1)	Section 3.3
REPT ALM EQPT -AR01 MISC ALM MJ,CGA (DS1 in DS3)	Section 3.2
REPT ALM AR01 -AR01 MISC ALM MJ,PBA (2.048 Mb/s line)	Section 3.4
REPT ALM EQPT -<npc No.>:{MJ/MN},<parameter>	Section 3.5
REPT ALM T3 -UNIT qq;DS3-c::IDLD	Section 1.3
REPT ALM EQPT -AR01 MISC ALM IDID CGA,IDLD	Section 1.3

6. Check the printout for an ERR ESR ANALYSIS REPORT message. See Figure 1-2 for the typical sequence of messages.
   - If you have the ERR ESR ANALYSIS REPORT message, go to Section 4.2 to clear that message.

```
A ff REPT EVT EQPT
   "<entity>,TN-X-dddd,EVENT-eeee,ESR,ERR"
   "<error data bytes>

A ff REPT ALMDET EQPT
   /* [O.01391] */
   "ANALYSIS, REPORT,EVENT-eeee,ESR,ERR"
   "<action>,<suspect plug-in No.1>
   "<action>,<suspect plug-in No.2>
   "<action>,<suspect plug-in No.3>
   "<action>,<suspect plug-in No.4>

A ff REPT RMV EQPT
   /* [O.33xxx] */
   "<entity>:<state>"

A ff REPT DGNDET EQPT
   /* [O.41xxx] */
   "<entity>:{ATP|CATP-cc|STF-ppqq},<data bytes>"
```

Figure 1-2. Error Analysis Report

7. Check the printout for REPT RMV EQPT and REPT DGNDET EQPT sequence of messages.
   - If you have the RMV and DGN sequence of messages, go to Section 4.3 to clear the ERR <entity> message.

8. Enter `RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;` for the whole frame or unit (of the frame) and check output for failed and out-of-service plug-ins and compare results with the ALMs query entered previously.

   NOTE:
   Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in the respective columns (out-of-service, failed, pested) of the output for each plug-in; unequipped NPCs are indicated by dashes.

9. If any circuits have failed status (shown in previous queries), Diagnose them with the DGN command. If they still have failed status, enter RMV command for plug-in, replace it, and enter RST command per Figure 1-3.
10. If any circuits are out-of-service but not failed, enter the RST command per Figure 1-3.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 1-3. Maintenance Command Construction

11. Check printout for any messages that start with an A (for autonomous) or I (information) prefix.
    - If you have an REPT EVT EQPT "LINK ...STATUS" message, check if the terminal has been disconnected from any link (first data byte after word STATUS will be 00 or 01 if this is the case).
    - If you have any of the autonomous messages, refer to Table 1-3 for trouble procedure reference.
    - If the alarm has cleared, the trouble was either intermittent or the preceding activity cleared the alarm condition. The status panel alarm will clear and an IDLD message will be issued in most cases.

12. If the alarm is still present, reenter the following commands:

```
RTRV-ALM-EQPT;
RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;
RTRV-STATE-COM:::::ALL;
```

    - If any CPs have failed status, enter the RMV command, replace the plug-in, and enter the RST command per Figure 1-3.

13. To make a record of the error history on the disk (for use by technical consultant), enter one of the following commands (see Note):

    Time of Day/Time Interval:

```
RTRV-LOG:[xy]::[ww]:ERR:HWER,{INT-mn|
[DATE-mm-dd-yy,]TOD-hh-mm-ss}];
```

    Suspect Entity:

```
RTRV-LOG:[xy]::[ww]:ERR:HWER,ENTY-eee;
```

    Where:

    INT = Interval of time (past 59 minutes)
    TOD = Time of day consisting of hour (hh=00 through 23), minutes (mm=00 through 60), seconds (ss=00 through 60). Date (month, day, year) is optional.
    eee = Plug-in designation, for example: BX, CCB, CCI, CCNI, FC, FTMI, LINK, MC, MP, MTC, NPC, DDC, FLI, FMT, MIU, MJU, MXR, SRM, SSC, SYNC, TAPE, TLI, TSI, UBX, UC.

    NOTE:
    If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

    - If you do have trouble messages (from printout or error log) to work with, refer to Table 1-3 to clear the trouble.

      NOTE:
      Steps **14** and **15** deal with an MC problem causing false alarms to be reported. To avoid unnecessary plug-in replacements in the MC, it is important to be sure there are no other trouble messages.

14. Replace the EMTC or MTC plug-in in the MC.
15. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

- If the alarm clears, this procedure is completed.
- If the alarm does not clear, there is an obscure trouble; contact technical consultant.

(Continue Here If DACS II Is Not Responding to Commands)

16. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If STARTUP ...STF message is received, go to Section 6 to clear reset stopped (startup diagnostic failed).
    - If the DACS II is now executing commands, this procedure is completed.
    - If the DACS II is still not executing commands, continue with Step **17**.
17. At the back of the frame, disconnect the administrative link cables (except link 1) from the main controller and tag them for correct installation after the trouble is cleared.
18. Replace the appropriate pack as follows:
    — For RL response, replace the CPU in the main controller.
    — For no response (no character echo), replace the HECI in the main controller.
19. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanations) message is received, this procedure is completed. Reconnect the administrative links.
    - If conditional completion is received, go to Section 7.2 to clear reset conditional completion.

Table 1-3. Autonomous Messages

Autonomous Message (Numerical Order)	Reference
[O.01101] M {BADVERB/FRMERR/SEQERR/CMD}:::[ww]:BAD-SYNTAX STOPPED	Section 10.1
[O.01111] M CMD::MC:[ww]:{OOS/MCOND/INSERVICE/MPDBASE} STOPPED	Section 10.1
[O.01121] A ff REPT EVT EQPT "CMD:ERR,ABT[,TN-X-abcd]"	Section 10.1
[O.01131.01] M [<error field>/<act verb>]:::[ww]:[<category>,]<reason> {STOPPEDIDENY}	Section 10.1
[O.01201] ** ff REPT ALM EQPT "{CI/ECI/HECI}:RESET"	Section 1.4
[O.01211] A ff REPT DGN EQPT "{CI/ECI/HECI}:STARTUP,{STF}"	Section 6.2
[O.01221] A ff REPT DGN EQPT "MP:STARTUP,{STF}"	Section 6.2
[O.01231] A ff REPT DGN EQPT "SSC:STARTUP,{STF}"	Section 6.2
[O.01241] A ff REPT EVT EQPT "BOOT:FROM-{DISK/TAPE}"	Section 1.4
[O.01241.01] A ff REPT EVT EQPT "BOOT:IN_PROGRESS"	Section 1.4
[O.01251] A ff REPT EVT EQPT ":RESET-STOPPED"	Section 6.2
[O.01261] A ff REPT EVT EQPT "MC:RESET-COMPLD,DACSII:gg,pp,r,kkttuuvv"	Section 1.4
[O.01271] BX {STF}	Section 6.2
[O.01272] EBX STARTUP {STF}	Section 6.2

Continued on next page

Table 1-3. *Continued*

Autonomous Message (Numerical Order)	Reference
[O.01281] MTC {STF}	Section 6.2
[O.01282] EMTC STARTUP {STF}	Section 6.2
[O.01291] A ff REPT INVID SFW	Section 6.2
[O.01301] A ff REPT EVT EQPT "PWR:TN-X-dddd,ERR"	Section 2.2
[O.01311] A ff REPT EVT EQPT "MC:[MP],TN-X-dddd[,EVENT-eeee][,ESR],ERR"	Section 4.3
[O.01311] A ff REPT EVT EQPT "MC:[EBX],TN-X-dddd[,EVENT-eeee][,ESR],ERR"	Section 4.3
[O.01311] A ff REPT EVT EQPT "MC:[EMTC],TN-X-dddd[,EVENT-eeee][,ESR],ERR"	Section 4.3
[O.01312] A ff REPT EVT EQPT "MC:[{MP/CI/SSC}],TN-X-dddd,[ESR],ERR"	Section 4.3
[O.01321] A ff REPT EVT EQPT "LINK-a:TN-X-dddd,ERR" "STATUS:a0,a1,a2"	Section 4.3
[O.01331] A ff REPT EVT EQPT "SYNC-a:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01333] A ff REPT EVT EQPT "SYNC-a:TLI-m,SSP-b[,NPC-abc],TN-X-dddd,ERR" /* ALARM SET */ "[LOS][,LEN][,EXJ][,PHS][,OOF][,MAJ][,MIN]"	Section 4.3
[O.01335] A ff REPT EVT EQPT "SYNC-a:TLI-m,SSP-b[,NPC-abc],TN-X-dddd,ERR" /* ALARM CLEAR */ "[LOS][,LEN][,EXJ][,PHS][,OOF][,MAJ][,MIN]"	Section 4.3

Continued on next page

Table 1-3. *Continued*

Autonomous Message (Numerical Order)	Reference
[O.01341] A ff REPT EVT EQPT "SYNC-a:TLI-m,SSP-b,TN-X-dddd[,NPC-[s]abc],EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01342] A ff REPT EVT EQPT "SYNC-a:TLI-m,TN-X-dddd,EVENT-eeee,[ESR],ERR"	Section 4.3
[O.01351] A ff REPT EVT EQPT "CCB-sf:TN-X-dddd,EVENT-eeee,[ESR],ERR"	Section 4.3
[O.01352] A ff REPT EVT EQPT "CCNI-s:TN-X-dddd,EVENT-eeee,ESR,ERR"	Section 4.3
[O.01353] A ff REPT EVT EQPT "TSI-sft:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01354] A ff REPT EVT EQPT "CCI-s:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01355] A ff REPT EVT EQPT "ETSI-sqq:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01361] A ff REPT EVT EQPT "UNIT-qq:{UC/UBX},TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01362] A ff REPT EVT EQPT "ERR-SOFTWARE"	Section 11.1
[O.01363] A ff REPT EVT EQPT "UNIT-qq:FTMI-b,TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01364] A ff REPT EVT EQPT "UNIT-qq:FC-sb,TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01366] A ff REPT EVT EQPT "SYNC-a,MODE-{FAST/HOLDOVER/NORMAL/MATE}[TLI-m,SSP-c],\	Section 4.3
[O.01371] A ff REPT EVT EQPT "NPC- :SIDE-s,TN-X-dddd,EVENT-eeee [,ESR],ERR"	Section 4.3

Continued on next page

Table 1-3. *Continued*

Autonomous Message (Numerical Order)	Reference
[O.01372] A ff REPT EVT EQPT "NPC- :TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01381] A ff REPT EVT EQPT "{UNIT-qq,UC/MC[,{CI/MP}]},OVERLOAD"	Section 6.5
[O.01391] A ff REPT ALMDET EQPT "ANALYSIS,REPORT,EVENT-eeee,ESR,ERR"	Section 4.2
[O.01392] A ff REPT ALMDET EQPT "<circuit ID>:TN-dddd,ERR,HARDWARE"	Section 4.8
[O.01393] A ff REPT EVT EQPT ":RESET,{DATE/TOD/DATE,TOD}"	Section 6.3
[O.01401] A ff REPT EVT EQPT "UNIT-qq-FLI-k:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01402] A ff REPT EVT EQPT "UNIT-qq-FMT-s:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01403] A ff REPT EVT EQPT "UNIT-qq-MXR-c[-DEV-<devc>]:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.01404] A ff REPT EVT EQPT "UNIT-qq-MIU-c:TN-X-dddd,EVENT-eeee[,ESR],ERR"	Section 4.3
[O.33xxx] A ff REPT EVT EQPT "<entity>:<state>"	Section 1.4
[O.41004] M DGN EQPT::<entity>:[ww] IN_PROGRESS	Section 1.4
[O.55703] M <verb>[<modifier>][<modifier>]:::[ww] IN_PROGRESS	Section 1.4
[O.58011] A ff REPT EVT EQPT "MC:MCOND"	Section 7

Continued on next page

Table 1-3. *Continued*

Autonomous Message (Numerical Order)	Reference
[O.65011] pa ff REPT ALM EQPT "AR01,MISC ALM" "<npc No.>:{MJ/MN/INFO},CGA,{A/B/F/L/M/R/V/X/Y}"	Section 3.3
[O.65011] pa ff REPT ALM EQPT "AR01,MISC ALM" "<npc No.>:{PMA/DMA/MI},PBA,{A/B/E/I/L/M/R/S/V/X/Y}"	Section 3.4
[O.65021] A ff REPT ALM EQPT "AR01,MISC ALM" "<npc No.>:IDLD,{CGA/PBA},<alarm type>"	Section 1.3
[O.65031] pa ff REPT ALM EQPT "<npc No.>:{MJ/MN},<parameter>"	Section 3.5
[O.65035] pa ff REPT ALM EQPT "<npc No.>,{15ME/24HR},<parameter>"	Section 3.5
[O.65041] A ff REPT ALM EQPT "<npc No.>:IDLD,<parameter>"	Section 1.3
[O.65045] A ff REPT ALM EQPT "<npc No.>:IDLD,{15ME/24HR},<parameter>"	Section 1.3
[O.65051] pa ff REPT ALM EQPT "ALM,RESET,{DATE/TOD/DATE,TOD}"	Section 6.3
[O.65053] ** ff REPT ALM EQPT "BOOT FAILED:BAD BOOT DEVICE"	Section 6.4
[O.65054] ** ff REPT ALM EQPT "s:OOS"	Section 4.1
[O.65055] pa ff REPT ALM EQPT "s:{MJ/IDLD}:OOS"	Section 4.1
[O.65056] pa ff REPT ALM EQPT "BMTR:TAPE:{MN/IDLD}"	Section 7.1

Continued on next page

Table 1-3. *Continued*

Autonomous Message (Numerical Order)	Reference
[O.65071] A ff REPT OPR ACO ALL	Section 1.4
[O.65131] pa ff REPT ALM EQPT "SC,ALARM" "{RT/DL}-ffff,{DGA/DGB/DGC/DGD/DGP}-[s]abc:{MJ/MN},\ {CLF/NE/FE}[,{CGA/INH/PSW/MSW/DLF}][,k]"	Section 3.3
[O.65131] pa ff REPT ALM "SC,ALARM" "{RT/DL}-ffff;{DGA/DGB/DGC/DGD/DGP}-uv-m-np:IDLD\ [,{CGA/INH/PSW/MSW/DLF}][,k]"	Section 1.3
[O.65141] pa ff REPT ALM "SC,ALARM" "{RT/DL}-ffff:[<alarm type>,]<state>[,FE]"	Section 3.10
[O.65151] A ff REPT ALM EQPT "SC,DPLX ALARM" "{SYNC-a/CCI-s/ETSI-sqq/FC-sb-UNIT-qq/FMT-s-UNIT-qq/\ NPC- -SIDE-s}:{CR/IDLD},NE"	Section 1.5
[O.65161] A ff REPT ALM "SC,ALARM" "{MC/UC qq/PWR DDD/FTMI qqb/DSPI qq}:<state>,NE"	Section 3.11
[O.65171] A ff REPT ALM EQPT "SC,ALARM" "RT-ffff:COMP,<state>[,INDX][,LBRV][,AB][,CD][,P][,ALP]"	Section 3.9
[O.66001] pa ff REPT ALM T3 "UNIT-qq:DS3-c:<state>"	Section 3.1
[O.66011] A ff REPT ALM T3 "UNIT-qq:DS3-c:<state>:IDLD"	Section 1.3

Continued on next page

Table 1-3. *Continued*

Autonomous Message (Numerical Order)	Reference
[O.82001] A ff REPT DGNDET EQPT "tttt:eeee[-DEV-devc],d0"	Section 8.3
[O.82002] A ff REPT DGNDET EQPT "ttt:d5,d4,d3,d2,d1,d0"	Section 8.1
[O.82003] A ff REPT DGNDET EQPT "tt:d8,d7,d6,d5,d4,d3,d2,d1"	Section 8.2
[O.82004] A ff REPT AUD EQPT "MC:tttt"	Section 8.3
[O.82005] A ff REPT EVT EQPT "FRAME:AUD,nnppqq"	Section 1.4

1.3 Check REPT ALM IDLD or INFO Message

Overview: This procedure deals with alarm IDLD (idled) and INFO (information) messages. Facility alarm idled messages are received after the line signal is restored on a facility that previously had a CGA (carrier group alarm). Alarm information messages are received on 2.048-Mb/s lines when an alarm condition designated as maintenance information occurs. Alarm idled messages do not occur after minor alarms due to facility error (for example, for SLIP or BER) are cleared. The error counts for these parameters are checked and the counts are cleared using utility commands.

1. Which one of the following keywords appears in the message?
   - If **IDLD**, continue with Step **2.**
   - If **INFO**, proceed to Step **6.**
2. This message reports that an alarm has cleared. For facility alarms, the NPC (or DS3 position in the unit) and the type of alarm are given in the message; for example, CGA (carrier group alarm), PBA (primary block alarm), and facility parameter BER (bit error rate).
3. If the message is the CGA type, refer to Table 1-4 for the meaning of the alarm type given at the end of the IDLD message.

Table 1-4. CGA Alarm Types

Indicator	Meaning
A	Alarm Indication Signal
B	Both red and yellow (not registered with TG80/TG80B NPC)
F	Frame format error rate (TG180 NPC)
L	Local multiframe alarm (DMI equipment)
M	Remote multiframe alarm (DMI equipment)
R	Red; incoming line failure
V	Line format violation (TG180 NPC)
X	Multiple alarms (TG180 NPC)
Y	Yellow; outgoing line failure

4. If the message is for a timing link failure (ERR SYNC messages) or for a DS3 line failure, refer to Table 1-5 for the meaning of the alarm type.
5. If the message is the PBA type for a 2.048-Mb/s line, refer to Table 1-6 for the meaning of the alarm type given at the end of the IDLD message.

Table 1-5. Keyword Meanings

Alarm Keyword	Meaning
AIS	Alarm indication signal (DS3)
BER	Bit error rate high (DS3)
LOS	Loss of signal
LEN	Loss of energy
EXJ	Excessive jitter
PHS	Phase shift
OOF	Out of frame
PMA	Prompt maintenance alarm
DMA	Deferred maintenance alarm

Table 1-6. PBA Alarm Types

Indicator	Meaning
A	All 1s signal (AIS) received from far end.
B	Incoming high bit error rate (BER).
E	Excessive errors received at far end (REER).
G	Far-end loss of CRC4 multiframe alignment in TS0 (FLCMA).
I	Remote all 1s indication (RAIS).
L	Loss of multiframe alignment (LMA). [Note 1]
M	Remote loss of alignment sent on TS16 (R16). [Note 1]
P	TS0 pseudo-frame word out-of-frame (PFWOOF).
R	Loss of signal primary block failure (LOS PBF); loss of frame primary block failure (LOF PBF). [Note 2]
S	Far end sync has gone into holdover (Sync Fail Indication).
V	All 1s indication on TS16 (A16). [Note 1]
X	Incoming excessive error rate (EER).
Y	Remote alarm indication (RAI).

Note 1: These only occur with CAS line format.

Note 2: R can be either LOF PBF or LOS PBF for PB/PC NPCs.

6. An "A" after the CGA word and NPC number reports the receipt of an AIS (alarm indication signal, all 1s, blue signal) from the far end.

7. Consider the following situations in which the far end will send an all 1s signal:
   - — On a DS1 facility connecting to multiplexers, the all 1s signal originates at the alarmed terminal (red) in the failed span and is forwarded along the route to prevent multiple red alarms that would hinder troubleshooting.
   - — The far-end NPC can be grown to send an all 1s signal when it is removed from service.

1.4 Check Autonomous Action or Command In-Progress Messages

NOTE:
Action messages indicate that some action has been initiated; frequently, an autonomous action brought by a trouble condition. In-progress messages are issued every 20 seconds while commands with longer execution times are underway. Other commands will be ignored while a command is in-progress.

1. See Table 1-7 for an explanation of the message. The message may not require any action, but associated messages may require action. Messages that do not require action are: ACO ACTIVE and CI/ECI/HECI RESET.

Table 1-7. Message Explanations

Message Keywords	Explanation
DGN EQPT <entity> IN PROGRESS	Autonomous or manually requested diagnostic is being run.
RMV EQPT <entity> IN PROGRESS	Autonomous or manually requested remove from service is being executed; this operation takes up to 3 minutes for the tape drive.
ACO State -Active	Alarm cutoff has been activated using the status panel control.
REPT EVT ...FRAME:AUD	Frame audit routine was autonomously initiated to compare values values stored in different memory locations.
REPT RECOVY EQPT	Autonomous trouble recovery action is being executed.
REPT ALM ...{CI | ECI | HECI} RESET	Notification to operation systems on links that the main controller has been reset.

2. Which type message do you have?
   - If FRADTS ...STARTED, continue with Step **3**.
   - If DGN, RMV, or UTL ...IN PROGRESS, proceed to Step **4**.
   - If UTL RCY ...IN PROGRESS, proceed to Step **5**.

3. When resulting frame audit messages are received, refer to the appropriate trouble-clearing procedure as follows:
   - If DGNDET Message No. O.82002, go to Section 8.1.
   - If DGNDET Message No. O.82001, go to Section 8.2.
   - If DGNDET Message No. O.82003, go to Section 8.3.

4. If the IN PROGRESS message was received in response to entry of a manual command, wait to see if command completion is received after 20 seconds. See Note.
   - If command completion message is received after 20 minutes, this procedure is completed.

NOTE:
Operations may be delayed because higher priority commands are being processed. Some commands take longer to complete; for example, the remove tape takes up to 3 minutes because the tape is rewound during the remove operation, and memory backups can take up to an hour.

5. If IN PROGRESS messages are still being received after an hour, hold the **RESET ENABLE** switch on and press the **RESET** button on the DACS II status panel.
   - If the trouble persists, contact technical consultant.

NOTE:
At this point the system is "hung" and the only way to establish communication with the frame is by performing the RESET mentioned above. However, you may run the risk of a service interruption by performing this RESET.

6. Check the printout for ERR ESR MC messages and other trouble messages and check if the **FAILURE** LED is lighted on the status panel. Also enter the following commands: `RTRV-ALM-EQPT;` and `RTRV-STATE-EQPT:::ALL;` and refer to the appropriate part (listed in order of importance) as follows:
   - If ERR ESR message, go to Section 4.3.
   - If FAILURE lighted on status panel, go to Section 6.1.
   - If retry later (RL) responses, go to Section 6.7.
   - If ERR SOFTWARE message, go to Section 9.1.
   - If frame alarm, go to Section 1.2.
   - If failed or out-of-service plug-ins, go to Section 4.5.
   - If other trouble message, find the message in Table 1-3 at the end of Section 1.2 and go to that reference.

1.5 Check SC Information Messages

1. See Table 1-8 for an explanation of the message keywords and consider the following about the SC (*SLC*® Carrier System) messages:

   — These messages are issued to inform the personnel at operations centers of DACS II troubles which may interrupt operations. Other messages are used by the DACS II technicians to clear the trouble. The SC information messages are:

   ```
   SC, DPLX ALARM ...<state>,NE
   SC, ALARM {MC|UC-qq|PWR-hhh|FTMI-qqb|DSPI}:
      <state>,NE
   ```

   — The NE keyword indicates that the trouble is at the near end (in the DACS II).

   — The possibilities for the <state> field are: CR, MJ, MN, IDLD. These are for critical alarm, major alarm, minor alarm, and for message idled. When IDLD is received, the trouble has cleared and capabilities are restored.

Table 1-8. Keyword Explanation

Keyword	Explanation
MC	Main controller failure. Customer service will not be affected, but DACS II message processing may be interrupted.
UC qq	Unit controller failure. Customer service will not be affected, but unit commands may be denied.
FTMI qqb/ DSPI qq	Unit interface failure. Customer service will not be affected, but unit commands may be denied.
PWR hhh	Power unit failed. A single power unit failure does not affect service because there is redundant power. Hexadecimal digits identify the power unit.
DPLX <entity>	Both sides of a duplicated entity have failed. Customer service will be interrupted. The entity named in the message is the last side that failed.

Power Failures

2

Contents

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2.2 Clear Power Unit Trouble 2-18

2.3 Recover From Loss of Input Power 2-23

Power Failures

2

This chapter contains the procedures to clear power troubles due to a blown fuse, a failed power unit, or the loss of 48-volt input power.

- **Blown Fuses.** There is no backup power for a blown fuse. However, fusing is designed so that a single failure will only affect one side of any duplicated network and a minimum of plug-ins. The indications of a blown fuse are the lighted indicator on the panel or fuse board and the output messages indicating that groups of plug-ins have failed.
- **Power Unit Failure.** The failure of a power converter is indicated by the lighted failure LED on the plug-in and by the receipt of the ERR PWR message. The failure of a single power unit does not cause a loss of service, because a redundant power unit is always provided to supply the load. A single power unit failure causes a major alarm to draw immediate attention; more than one failure in a power unit group causes a critical alarm and the loss of service.
- **Loss of Input Battery.** The arrangement of the four input power feeders is as follows: feeders A and B supply side 0 circuit groups, and feeders C and D supply side 1 circuit groups. This arrangement prevents the loss of service if one feeder fails. The procedure to recover from loss of all input power is to reset the frame controller after the power is connected. This will cause the MC and sync packs to be reset and restored. Cross-connect network and peripheral unit plug-ins must be restored using manual input commands.

NOTE:
If you already have isolated the trouble to powering, you can go directly to the procedure for that trouble; otherwise, go to *Trouble Identification* to first isolate the trouble.

2.1 Clear Blown Fuse Trouble

1. Locate blown fuse by lighted LED fuse or extended fuse bead. An **FAL** indicator on the fuse and alarm panel will be lighted for a 48-volt fuse. The fuse and alarm panel is at the bottom of the multibay frame and at the top of single-bay frame.
2. If fuse **D7** or **D8** (48-volt fuse panel) or **DISK** fuse (CEF controller fuse board) is blown, proceed as follows:

   For D8 or DISK Fuse:

   a. Enter the following commands to remove the hard disk drive from service to prevent software error messages:
   `RST-EQPT::MC::MCOND;` and `RMV-EQPT::DISK;`

   For D7 Fuse:

   b. Continue with procedure to clear blown fuse (the disk considerations are given in this procedure after the power is restored).

3. Replace blown fuse. For LED-type fuses, use extractor or long-nose pliers. If separate 1/2 A indicator fuses are provided, replace the higher amperage fuses before the indicator fuses.

   ⚠ CAUTION:
   Using a replacement fuse of higher amperage rating can cause equipment damage.

   NOTE:
   The color of the bead indicator fuses denotes the amperage. Red is for 1/2 A (70G), orange is for 2A (70B), and green with black stripe is for 5A (70D) fuse.

   NOTE:
   On older fuse panels, which do not use a 5A indicator fuse for positions A5-1, A6-1, B5-1, B6-1, etc., the fuses for those positions are 1/2 A indicator fuses and the associated 7.5A fuses.

   - If the fuse holds, proceed to Step **14.**
   - If the fuse does not hold, continue with Step **4.**

4. If the blown fuse is on the 48-volt fuse and alarm panel, continue with Step **5.**
   - If the blown fuse is not on that panel, proceed to Step **8.**

5. Replace associated power unit or CP (circuit pack) listed in the appropriate table:
   - — Table 2-1 for the CEF
   - — Table 2-2 for the non-CEF multibay frame
   - — Table 2-3 for the single-bay frame.
6. Replace fuses.

Table 2-1. 48-Volt Power (for CEF)

Feed A Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
A1	411A,SM566, or 563A	Unit 1	70D,5A	Green
A2	411A,SM566, or 563A	Unit 2	70D,5A	Green
A3	411A,SM566, or 563A	Unit 3	70D,5A	Green
A4	411A,SM566, or 563A	Unit 4	70D,5A	Green
A5-1	CCI,ETSIs	ECCN 0	70G,0.5A	Red
A5-2	Indicator	-	74J,7.5A	-
A6-1	-	-	-	-
A6-2	-	-	-	-
A7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A9	411AA,SM566, or 563A	Unit 6	70D,5A	Green
A12	411AA,SM566, or 563A	Unit 7 (0PU)	70D,5A	Green
A13	411AA,SM566, or 563A	Unit 8 (0PU)	70D,5A	Green
A14	411AA,SM566, or 563A	Unit 10	70D,5A	Green
A15	411AA,SM566, or 563A	Unit 11 (0PU)	70D,5A	Green
A16	411AA,SM566, or 563A	Unit 13 (0PU)	70D,5A	Green
A17	411AA,SM566, or 563A	Unit 14 (0PU)	70D,5A	Green
A18	411AA,SM566, or 563A	Unit 15	70D,5A	Green
A19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-1. *Continued*

Feed B Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
B1	411A,SM566, or 563A	Unit 1	70D,5A	Green
B2	411A,SM566, or 563A	Unit 2	70D,5A	Green
B3	411A,SM566, or 563A	Unit 3	70D,5A	Green
B4	411A,SM566, or 563A	Unit 4	70D,5A	Green
B5-1	-	-	-	-
B5-2	-	-	-	-
B6-1	-	-	-	-
B6-2	-	-	-	-
B7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
B8	-	CRO	70D,5A	Green
B9	411AA,SM566, or 563A	Unit 6	70D,5A	Green
B12	411AA,SM566, or 563A	Unit 7	70D,5A	Green
B13	411AA,SM566, or 563A	Unit 9 (0PU)	70D,5A	Green
B14	411AA,SM566, or 563A	Unit 10 (0PU)	70D,5A	Green
B15	411AA,SM566, or 563A	Unit 11	70D,5A	Green
B16	411AA,SM566, or 563A	Unit 12 (0PU)	70D,5A	Green
B17	411AA,SM566, or 563A	Unit 14	70D,5A	Green
B18	411AA,SM566, or 563A	Unit 15 (0PU)	70D,5A	Green
B19	411AA,SM566,	Unit 16 (0PU)	70D,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-1. *Continued*

Feed C Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
C1	411A,SM566, or 563A	Unit 1 (1PU)	70D,5A	Green
C2	411A,SM566, or 563A	Unit 2 (1PU)	70D,5A	Green
C3	411A,SM566, or 563A	Unit 3 (1PU)	70D,5A	Green
C4	411A,SM566, or 563A	Unit 4 (1PU)	70D,5A	Green
C5-1	CCI,ETSIs	ECCN 0	70G,0.5A	Red
C5-2	Indicator	-	74J,7.5A	-
C6-1	-	-	-	-
C6-2	-	-	-	-
C7	411AA,SM566, or 563A	Unit 5	70D,5A	Green
C8	TG58	1SPU (SYNC 1)	70D,5A	Green
C9	411AA,SM566, or 563A	Unit 6 (1PU)	70D,5A	Green
C12	411AA,SM566, or 563A	Unit 7 (1PU)	70D,5A	Green
C13	411AA,SM566, or 563A	Unit 8 (1PU)	70D,5A	Green
C14	411AA,SM566, or 563A	Unit 9	70D,5A	Green
C15	411AA,SM566, or 563A	Unit 11 (1PU)	70D,5A	Green
C16	411AA,SM566, or 563A	Unit 12	70D,5A	Green
C17	411AA,SM566, or 563A	Unit 13 (1PU)	70D,5A	Green
C18	411AA,SM566, or 563A	Unit 16	70D,5A	Green
C19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-1. *Continued*

Feed D Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
D1	-	-	-	-
D2	-	-	-	-
D3	-	-	-	-
D4	-	-	-	-
D5-1	-	-	-	-
D5-2	-	-	-	-
D6-1	-	-	-	-
D6-2	-	-	-	-
D7	411AA,563A	+5 MC Power	70D,5A	Green
D8	484GA	+12 MC Power	70D,5A	Green
D9	SM565 (MCP)	MC Power	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red
D12	411AA,SM566, or 563A	Unit 8 (0PU)	70D,5A	Green
D13	411AA,SM566, or 563A	Unit 9 (1PU)	70D,5A	Green
D14	411AA,SM566, or 563A	Unit 10 (1PU)	70D,5A	Green
D15	411AA,SM566, or 563A	Unit 12 (1PU)	70D,5A	Green
D16	411AA,SM566, or 563A	Unit 13	70D,5A	Green
D17	411AA,SM566, or 563A	Unit 14 (1PU)	70D,5A	Green
D18	411AA,SM566, or 563A	Unit 15 (1PU)	70D,5A	Green
D19	411AA,SM566, or 563A	Unit 16 (1PU)	70d,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, or DS3U).

Table 2-2. Multibay Power (Non-CEF)

	Power Unit/CP			
Fuse	Type	Designation/ Location	Size	Bead Color
A1	411AA	128-012	70D,5A	Green
A2	411AA	128-108	70D,5A	Green
A3	411AA	328-012	70D,5A	Green
A4	411AA	328-108	70D,5A	Green
A5-1	485AB	PU1 (CCN0)	70D,5A	Green
A5-2	-	-	-	-
A6-1	485AB	PU2 (CCN 0)	70D,5A	Green
A6-2	-	-	-	-
A7	411AA	1PU (Unit 5)	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A8	-	0TB	70D,5A	Green
A9	411AA	1 PU (UNIT 6)	70D,5A	Green
B1	411AA	128-024	70D,5A	Green
B2	411AA	128-124	70D,5A	Green
B3	411AA	328-024	70D,5A	Green
B4	411AA	328-124	70D,5A	Green
B5-1, B5-2	485AB	PU3 (CCN 0)	70D,5A	Green
B6-1, B6-2	485AB	PU4 (CCN 0)	70D,5A	Green
B7	411AA	0PU (UNIT 5)	70D,5A	Green
B8	TG58	1SPU (SYNC 1)	70D,5A	Green
B8	-	1TB	70D,5A	Green
B9	411AA	0PU (UNIT 6)	70D,5A	Green

Table 2-3. Single-Bay Power (Non-CEF)

Fuse	Power Unit	
	Type	Designation/Location
A1	411AA	FTU1-First PU
A2	TG58	0SPU (Sync Power)
A3	411AA	0PU (DSPU Side 0 Power)
A4	411AA	CCN2 Side 0 Power Unit
B1	411AA	FTU1-Second PU
B2	TG58	1SPU (Sync Power)
B3	411AA	1PU (DSPU Side 1 Power)
B4	411AA	CCN2 Side 1 Power Unit
C1	411AA	FTU1-Third PU
C2	NONE	48 Volts to TLIs 1-4, Both Sides
C3	SM566	DCP (DSPU Power)
D2	411AA	+5 Controller Power
D3	484GA	+12 Controller Power
D4	SM565	MCP (Main Controller Power)
D5	NONE	48 Volts to MTC Pack

7. If the fuse holds, verify that power unit output voltage is within limits (see Note 1) per Table 2-4 using a digital multimeter (such as KS-20599).

NOTE 1:
The FTU and DS3U power units feed a common bus. To test the replacement for low voltage, one of the other units in the group must be temporarily disconnected.

- If output is out of limits, replace the power unit with one that meets requirements.
- If the fuse does not hold, refer to the appropriate schematic from the list below to locate the wiring trouble between feeder fuse and the power unit.
  - — SD-96699-01 for CEF
  - — SD-96658-01 for non-CEF multibay frame
  - — SD-96684-01 for single-bay frame.

NOTE 2:
After the wiring trouble is corrected, you will have to use the commands of Figure 2-1 to restore all plug-ins that were removed from service (see trouble printout).

Table 2-4. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 −11.75 to −12.25	+V2 −V2	RTN RTN
411AA	+5.1 to +5.3	+	−
484GA	+11.60 to +12.60	+	−
TG58	+4.75 to +5.25 −4.95 to −5.45	+ +	− −
485AB	+5.1 to +5.4	+	−
SM566	+4.75 to +5.25	+	−
563A	+4.9 to +5.3	5.5V	GRD

8. Refer to the appropriate table(s) that follows and the trouble printout to see the associated packs.

   — Table 2-5 for controller and sync fuses (CEF)

   — Table 2-6 for controller and sync fuses (non-CEF)

   — Table 2-7 for IFTU fuses

   — Table 2-8 for DSPU fuses (flexible bay)

   — Table 2-9 for DSPU fuses (original interface bay)

   — Table 2-10 for DS3U fuses

   — Table 2-11 for CCN fuses (original interface bay)

   — Table 2-12 for FTUs (original interface bay). See Note.

NOTE:
For LED-type fuses, the designation strips which have the right half offset up are read as follows: the lower left designation is for the bottom fuse on the fuse board, and the upper right one is for the top fuse (for example, CA at bottom and CH at top on ED-2C863-30, G1 dual fuse board).

9. Use RMV-EQPT commands per Figure 2-1 to remove any affected packs from service that were not removed as part of error recovery (RMV ...COMPLD in printout).

10. Disengage CPs associated with the blown fuse and replace fuse(s).

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 2-1. Maintenance Command Construction

11. If the fuse holds, continue with Step **12.**

    - If the fuse does not hold, refer to appropriate schematic listed below to clear wiring problem (see Note). After trouble is cleared, reinsert CPs; the packs affected by the power loss will also have to be restored to service per Figure 2-1.
      - — SD-96699-01 for CEF
      - — SD-96658-01 for non-CEF multibay frame
      - — SD-96684-01 for single-bay frame.

NOTE:
You can use the coordinate location stamped over the plug-in position on the front panel to locate the slot wiring on the backplane.

12. Reinsert CPs one by one while watching fuse to find defective CP which blows fuse.
13. Replace CP that blows fuse and replace blown fuses.
14. Use RST-EQPT commands per Figure 2-1 to restore affected packs (RMV ...COMPLD in printout). The commands are listed according to the hierarchy of the packs in the frame.
    - If fuse **D8** (48-volt fuse panel) or controller **DISK** fuse was replaced, enter the following commands to restore the disk to service: `RST-EQPT::DISK;` and `RST-EQPT::MC;`.
    - If fuse **D7** (48-volt fuse panel) fuse was replaced, reset the frame using the **RESET ENABLE** switch and **RESET** button on the DACS II status panel. After reset completes, enter `DGN-EQPT::DISK;` to check if the disk data was corrupted. If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed disk diagnostic.
    - If the CCI cannot be restored, enter `STA-LOCL-RST::PRI;` and, after the boot completes, restore the CCI to service.
    - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion.

Table 2-5. Sync and Controller Fuses (CEF)

Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /14-106	0TLI1 /10-104	MCP /04-144	SSC /04-104
	0TLI2 /10-112		EBX /04-128
	0TLI3 /10-120		CPU /04-120
	0TLI4 /10-128		EMTC /04-112
	0DPLL /12-084		CI /04-136
	0TB /14-128	PU /04-012	SSC /04-104
1SPU /14-160	1TLI4 /10-136		EBX /04-128
	1TLI3 /10-144		CPU /04-120
	1TLI2 /10-152		EMTC /04-112
	1TLI1 /10-160		CI /04-136
	1DPLL /12-092		DISK UNIT /04-092
	1TB /14-150		TAPE UNIT /04-048
		PU /04-160	DISK UNIT /04-092
			TAPE UNIT /04-048

Table 2-6. Sync and Controller Fuses (non-CEF)

Synchronizer		Main Controller	
Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
0SPU /227-010	0TLI1 /223-008	MCP /225-136	SSC /225-092
	0TLI2 /223-016		BX /225-100
	0TLI3 /223-024		CPU /225-108
	0TLI4 /223-032		MTC /225-120
	0DPLL /225-076		CI /225-128
A8 FUSE	0TB /227-032	PU /225-148	SSC /225-092
1SPU /227-064	1TLI1 /223-064		BX /225-100
	1TLI2 /223-056		CPU /225-108
	1TLI3 /223-048		MTC /225-120
	1TLI4 /223-040		CI /225-128
	1DPLL /225-084		DISK UNIT /233-024
B8 FUSE	1TB /227-054		TAPE UNIT /233-064
		PU /225-160	DISK UNIT /233-024
			TAPE UNIT /233-064

Table 2-7. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30 ED-9C011-30	+5A1 through +5A4 (1-4 through 17-20) +5A5	 4 plug-ins (8 NPCs) per fuse (see +5A5 below)
ED-9C012-30 ED-9C011-30	+5A1 through +5A4 (1 through 20) +5A5, number 1 +5A5, number 2 +5A5, number 3 +5A5, number 4 +5A5, number 5	 1 plug-in (2 NPCs) per fuse CPU UBX FTMI 0-Side FC 1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 2-8. DSPU Fuses (Flexible Bay)

Fuse	Side	DSP Position (Note)
(Top)	0 DSPU	(Left Panel)
No. 1		First and second
No. 2		Third and fourth
No. 3		Fifth and sixth
No. 4		Seventh and eighth
(Bottom)	1 DSPU	(Right Panel)
No. 5		First and second
No. 6		Third and fourth
No. 7		Fifth and sixth
No. 8		Seventh and eighth

Note: Each fuse supplies two DSP plug-ins.

Table 2-9. DSPU Fuses - Original Interface Bay

DSPU5		DSPU6	
Fuse or PU/ Location	Associated Circuit Pack/Location	Fuse or PU/ Location	Associated Circuit Pack/Location
(SIDE 0)		(SIDE 0)	
0PU/109-160		0PU/312-160	
JBH/109-148	NPC641 /109-006	JBH/312-148	NPC801 /312-006
	NPC661 /109-012		NPC821 /312-012
JBG	NPC681 /109-018	JBG	NPC841 /312-018
	NPC701 /109-024		NPC861 /312-024
JBF	NPC721 /109-030	JBF	NPC881 /312-030
	NPC741 /109-036		NPC901 /312-036
JBE	NPC761 /109-042	JBE	NPC921 /312-042
	NPC781 /109-048		NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/109-142		1PU/312-142	
JBD/109-148	NPC641 /109-074	JBD/312-148	NPC801 /312-074
	NPC661 /109-080		NPC821 /312-080
JBC	NPC681 /109-086	JBC	NPC841 /312-086
	NPC701 /109-092		NPC861 /312-092
JBB	NPC721 /109-098	JBB	NPC881 /312-098
	NPC741 /109-104		NPC901 /312-104
JBA	NPC761 /109-110	JBA	NPC921-310
	NPC781 /109-116		NPC941 /312-116
DCP5 /109-130	CPU5 /109-056	DCP6 /312-130	CPU6 /312-056
	DSPI5 /109-062		DSPI6 /312-062

Table 2-10. DS3U Fuses

Fuse Designation	Associated CPs
L	P MXR
K	1 MXR
J	2 MXR
I	3 MXR
H	0 FMT
G	UC
F	1 FMT
E	S FLI
D	P FLI
C	4 MXR
B	5 MXR
A	6 MXR

Table 2-11. CCN Fuses - Original Interface Bay

CCN0		CCN1	
Fuse/ Location	Associated Circuit Pack/Location	Fuse/ Location	Associated Circuit Pack/Location
JA1 /215-072	0CCNI /246-150	JA1 /215-088	1CCNI /269-150
	0TSI11 /246-014		1TSI11 /269-014
	0TSI13 /246-020		1TSI13 /269-020
JA2	0CCB1 /246-032	JA2	1CCB1 /269-032
	0TSI15 /246-026		1TSI15 /269-026
	0TSI21 /246-038		1TSI21 /269-038
JA3	0TSI12 /254-014	JA3	1TSI12 /277-014
	0TSI14 /254-020		1TSI14 /277-020
	0TSI16 /254-026		1TSI16 /277-026
JA4	0CCB2 /254-032	JA4	1CCB2 /277-032
	0TSI22 /254-038		1TSI22 /277-038
JA5	0TSI23 /246-044	JA5	1TSI23 /269-044
	0TSI25 /246-050		1TSI25 /269-050
	0TSI31 /246-056		1TSI31 /269-056
JA6	0CCB3 /246-078	JA6	1CCB3 /269-078
	0TSI33 /246-066		1TSI33 /269-066
	0TSI35 /246-072		1TSI35 /269-072
JA7	0TSI24 /254-044	JA7	1TSI24 /277-044
	0TSI26 /254-050		1TSI26 /277-050
	0TSI32 /254-056		1TSI32 /277-056
JA8	0TSI34 /254-066	JA8	1TSI34 /277-066
	0TSI36 /254-072		1TSI36 /277-072
JB1 /215-076	0TSI41 /246-084	JB1 /215-092	1TSI41 /269-084
	0TSI43 /246-090		1TSI43 /269-090
	0TSI45 /246-096		1TSI45 /269-096
JB2	0TSI51 /246-102	JB2	1TSI51 /269-102
	0TSI53 /246-108		1TSI53 /269-108
JB3	0CCB4 /254-078	JB3	1CCB4 /277-078
	0TSI42 /254-084		1TSI42 /277-084
	0TSI44 /254-090		1TSI44 /277-090
JB4	0TSI46 /254-096	JB4	1TSI46 /277-096
	0TSI52 /254-102		1TSI52 /277-102
	0TSI54 /254-108		1TSI54 /277-108
JB5	0CCB5 /246-124	JB5	1CCB5 /269-124
	0TSI55 /246-118		1TSI55 /269-118
	0TSI61 /246-130		1TSI61 /269-130
JB6	0TSI63 /246-136	JB6	1TSI63 /269-136
	0TSI65 /246-142		1TSI65 /269-142
JB7	0CCB6 /254-124	JB7	1CCB6 /277-124
	0TSI56 /254-118		1TSI56 /277-118
	0TSI62 /254-130		1TSI62 /277-130
JB8	0TSI64 /254-136	JB8	1TSI64 /277-136
	0TSI66 /254-142		1TSI66 /277-142

Table 2-12. 77-Type, FTU Fuses - Original Interface Bay

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU, UBX	CPU, UBX	CPU, UBX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

2.2 Clear Power Unit Trouble

1. To see which power unit has failed, enter **RTRV-ALM-EQPT;**

   NOTE:
   The failed power unit is indicated by an "M" in the PWR line of the message. The left-to-right assignment on the PWR line is: positions 1 through 6 for units 1 through 6, 7 and 8 for syncs 0 and 1, 9 and 10 for ECCN sides 0 and 1, and 11 through 20 for units 7 through 16.

2. At the frame, locate the power unit with the lighted **ALM** LED. Figure 2-2 shows the relationship of the power units to the FTUs in an original interface bay and the power units in an IFTU of a flexible bay. The DSPU power units are mounted the same in both type bays.

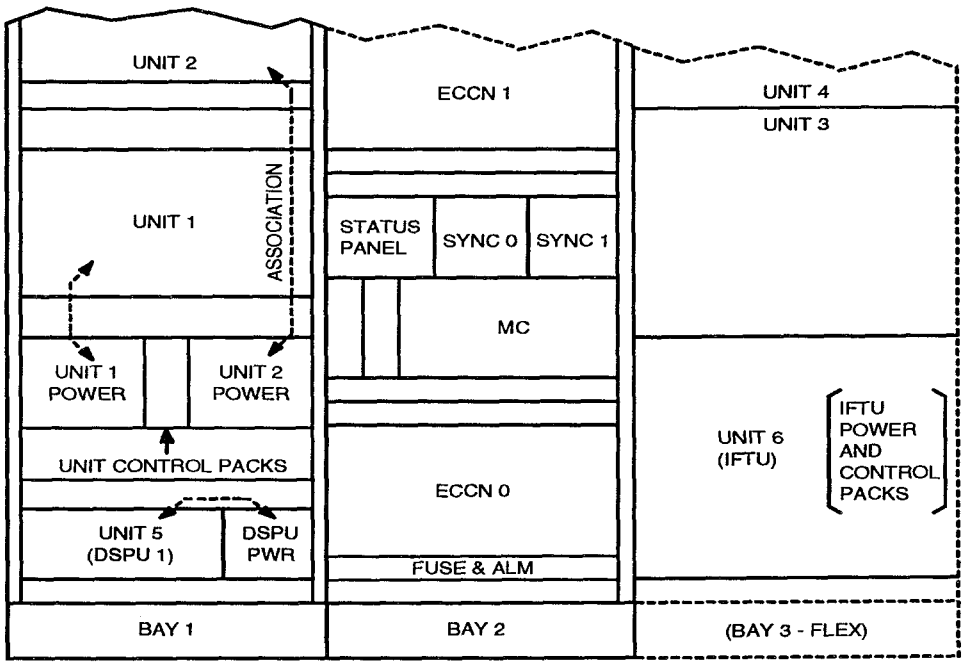

Figure 2-2. Retrofit Frame

3. If the **ALM** indicator is lighted on any power unit, then proceed to Step **6.**
   - If no **ALM** indicator is lighted, then continue with Step **4.**

4. See Note. With digital multimeter (such as KS-20599), check the outputs of the power units identified by the ALMS message. Measure between + and –V (and V2) jacks Table 2-13.

   NOTE:
   The FTU and DS3U power units feed a common bus, and low voltage can only be detected if one power unit is failed or disconnected.

Table 2-13. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
484GA	+11.60 to +12.60	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

5. If the requirement of Table 2-13 is met, re-install any power unit that was removed and proceed to Step **11.**
   - If the requirement of Table 2-13 is not met, continue with Step **6.**

6. Reseat the suspect power unit by moving the latch switch to open and then back to closed.

   NOTE:
   To find a failed FTU or DS3U power unit (when LED is not lighted), use the process of elimination. Remove one power unit for that FTU/DS3U and check for low voltage; reinstall that unit, remove a different one, and measure again. Repeat until you can determine which one causes the low voltage.

7. If the **ALM** indicator on the replacement goes off and remains off, proceed to Step **11.**
   - If the **ALM** indicator does not go off and remain off, continue with Step **8.**

8. See Notes 1 and 2; enter `RMV-EQPT::UNIT-[q]q::UC;` to avoid possible ESR COND 31 message. Replace the suspect power unit with one that has the same equipment code.

   ⇒ NOTE 1:
   To find a failed FTU or DS3U power unit (when LED is not lighted), use the process of elimination. Remove one power unit for that FTU/DS3U and check for low voltage; reinstall that unit, remove a different one, and measure again. Repeat until you can determine which one causes the low voltage.

   ⇒ NOTE 2:
   Insertion of a power unit into a unit can produce an ESR COND 31 message and result in the unit UC being taken out of service. The unit UC can be manually removed before inserting the power unit to avoid the trouble message.

9. If the **ALM** indicator goes off and remains off, continue with Step **10.**
   - If the **ALM** indicator does not go off and remain off, clear wiring trouble between power unit and unit fuses using the appropriate schematic listed below. After the trouble is cleared, the circuit packs affected by the power loss will still have to be restored to service per Figure 2-3.
     - — SD-96699-01 for CEF
     - — SD-96658-01 for non-CEF multibay frame
     - — SD-96684-01 for single-bay frame.

10. If the unit UC was removed from service, enter `RST-EQPT::UNIT-[q]q::UC;`.

11. To allow future alarms from subject power unit, enter `INIT-REG::PWR-pp;`.

    Where: pp = 00 for all power units, 01 through 06 for corresponding unit, 07 or 08 for sync 0 or 1, 09 for ECCN0, and 10 for ECCN1, and 11 through 20 for corresponding power unit.

12. Enter **RTRV-STATE-EQPT:::::OOS;** to see which packs have been autonomously removed from service.

    NOTE:
    The out-of-service status is indicated by the presence of a "1" in the out-of-service column for each pack. Unequipped NPCs are indicated by dashes.

13. Use the RST-EQPT commands in Figure 2-3 to restore affected packs to service; MC and sync packs will be reset/restored (and sync will go to fast start) when power is reapplied.

    - If ETSIs (expanded time slot interchange) cannot be restored after a DSPU failure, do the following and retry the ETSI restoral after each corrective action. First, remove and restore the subject unit UC.
    - If the ETSIs still cannot be restored, remove any DMBs for those units from service, reseat them in the slots, and restore them.
    - If the ETSIs do restore, this procedure is completed.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 2-3. Maintenance Command Construction

2.3 Recover From Loss of Input Power

Overview: The most direct approach to recovering from a total input power loss is to simply reset the frame after the 48 V power is restored. The MC and sync packs will be reset/restored (and the sync will go to fast start). Unit and ECCN packs that are out-of-service must be restored using manual input commands. One factor that changes the reset operation is that if the DACS II cannot boot from the disk, the disk drive must be disengaged to force the DACS II to boot from the tape. This would only apply if the disk was corrupted because it was being written to at the time of the power loss. In the remote case that the tape was also corrupted, the backup tape must be replaced with another backup tape. Unless the power failure occurred in two segments, corruption of the tape is unlikely because the disk and the tape would not be written to at the same time.

NOTE:
The data base in the circuit pack memories is lost after a power failure, but the data base can be restored from the nonvolatile hard disk or tape cartridge (if the disk is corrupted).

CAUTION:
To prevent damage to the power converters from a power surge, disconnect converters before restoring power.

1. After the power is restored, reinsert the power units. Wait 30 minutes (not necessary if power is off only momentarily) for the sync TB ovens to heat up and, on the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
2. Watch the output messages. The reset will go through CI and MP STARTUP to the point where the system will attempt to use the disk to boot the frame.
   - If any STARTUP STF message is received, go to *Controller and Link Troubles* to clear startup trouble.
   - If REPT EVT BOOT FROM DISK message was not received, continue with Step **3.**
   - If the reset sequence proceeds to the receipt of RESET COMPLD (with no error explanation) message, proceed to Step **12.**
   - If the reset sequence proceeds to the receipt of RESET COMPLD (with error explanation) message, go to *Data Base Troubles* to clear conditional reset.
3. The hard disk will be disconnected in the next step, but this can only be done with the disk not running. Unplug the SSC pack from the controller to power down the disk. Wait until the disk stops spinning before proceeding to the next step.

4. Unscrew the thumb screw on the front of the hard disk mounting assembly and pull the assembly out slightly to disconnect it, but be sure that it will not fall out. Reinstall the SSC pack.
5. Verify that the backup tape is installed in the tape drive.
6. Reset the frame again using the **RESET ENABLE** and **RESET** on the status panel. With the hard disk disconnected, DACS II will boot from the tape.
7. After receiving the RESET COMPLD message, push the disk drive assembly in to where the thumb screw can be used to draw the assembly into the slot; once in, tighten the thumb screw.
8. Enter `RST-EQPT::DISK::CLR;` to power up and initialize the disk. Answer YES when prompted to answer if you are sure you want to enter the command; the clear option clears the data from the disk.

   ⇒ NOTE:
   You must have RMON (restricted maintenance enabled) via ADD USER to enter this command. To verify you have received RMON, enter `RTRV-PRVG-{USER|TERM}::::{<user id>|<link No.>};`

   Where: <link No.>| = Identification of user(s) or link(s) to
   <user id> be queried as follows: particular link number given as physical link (1 through 6) and virtual circuit (for synchronous, 01 through 16) or particular user ID.

9. Enter `CPY-MEM:::SEC,PRI:PROG;` to copy the software onto the disk. The frame should already be in the MCOND because of the previous boot from tape.
10. Enter `CPY-MEM:::SEC,PRI;` to copy data base information onto the disk.
    - If the CPY ...DENY message is received for either of the previous inputs, go to *Data Base Troubles* to clear backup transfer denial.
11. Reset the frame again using the RESET ENABLE and RESET on the status panel.
12. If early codes of NPCs (Series 4 DDC or Series 2 DMBs) are installed, these codes will have to be disconnected from the frame and reinserted (reset by power up) in order for the packs to be restored to service.

13. Enter **RTRV-STATE-EQPT:::::ALL;** to obtain listing of out-of-service, failed, and pested plug-ins.

> **NOTE:**
> Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in the respective columns of the output message for each plug-in; unequipped NPCs are indicated by dashes.

14. To check only common equipment, enter the following command and read the output per Figure 2-4:

RTRV-STATE-COM:::::{OOS|FAIL|PEST|ALL};.

```
M RTRV STATE EQPT ... COMPLD
"<subject>:g,h,i,j,k,l,m,n,o,p"

g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-Connect Side 0
n = Cross-Connect Side 1
o = CCI 0 / CCNI 0
p = CCI 1 / CCNI 1
```

Figure 2-4. Common Equipment Readout

15. See Note. If any CPs are equipped but out-of-service, enter the RST (restore) command per Figure 2-5 for the pack.
    - If command denial occurs, find the reason for denial in the output message and perform corrective action to obtain command completion.

> **NOTE:**
> When a CP in a duplex/protected network (ECCN, DSPU, DS3U) fails, service is switched and all the CPs on the failed side/group are removed from service and pested. To correct the problem, the failure must be cleared so the side (or all CPs) can be restored. If both sides/groups are failed, trouble must be cleared on the out-of-service side/group first; removal of the other side will be denied.

16. If any CPs are failed, enter the DGN (diagnose) command per Figure 2-5 for the pack.
    - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed diagnostic.
    - If diagnostic passes, enter RST command.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 2-5. Maintenance Command Construction

17. To check for out-of-service, failed, and pested CPs, enter **`RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;`**.
18. If any CPs are still pested, enter the commands to first remove and then restore the CPs per Figure 2-5.
    - If command denial occurs, find the reason for denial in the output message and perform corrective action to obtain command completion.
    - If there are no pested CPs or command denials did not occur, this procedure is completed.

Facility Alarms

3

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Facility Alarms

3

This chapter contains the procedures to clear facility alarms for all the facility types that connect to the DACS II.

NOTE:
If you already have isolated the alarm to one of the facility alarms listed, you can proceed directly to the procedure for that alarm; otherwise, you should go to *Trouble Identification* to first isolate the trouble.

Familiarize yourself with the following equipment considerations.

- The IFTU (and older FTU) equipment and the DS3U equipment terminate external facilities; the DSPU equipment does not. Any type unit can be placed in any of the three unit positions in a flexible interface bay.
- There is an NPC (network processing circuit) associated with each DS1 facility, whether the DS1 is terminated directly or is embedded in a DS3 signal. The NPC commands, including the STATE query, are operative for any type NPC. For direct DS1 and terminations, the circuitry for two NPCs is mounted on a single plug-in unit. For embedded NPCs, the circuitry for 28 DS1s is mounted on the DS3 MXR plug-in.
- Replacing the NPC plug-in equipment is not the first line of action in clearing a facility trouble. Not only are multiple line signals affected (two for direct DS1s and 28 for DS3) when the plug-in is replaced, but it can take over 30 seconds for the line signal to be restored.

CAUTION:
When the command to remove an NPC is executed, the service on all channels is interrupted. The restore command operation runs diagnostic tests and establishes end-to-end transmission. Accordingly, it can take over 30 seconds for the line transmission to be restored plus any alarm refinement time.

- Whenever maintenance is required on a facility, arrangements must be made to notify special service customers and to patch service to another facility (maintenance spare).

  For the *SLC®* carrier system, facility protection switching is provided to automatically cross-connect the failed channels to channels in the protection line.

- For the DS3U, the protection switching does not protect against facility failures, it protects against DS3 plug-in failures. In the rare case where a DS3U plug-in must be replaced to clear a facility failure, service will be switched to the protection MMFG when the suspect MMFG is removed from service.

  CAUTION:
  If the protection MMFG is already serving a previous failure, that failure will have to be cleared to make the protection switch available. If the plug-in is replaced while protection switching is not available, service on all 28 DS1 signals will be interrupted, and the replacement MMFG cannot be restored to service because service removal would have been denied when protection is not available.

3.1 Clear REPT ALM T3 (Unit DS3) Message

NOTE:
Receipt of this message indicates a DS3 signal failure. Since the DACS II equipment is not at fault, the protection switching is not operated. The DACS II sends an AIS signal downstream (except for high BER) on all the component NPC channels.

1. If alarm cutoff is needed, enter **OPR-ACO-ALL;**.
2. Notice which alarm state is reported as follows:
   - — LOS (loss of signal)
   - — BER (bit error rate)
   - — OOF (out-of-frame)
   - — AIS (alarm indication signal).
3. If the AIS state is reported, take no action; this is an information message and the alarm will clear when the trouble is cleared in the upstream equipment. The AIS is sent from upstream equipment to indicate trouble and to prevent registering a local alarm so that the trouble can be isolated to the section with the incoming failure alarm.
   - ■ If the AIS is not reported, proceed to Step **4**.
4. To see if other DS3 lines have failed, possibly because of a cable cut or maintenance activity, enter **RTRV-ALM-T3:[xy]::[ww];** and read the output message using Figure 3-1.

"UNIT-[q]q:xx|oba,<MMFG2>,<MMFG3>,<MMFG4>,<MMFG5>,<MMFG6>"

ttt	=	Total number of DS3 facilities in the output segment reporting reporting critical facility alarms.
e	=	Number of lines in the output message.
xx	=	DS3 status: CR (critical alarm), ER (error & pested), CL (clear), UX (unit OOS, no data), or dashes for unequipped.
l	=	Loss of Signal: 1 (Present), 0 (Absent), or - (no data).
o	=	Out of Frame: 1, 0, or - (no data).
b	=	Bit Error Rate (High): 1, 0, or - (no data).
a	=	Alarm Indication Signal: 1, 0, or - (no data).

Figure 3-1. DS3 Alarm Readout

5. To see LOC (loss of clock) indications at FLI pack, enter **RTRV-REG-EQPT::UNIT-[q]q::FLI-{S|P}:ESR;** and read output message using Figure 3-2. Each byte consists of 2 hexadecimal digits which when converted to binary gives 8 bits (the bit positions are designated 76543210 from left-to-right). When a bit equals a 1, the LOC exists for that DS3 input.

"ESR:<byte 1> <byte 2> <byte 3> <byte 4>"

<byte 3>	=	Loss of Clock on inputs as follows:
Bit 0	=	LOC for DS3 No. 1
Bit 1	=	LOC for DS3 No. 2
Bit 2	=	LOC for DS3 No. 3
Bit 3	=	LOC for DS3 No. 4
Bit 4	=	LOC for DS3 No. 5
Bit 5	=	LOC for DS3 No. 6
Bit 6,7	=	Not Used

Figure 3-2. Error Source Register for FLI

6. At this point, you know the trouble is incoming signal loss. So, you can check the line signal using an external test set at the DSX-3 bay or you can assist the far end as required to loop back or isolate the line trouble.
   - To check if FLI is causing loss of signal, continue with Step 7.
7. Enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** for the unit with the alarm to see the FLI maintenance state (IS, OOS, or ISF for in-service and failed) and switch state (SLT -selected, USLT - unselected).

8. Make sure both FLI packs are installed in the unit, then enter appropriate command to switch to the other (unselected) FLI.
   `SW-TOPROTN-EQPT:[xy]:UNIT-[q]q:[ww]:FLI;`
   `SW-TOWRG-EQPT:[xy]:UNIT-[q]q:[ww]:FLI;`
   - If switch is denied because the other side is out-of-service, clear the trouble on that FLI per Section 4.9 to enable switching.

     NOTE:
     DS3 plug-ins must only be disconnected and replaced if the plug-ins can be removed from service; otherwise, the restore command will be denied after the replacement because the plug-in was never removed. If the mate plug-in is failed, it will have to be replaced to enable switching.

9. Enter `RMV-EQPT::UNIT-[q]q::FLI-{S|P};` to remove the FLI (now unselected) and replace it.
   - If RMV ...DENY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion.

10. Enter `RST-EQPT::UNIT-[q]q::FLI-{S|P};` to restore the replacement FLI.
    - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion.

3.2 Clear CGA on DS1 Embedded in DS3 Signal

NOTE:
Each DS3 signal is composed of 28 DS1 signals. This procedure deals with CGA alarms on the embedded DS1 and includes information to determine whether there is a DS3 trouble affecting all the DS1s or if isolated DS1 signals have alarms.

1. If alarm cutoff is needed, enter `OPR-ACO-ALL;`.
2. Notice the NPC number given in the CGA message and notice which alarm state is indicated. See Table 3-1 for meanings of states.

NOTE 1:
For any of the outgoing DS1 signal failures, DACS II error recovery would do looped tests to check the MXR circuitry and would do protection switching if a trouble is present.

NOTE 2:
A red alarm supersedes an AIS; if the DACS II has a red alarm and an AIS is subsequently received in the incoming bit stream (as part of testing), the red alarm will remain instead of changing to AIS. When good transmission is restored (no alarm signal), the red alarm will clear.

Table 3-1. Alarm Designations

Designation	Meaning
R	Red alarm (incoming failure)
Y	Yellow alarm (outgoing failure)
B	Both red and yellow (D-bank looped)
L	Local multiframe (LMA)
M	Remote multiframe (RMA)
F	Frame format error (FFER)
V	Line format violation rate (LFVR)
A	Alarm indication signal

3. Check printout for REPT ALMDET ...ANALYSIS REPORT or ERR ESR message showing hardware failure in ECCN or DS3U. A duplex side failure or an unprotected DS3U failure would cause DS3 and DS1 signal failures.
   - If there is a failure message for ECCN or DS3U plug-ins, go to *Hardware Failures* to clear ANALYSIS REPORT or ERR ESR message.

4. If you do not already know if the DS3 signal (or multiple DS1s) failed, you can determine the extent of the trouble using the following queries:
   — To see all alarms on the frame, enter **RTRV-ALM-EQPT;**.
   — To see DS3 line alarms, enter **RTRV-ALM-T3;**.
   — To see the maintenance and protection status of one MMFG/DS3 in a unit, enter **RTRV-PSTATE-T3::UNIT-[q]q::DS3-c;**.

NOTE:
For the DS3 line alarms, there is a field (xxloba) for each MMFG which gives the status (xx = CL, CR, ER, UX, or dash), the LOS (loss of signal - 0,1), BER (bit error rate - 0,1), or AIS (alarm indication signal - 1,0). The meanings of the status words are: CL (clear), CR (critical), ER (error condition, out-of-service or failed in-service), or UX (unit out-of-service, no data output).

NOTE:
For protection status, the keywords are made up of the following parts: INH (inhibited), ALW (allowed), MP (manual switch), AP (auto switch), and S (switch).

5. Which failure condition exists? See Note.
   - If **DS3 LINE FAILED,** then go to Section 3.1 to clear DS3 alarm message.
   - If **ONLY DS1 LINE(S) FAILED,** then continue with Step **6**.

NOTE:
With a failed incoming DS3 signal, an AIS (alarm indication signal) is sent out on all the component NPC channels.

6. Enter **RTRV-PRMTR-T3:[<xy>]::[ww]:LBO;** to check the DS3 line build out setting.

7. Compare the settings with settings for other units going to the DSX-3, DACS IV, office records, and the following.

LBO SETTING	TO DSX-3		TO NETWORK ELEMENT	
	KS-19224, L2 CABLE	734A CABLE	KS-19224, L2 CABLE	734A CABLE
ON	0 to 75 feet	0 to 225 feet	0 to 150 feet	0 to 450 feet
OFF	75 to 150 feet	225 to 450 feet	150 to 300 feet	450 to 900 feet

   - If the LBO is incorrect, continue with Step **8**.
   - If the LBO is correct, the trouble must be at the far-end M13 (or other) muldem.

   ⇒ **NOTE:**
   If clear-channel DS1s are involved, a test access connection can be established to the facility to allow testing with external test equipment. Test access procedures are covered in Volume I.

8. If the MXR for the DS3 is not already out-of-service (RMV ...COMPLD in the trouble printout), enter **`RMV-EQPT::UNIT-[q]q::MMFG-c[INCL];`** for the unit and multiplexer to be changed.

   Where:
   [q]q = Unit number (1 through 16).
   c = MMFG number for subject DS3 (1 through 6).
   INCL = Optional, to remove all equipped component NPCs from service.

9. Enter **`ED-PRMTR-T3::UNIT-[q]q::DS3-c:LBO-{ON|OFF};`**

10. Enter **`RST-EQPT::UNIT-[q]q::MMFG-c:[INCL];`**

    Where: INCL = Optional, to cause all equipped NPCs on the subject multiplexer to be restored to service.

3.3 Clear DS1 Facility CGA (Except *SLC*® Carrier System)

Overview: This procedure deals with alarms caused by facility failures and NPC hardware failures. Alarms can also be caused by maintenance activity or by incompatible NPC growth specifications. If an obscure alarm occurs on a new facility or one in which the IW (insertion word) was recently changed, the line formats and IW specifications for the NPCs may not be end-to-end compatible.

1. If alarm cutoff is not already operated, enter **`OPR-ACO-ALL;`**.
2. Enter **`RTRV-ALM-EQPT::NPC::CGA;`** to list current CGAs and check far-end conditions to determine if the troubles are associated.
   - If DS1 line connects to 19.2-kb/s MJU shelf, see Table 3-2 for summary of how MJU alarms are reported to DACS II. Refer to the *DACS II DS1 Multipoint Junction Unit (MJU) Shelf - Description, Operation, and Maintenance* manual (AT&T 365-352-007) for information on how to clear these alarms.
   - If multiple NPCs are alarmed and the NPCs are in the same FTU, check printout for equipment failures. See *Trouble Identification*..
   - If multiple NPCs are alarmed and the alarms are not related (on same cable or due to maintenance activity), select one CGA to proceed with and, after isolating that trouble, repeat for the next one.

NOTE:
A critical alarm indication on the status panel and a "C" at the beginning of the alarm message means six or more in-service digroups have failed.

Table 3-2. 19.2-kb/s Alarms Registered at DACS II

MJU Alarm	DACS II Alarm	Meaning
HDW	CGA R	MJU hardware failure. Flashing light means can't initialize circuits on CP. Steady light means power or microprocessor failure.
LOS	CGA AIS	Incoming line signal loss detected at MJU.
LOF	CGA Y	Incoming loss of DS1 framing detected at MJU.
RFA	CGA R	Remote frame alarm (DACS II detected incoming signal loss and sent RFA to MJU).

3. Find the alarm designation in the message (located after the NPC number) and check Table 3-3 for the meaning of the alarm (see Notes 1 and 2).

NOTE 1:
Trunk conditioning (AIS for clear-DS1; AIS for 24-channel range connections if specified in the cross-connections) is sent downstream from the equipment that registers a red (incoming) alarm. By sending the trunk conditioning downstream, other equipment is alarmed as required to make circuits unavailable, but only one terminal has a red alarm to show the failed section of the route.

NOTE 2:
A red alarm supersedes an AIS; if the DACS II has a red alarm and an AIS is subsequently received in the incoming bit stream (as part of testing), the red alarm will remain instead of changing to AIS. When good transmission is restored (no alarm signal), the red alarm will clear.

Table 3-3. Alarm Designations

Indicator	Meaning
A	Alarm Indication Signal
B	Both red and yellow (not registered with TG80/TG80B NPC)
F	Frame format error rate (TG180 NPC)
L	Local multiframe alarm (DMI equipment)
M	Remote multiframe alarm (DMI equipment)
R	Red; incoming line failure
V	Line format violation (TG180 NPC)
X	Multiple alarms (TG180 NPC)
Y	Yellow; outgoing line failure

4. Which alarm did you start with when you came to this procedure? See Note.

   - If **Y, B,** or **M (Remote Alarm),** continue with Step **5.**
   - If **R** or **L (Local Alarm),** proceed to Step **6.**
   - If **A,** no action is necessary. This signal (blue signal) originates upstream at an alarmed terminal and is forwarded along the route to prevent multiple red alarms. The trouble can be isolated to a single span with only one red alarm in the route. The far-end NPC can also be grown to send an all 1s signal when it is removed from service.

NOTE:
With the CGA present, the NPC sends trunk conditioning toward the connected facility to make far-end equipment unavailable for service. Consequently, even though the NPC could be quickly checked by looping at DSX-1 bay to see if the alarm clears or changes, the following tests should be used unless service has been patched off at the ends of the facility.

5. At DSX-1 bay, use DS1 signal test to check for pulses with no errors at the MON jack for the transmit of the DACS II. Be sure the test set controls are set for the correct line format (D4, ESF, T1DM, etc.).

   - If pulses without errors were detected, the trouble is either in the line going to the far end or in the alarm detection equipment at the far end. Have the far end perform looped D-bank test or check for pulses with an external test set. If the line is at fault, have facility maintenance crew isolate trouble.
   - If no pulses or if errors were detected, proceed to Step **7.**

NOTE:
The trouble is isolated by testing the signal at intermediate offices with a test set to determine where the trouble first appears along the line. AT&T 365-800-003 details the isolation procedure for T1 lines.

6. At DSX-1 bay, use test set such as J98725A to test for pulses without errors at the MON jack for the receive line (to DACS II).
   - If pulses without errors were detected, continue with Step **7.**
   - If no pulses or pulses with errors were detected, the trouble is on incoming facility or at far-end equipment. Have the far end perform looped D-bank test or check for pulses with external test set. If the line is at fault, have maintenance crew isolate trouble.

   NOTE:
   The trouble is isolated by testing the signal at intermediate offices with a test set to determine where the trouble first appears along the line. AT&T 365-800-003 details the isolation procedure for T1 lines.

7. Verify that NPC for alarmed facility is out-of-service (RMV NPC ...COMPL in printout) to allow more complete diagnostic testing; if necessary, enter **RMV-EQPT::NPC-<npc No.>::[:INCL];**.

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   INCL = Optional, to enable the removal of which is designated as carrying special service circuits.

8. Enter **DGN-EQPT::NPC-<npc No.>;**.

   NOTE:
   The diagnostic tests the NPC transmission paths except for the line transformers. So, if the cabling is not at fault, the NPC could still be causing the trouble.

9. If DGN ...STF message is received, replace the plug-in for the NPC as follows and restore the NPC(s) to service.
   - Arrange a time when both NPCs on the DDC plug-in can be removed from service, and enter **RMV-EQPT::NPC-<npc No.>::[:INCL];** for each NPC; then replace the plug-in (for example, DDC).
   - Enter **RST-EQPT::NPC-<npc No.>;** for EACH of the removed NPCs.

10. If the DGN ...STF message is not received, then the trouble is in cabling to DSX-1 bay. Repair or replace cabling using local procedures; after trouble is cleared, enter **RST-EQPT::NPC-<npc No>;** for EACH of the removed NPCs.

3.4 Clear 2.048-Mb/s Facility AR01 MISC ALM Message

Overview: This procedure isolates the cause of an incoming or outgoing signal problem to either the facility or the DACS II equipment and provides the interpretation of received alarm signals. The alarm message also indicates the alarm status: PMA for prompt maintenance, DMA for deferred maintenance, or MI for information. When a receive failure occurs, the DACS II sends a remote alarm signal over the facility to produce a remote alarm indication (RAI, REER, or R16) at the other end. Failure of a facility that serves as a timing link for the DACS II sync brings sync error messages.

1. If alarm cutoff is needed, enter **`OPR-ACO-ALL;`**.
2. To list all current primary block alarms, enter **`RTRV-ALM-EQPT::NPC::CFA;`**, and if associated facilities are alarmed, check records and far-end conditions to determine if trouble is due to cable problem or maintenance activity.
   - If the alarms on other facilities are not related, continue with procedure to clear trouble on one facility and repeat for others.

   NOTE:
   A critical alarm indication on the status panel or a "C*" at the beginning of the alarm message means six or more channel groups have failed.

3. When more than one alarm indication is received on the same facility, refer to Table 3-4 to determine the priority of the alarm types.

Table 3-4. Alarm Priorities

Priority	Alarm Type	Class	Prefix
1	A (for AIS)	MI,DMA or PMA	I, *, **, or *C
2	R (for PBF)	PMA	** or *C
3	Y (for RAI)	MI	I
4	B (for MBER)	DMA	*
	E (for RBER)	MI	I
5	V (for A16)[1]	MI	I
6	L (for LMA)[1]	PMA	** or *C
	X (EER or LOS)	PMA	**
7	M (for R16)[1]	MI	I
	I (for RAIS)	MI	I
	S (for Sync Fail)	MI	I

[1] These only occur with CAS line format.

4. Which alarm type appears in the MISC ALM message?
   - If **Y** or **E (Remote Alarm),** continue with Step **5.**
   - If **B, R, L,** or **X (Local Alarm),** proceed with Step **8.**
   - If other **(A, V, M, I, S),** proceed to Step **12.**
5. At jack on DPC pack or at line interface jacks (if provided), use office test set to check signal at the MON jack for the transmit line (from DACS II).
   - If good clock signal with no alarms was detected, continue with Step **6.**
   - If good clock signal with no alarms was not detected, proceed to Step **15** and replace the plug-in for the NPCs.

NOTE:
The jack on the DPC provides bridging access to the transmit paths at a level approximately 30 dB below the transmit level. The bottom jack is for the odd numbered NPC and the top jack is for the even numbered NPC.

NOTE:
The Y alarm type (TS0 bit 3) indicates loss of signal, excessive errors, or loss of frame alignment at the far end, and the E alarm type (TS0 bit 4) indicates excessive error rate at the far end.

6. If the trouble is in the line going to the far end or in the alarm detection equipment at the far end, have far-end personnel check for pulses without errors with an external test set. If the line is at fault, have facility maintenance crew isolate trouble by testing for signal at intermediate offices. If the office equipment is at fault, replace receive pack.
7. If 2.048-Mb/s signal loopback (toward the line side) is requested at DACS II to allow testing from the far end, place loopback at line interface bay.

For Local Alarm Indicator, Continue Here

8. The type L (LMA) indication means that there is a loss of multiframe alignment for the CAS signaling sent on time slot 16 for all service channels. Enter `RTRV-STATE-EQPT::NPC-<npc No.>;` for alarmed facility and verify that the NPC is provisioned for CAS.

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

   NOTE:
   The first digit of the NPC growth specification will be an odd number when the CAS option is selected.

9. If line interface jacks are provided, use the office test set to test signal at the MON jack for the receive line (to DACS II). The incoming line failure may be due to signal loss, loss of framing, or bit error rate greater than 10^{-3}.
   - If good clock with no alarms is detected, then proceed to Step **15** and replace the plug-in for the NPC.
   - If good clock was not detected, then continue with Step **10.**
10. If the trouble is on the incoming facility or at far-end equipment, have far-end personnel check the signal with external test set. If the line is at fault, have maintenance crew isolate trouble by testing for signal at intermediate offices.

    NOTE:
    The type L alarm is not likely to be caused by the line; the far-end transmission equipment is suspect.

11. If 2.048-Mb/s line signal loopback (toward line side) is requested to allow testing from the far end, place loopback at line interface bay.

For Alarm Type A, V, M, I, S, Continue Here

12. Which alarm type appears in the MISC ALM message?
    - If **M,** proceed to Step **13.**
    - If **S,** notify the connecting DACS II tester to use ERS SYNC to isolate the trouble. The type S (sync failure indication) means that the far-end DACS II frame timing has gone into the holdover mode. During holdover, the internal clock is supplying the signal without receiving timing from external timing links.
    - If **A, V, or I,** an alarm indication signal is being received from the far-end equipment, either on all channels (type A-AIS), on TS16 (type V-A16), or on TS0 bit 4 (type RAIS - remote AIS). This alarm is sent to indicate trouble upstream without registering a PBF; consequently, the trouble is isolated to the section with the PBF and RAI alarms. The alarm will clear when the trouble is cleared in the upstream equipment.
13. The type M (R16) indication appears when signaled from the far-end equipment over time slot 16. This indicates that the far end has lost multiframe alignment for CAS signaling in time slot 16 and consequently has an LMA alarm.
14. Enter `RTRV-STATE-EQPT::NPC-<npc No.>;` for alarmed facility to verify that the NPC is provisioned for CAS format (see Notes 1 and 2).

NOTE 1:
The first digit of the NPC growth specification will be an odd number when the CAS option is selected.

NOTE 2:
If the far end clears the trouble, the type M (R16) alarm will clear; otherwise, you may have to assist in troubleshooting.

To Replace Plug-In for NPC, Continue Here

15. Verify that NPC for alarmed facility is out-of-service (RMV NPC ...COMPL in printout) to allow more complete diagnostic testing; if necessary, enter `RMV-EQPT:[xy]:NPC-<npc No.>:[ww]:[:INCL];`

    Where: INCL = Optional, needed to remove NPC with special circuits.

16. Enter `DGN-EQPT::NPC-<npc No.>;`.
    - If DGN ...STF message is received, continue with Step **17.**
    - If DGN ...STF message is not received, the trouble is in cabling to the line interface jacks. Repair or replace the cabling; after trouble is cleared, enter `RST-EQPT::NPC-<npc No.>;` for each of the removed NPCs.

    NOTE:
    The diagnostic tests the NPC transmission paths except for the line transformers. So, if cabling is not at fault, the NPC could still be causing the trouble.

17. Arrange a time when both NPCs on the dual DPC card can be removed from service; enter `RMV-EQPT::NPC-<npc No.>:[ww]:[:INCL];` for other NPC, and replace the dual pack.
18. Enter `RST-EQPT::NPC-<npc No.>;` for each of the removed NPCs.

3.5 Clear DS1 Facility Error Messages (Except *SLC* Carrier System)

Overview: This procedure is used to clear alarms that are registered when any facility errors reach alarm threshold levels. The DS1 parameters that the DACS II monitors are: BER (bit error rate), BPV (bipolar violations), ERS (errored seconds), ER (error rate), SERS (severe-ERS), SLIP (slips), OOF (out-of-frame), FRER (framing error), CRC (cyclic redundancy), and COFA (change of frame alignment). The troubleshooting strategy is to first verify that correct NPC alarm options are selected, have the far end check for errors in the transmit direction, and then use signal loopback to check the digital line.

CAUTION:
The line looping in this procedure interrupts service on all channels of the line, so service will have to be removed or patched to another facility. For minor alarms (not service affecting), you may want to postpone testing until nonbusy hours.

NOTE:
The type of error (SLIP or ERS) and whether on a new facility often indicates the source of the trouble. Timing SLIPS are usually caused by not having the far end optioned for loop timing or by a loop timing pack not functioning. This is more likely to occur on a new facility as incorrect NPC provisioning. The other parameters indicate facility problems.

1. If alarm cutoff is not already operated, enter **`OPR-ACO-ALL;`**.
2. Enter **`RTRV-STATE-EQPT::NPC-<npc No.>;`** for NPC on alarmed facility.

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).

3. Read the selected alarm threshold for the facility parameter from the output message and compare to office records or other (same type) NPCs.
   - If the alarm threshold for the parameter is incorrect, enter following command with the required parameter identifiers:
     `ED-PRMTR-EQPT::{NPC-<npc No.>|TYPE-mnxyz}`
     `::rr/l&ss/m...&tt/n;`

     Where:
     NPC or TYPE field = Selects number of NPCs to be changed: one NPC given as extended (for example, [0]001),

hierarchical (for example, 01-1-01), or all NPCs with the same type specification (mnxyz).

rr,ss,tt = Listing of any of the associated alarm types (01 through 10 and 31 through 40) per Table 3-5. Types 31 through 40 are for 2.048-Mb/s only.

l,m,n = Predefined number (0 through 3) per Table 3-6 which selects alarm threshold. Monitoring of a parameter can be disabled by entering "c" for the alarm threshold.

Table 3-5. Alarm Parameters

Type (rr,ss,tt)	Meaning
01	Type DE/TE/DS SLIPs, Major Alarm
02	Type DE/TE/DS SLIPs, Minor Alarm
03	Type DE/TE/DS BER, Major Alarm
04	Type DE/TE/DS BER, Minor Alarm
05	Type DE/TE/DS ERS
06	Type DE/TE/DS SERS
07	Type DE/TE/DS COFA, Major Alarm
08	Type DE/TE/DS COFA, Minor Alarm
31	Type PB/PC DM, 1 Hr.
32	Type PB/PC DM, 24 Hr.
33	Type PB/PC SERS, 15 Min.
34	Type PB/PC SERS, 24 Hr.
35	Type PB/PC ERS, 15 Min.
36	Type PB/PC ERS, 24 Hr.
37	Type PB/PC US, 15 Min.
38	Type PB/PC US, 24 Hr.
39	Type PB/PC SLIPS, 15 Min.
40	Type PB/PC SLIPS, 24 Hr.

Table 3-6. Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

4. Enter `INIT-REG::NPC-<npc No.>[&&[&]-<range>]::<parameter>;`, and after recording period, enter `RTRV-PRMTR-EQPT::NPC-<npc No.>[&&[&]-<range>]::<parameter>;`.

   Where:
   <parameter> = For DS1 facility: BER, BPV, COFA, CRC, ER, ERS, FRER, OOF, SERS, or SLIP.
   <range> = Optional, last NPC of continuous range. Three ampersands (&s) are needed for hierarchical.

5. If an alarm is received on facility or error count is still near alarm threshold, continue with Step **6.**
   - If there is no alarm or high error counts, there is no trouble at this time; either return facility to service and watch for further trouble or test the facility for a longer period.

6. At far end, have tester connect external test set to MON jack at DSX-1 for transmit direction and check for errors.
   - If errors were registered (and far end has DACS II), have far-end tester refer to Step **13**.
   - If errors were registered (and far end does not have DACS II), then refer trouble to tester at far-end terminal equipment.
   - If errors were not registered at far end, continue with Step **7**.

   ⚠ CAUTION:
   Signal looping in the following portion will interrupt service on all channels of the line; service must be patched to another facility or customers notified of loss of service.

7. In the following portion, a signal loopback will be established at DSX-1 at one end so that the other end can check the entire line (both directions) for errors.
8. Either patch service to another facility or arrange for facility to be taken out-of-service.
9. Have the far-end tester place a loop on the line side at DSX-1 to loop the signal toward you.

10. At end receiving looped signal, check errors again either with test set or with DACS II; enter **INIT-REG::NPC-<npc No.>::<parameter>;**, and, after recording period, enter **RTRV-PRMTR-EQPT::NPC-<npc No.>::<parameter>;**.
    - If alarm is received or high error count is still received, continue with Step **11.**
    - If alarm or high error count is not received, there is an intermittent line trouble or the far-end terminal was causing errors. Either return the facility to service and watch for further trouble or test the facility (or far terminal) for a longer period.

11. At end receiving looped signal, place looping cord on equipment side jacks on DSX-1 bay to test local cabling and receive equipment. Have far-end personnel remove any line-side signal loop.

12. Either check errors again with test set or enter **INIT-REG::NPC-<npc No.>::<parameter>;**, and, after recording period, enter **RTRV-PRMTR-EQPT::NPC-<npc No.>::<parameter>;**.
    - If alarm is received or high error count is still received, continue with Step **13.**
    - If alarm or high error count is not received, there is trouble on facility. Remove signal loopback and isolate defective span line by placing signal loops (or testing) at intermediate offices. After trouble is cleared, remove all line-interface bay signal loops.

13. Enter **RMV-EQPT::NPC-<npc No.>::[:INCL];** to remove the involved NPC from service in order to run complete diagnostics.

    Where: INCL = Optional, needed to remove NPC with special circuits.

    ⇒ NOTE:
    The NPC itself is not a likely source of errors. The out-of-service diagnostic checks some transmit and receive error-detecting and clearing circuits. The NPC line transformers are not included in internal loop during the diagnostics.

14. Enter **DGN-EQPT::NPC-<npc No.>;**.

15. If DGN ...STF message is received, continue with Step **16.**
    - If DGN ...STF message is not received, there is trouble in cabling to line-interface bay; repair or replace cabling.

16. Arrange a time when both NPCs can be removed from service. Enter **RMV-EQPT::NPC-<npc No.>::[:INCL];** for that NPC and replace the plug-in.

17 Enter **RST-EQPT::NPC-<npc No.>;** for each NPC. Remove all line interface bay signal loops.

NOTE:
The parameter counts are cleared during restore operation.

3.6 Clear DS1 Facility Error Messages - *SLC* Carrier System

Overview: This procedure is used to clear major or minor alarms that are registered when facility parameters reach threshold levels. The facility parameters that the DACS II monitors are: BPV (bipolar violations), BER (bit error rate, ERS (errored seconds), ER (error rate), SERS (severe-ERS), SLIP (slips), OOF (out-of-frame), FRER (framing error), CRC (cyclic redundancy code), COFA (change of frame alignment), SANE (shelf alarm-near end), and SAFE (shelf alarm-far end). *When OOF or BER/BPV reach major thresholds, an SC ALM message occurs and protection switching operates (if provided) for the digroup.*

NOTE:
If protection switching is not provided, service on the subject digroup must be patched to the maintenance spare line in order to do the looped line test in this procedure; unless you have a major alarm, postpone testing until nonbusy hours when service can be patched to a maintenance line.

NOTE:
The type of error (SLIP vs. ERS) and whether or not it occurs on a new facility often indicates the source of trouble. Timing SLIPs are usually caused by not having the far end optioned for loop timing or by a malfunctioning loop timing pack. These conditions are more likely on a new facility as is incorrect NPC provisioning.

1. If error message reports shelf alarms - SAFE (far end) or SANE (near end), you only need to check for associated SC ALM messages in this procedure since the shelf alarms are only information messages. The shelf alarms can occur just before the protection switch operates or can accompany other alarms.
2. If alarm cutoff is needed, enter **`OPR-ACO-ALL;`**.
3. If there is an SC ALM message present for the same digroup, refer to the appropriate procedure in this chapter as follows:

   For SC ALM ...MN, then go to Section 3.8.
   For SC ALM ...MJ, then go to Section 3.7.

4. Obtain facility performance information and options for one of the alarmed NPCs by entering
   RTRV-STATE-EQPT::NPC-<npc No.>[&&[&]-<range>];

   Where:
   <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01-1-01).
   <range> = Last NPC in a range.

5. Read the reported occurrences and the threshold values for alarms from the listing in the message for the failed parameter to see which threshold options are available; enter **RTRV-OPT-T1::NPCS;**.

6. If alarms are due to incorrect (too low) alarm threshold, enter following command with the required parameter identifiers: **ED-PRMTR-EQPT::{NPC-<npc No.>|TYPE-mnxyz}::rr/l&ss/m...&tt/n;**

   Where:
   NPC or TYPE Field = Selects number of NPCs to be changed: one field NPC given as extended (for example, [0]001), hierarchical (for example, 01-1-01), or all NPCs with the same type specification (mnxyz).

   rr,ss,tt = Listing of any of the associated alarm types (01 through 10 and 31 through 40) per Table 3-7. Types 31 through 40 are for 2.048-Mb/s interface only.

   l,m,n = Predefined number (0 through 3) per Table 3-8 which selects alarm threshold. Monitoring of a parameter can be disabled by entering "c" for the alarm threshold.

   - After changing the threshold, clear the count (**INIT-REG::NPC-<npc No.>[&&[&]-<range>]::<parameter>;**) If trouble persists, continue with Step 7.

Table 3-7. Alarm Parameters

Type (rr,ss,tt)	Meaning
01	Type DE/TE/DS SLIPs, Major Alarm
02	Type DE/TE/DS SLIPs, Minor Alarm
03	Type DE/TE/DS BER, Major Alarm
04	Type DE/TE/DS BER, Minor Alarm
05	Type DE/TE/DS ERS
06	Type DE/TE/DS SERS
07	Type DE/TE/DS COFA, Major Alarm
08	Type DE/TE/DS COFA, Minor Alarm
09	Type DS SANE
10	Type DS SAFE

Table 3-8. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

7. If protection switching is provided for subject digroup, enter the following commands to operate the protection switch for the digroup and operate far-end loopback:
   `SW-PROTN-T1::{NPC-<npc No.>|DGx};`
   `OPR-LPBK-T1::DGx::LLB:{RT|DL}-ffff;`

   Where:
   ffff = RT or DCLU identification.
   DGx = Digroup designation (DGA, DGB, DGC, DGD).

   - If protection switching is not provided, continue with Step **8.**

8. During nonbusy hours, patch service from subject facility to maintenance spare line.
9. If the protection switch and far-end loopback were not operated, have far end place loop on line-side at DSX-1 bay.
10. Either use external test set to check looped line for errors or enter `INIT-REG::NPC-<npc No.>[&&[&]-<range>]::<parameter>;` and, after about 1 hour, enter `RTRV-PRMTR-EQPT::NPC-<npc No.>[&&[&]-<range>]::<parameter>;`.
11. If alarm is received on facility or if count for parameter is near alarm threshold, then continue with Step **12.**

    - If there are no alarms or high counts, there is no trouble at this time. Either return the facility to service and watch for further trouble or test the facility for a longer time.

12. At DSX-1 bay, connect patch cord between DACS-side OUT and IN jacks to loop the signal back. Have far end remove any line-side signal loop.
13. Either check errors again with test set or enter `INIT-REG::NPC-<npc No.>[&&[&]-<range>]::<parameter>;` and, after about 1 hour, enter `RTRV-PRMTR-EQPT::NPC-<npc No.>[&&[&]-<range>]::<parameter>;`.
14. If alarm is received or count for parameter is near alarm threshold, continue with Step **15.**

    - If there is no alarm or high count, the trouble is on facility. After trouble is cleared, remove all DSX-1 bay signal loops.

15. Enter **RMV-EQPT::NPC-<npc No.>::[INCL];** to remove the involved NPC from service in order to run complete diagnostics.

    Where: INCL = Optional, needed to remove NPC with special circuits.

16. Enter **DGN-EQPT::NPC-<npc No.>;**.

17. If DGN ...STF message is received, then continue with Step **18.**

    - If the DGN ...STF message is not received, the trouble is in cabling to DSX-1 bay; repair or replace cabling. Remove DSX-1 bay line loops and enter
      INIT-REG::NPC-<npc No.>[&&[&]-<range>]::<parameter>;.

    ⇒ NOTE:
    The NPC itself is not a likely source of errors. The out-of-service diagnostic checks some transmit and receive error detecting and clearing circuits. The NPC line transformers are not included in the internal loop during diagnostics.

18. Arrange a time when both NPCs can be removed from service, enter **RMV-EQPT::NPC-<npc No.>::[INCL];** for both NPCs, and replace the plug-in.

19. Enter **RST-EQPT::NPC-<npc No.>;** for each NPC. Remove all DSX-1 bay signal loops.

    ⇒ NOTE:
    The parameter counts are cleared during restore operation.

3.7 Clear SC ALM MJ CGA Message

Overview: This procedure deals with CGA major alarm messages received on: (1) *unprotected* facilities or (2) the protection line itself *when the far end sends a shelf alarm.* The major alarm indicates a possible loss of service. The location is identified by the message keywords: CLF (carrier line failure) and direction (R or Y for receive or transmit), NE (near end; DACS II failure), or FE (far-end; RT failure). Before reporting the location, the DACS II automatically performs a line loopback test and checks the data link for remote alarm indications. Line looping at DSX-1 bays is not used to isolate troubles because line looping interferes with trunk conditioning sent to down stream equipment.

1. If alarm cutoff is needed, enter **`OPR-ACO-ALL;`**.
2. If the prefix on the alarm message is *C, five or more digroups have failed. For this situation, check the possibility of maintenance activity or a cable cut that may be causing the failures.
3. From the alarm message, read the RT or DCLU ID, the digroup, and the NPC number which appears after the digroup. Also, notice the alarm location (NE, FE, CLF).
4. Consider the following possible causes of an MJ alarm:
   - — Incoming line failure on an unprotected facility
   - — Protection switching not available, either already in use or protection line failed. If the switch was manually operated, it must be manually released or the line failure must be cleared to remove the major alarm.
   - — Receipt of a shelf alarm from the RT or DCLU or receipt of a yellow (Y) alarm from a *SLC*® 96 carrier Mode III RT
   - — Failure of the *SLC* carrier data link
   - — Failure (or removal from service) of a DACS II NPC.
5. Which message word appears after the NPC number in the alarm message?
   - If **NE,** continue with Step **6.**
   - If **FE,** proceed to Step **9.**
   - If **CLF,** proceed to Step **12.**

6. Check printout for other SC ALM messages (such as MJ CGA) on the protection line which indicate that shelf and major alarms were sent from the RT or DCLU. These messages implicate the connecting equipment. Check the printout for ESR ANALYSIS REPORT messages that name the failed circuit in DACS II.

7. If the subject NPC for the facility failed diagnostics and removed from service, continue with Step **8.**

   - If the NPC has not failed and been removed, find other trouble messages in printout and go to *Trouble Identification* to find trouble procedure reference.

8. Replace the plug-in for the NPC as follows to clear the trouble.

   - Arrange a time when the other NPC on the S96D or SS5D card can be removed from service; enter **RMV-EQPT::NPC-<npc No.>:[:INCL];** for that NPC, and replace the card.

     Where:
     <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01101).
     INCL = Optional, needed to remove NPC with special circuits.

   - Enter **RST-EQPT::NPC-<npc No.>;** for each NPC.

9. At DSX-1 bay, use office test set to check signal loss and excessive bit error rate at the MON jack for the transmit line (from DACS II).

   - If signal loss or excessive errors were found, continue with Step **10.**
   - If signal loss or excessive errors were not found, the trouble is either in the line going to the far end or at the far end. If the line is at fault, have facility maintenance crew isolate trouble by testing for signal at intermediate offices.

10. Verify that NPC for alarmed facility is out-of-service to allow more complete diagnostic testing; if necessary, enter **RMV-EQPT::NPC-<npc No.>:[:INCL];**.

11. Enter **DGN-EQPT::NPC-<npc No.>;**.

    - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed NPC diagnostic.
    - If DGN ...STF message is not received, the trouble is in cabling to DSX-1 bay. Repair or replace cabling; after trouble is cleared, enter **RST-EQPT::NPC-<npc No.>;** for each of the removed NPCs.

      ⇒ NOTE:
      The diagnostic checks the NPC transmission paths except for the line transformers. If the diagnostic passes but there is no trouble in office wiring, the NPC could still be the trouble.

12. From alarm message, notice the alarm direction, either R (local/receive) or Y (remote/transmit). At DSX-bay, use office test set to check signal loss and excessive bit error rate at the MON jack for the failed direction as follows: for R CLF, the incoming line (to DACS II); for Y CLF, the outgoing line (from DACS II).
    - If signal loss or excessive errors were found, continue with Step **13.**
    - If signal loss or excessive errors were not found, then the trouble is either in the line going to the far end or at the far end. If the line is at fault, have facility maintenance crew isolate trouble by testing for signal at intermediate offices.

13. Which direction of CLF alarm do you have?
    - If **R,** continue with Step **14.**
    - If **Y,** refer trouble to line maintenance crew.

14. Enter **RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;** and check the output message for SWMR (switch - manual request) or SWAR (switch - autonomous request) under PLSW heading. The presence of either keyword indicates that the protection switching is activated.

15. Refer trouble to line maintenance personnel; trouble is either on incoming facility or at far-end equipment.

NOTE:
If you want to use fault-locate test set to isolate trouble, enter TTST LLB TO command to produce far-end loopback, and connect test set to DSX-1 jacks for failed facility.

NOTE:
To prevent looped test set from reaching NPC and possibly clearing the alarm indication, keep cord end or dummy plug inserted in DACS II side DSX-1 IN jack.

3.8 Clear SC ALM MN {INH/MSW/PSW/DLF/CGA} Message

Overview: This procedure deals with SC ALM messages received on *protected* facilities going to an RT bank or a DCLU (for *5ESS*® switch). The location is identified by message keywords: CLF (carrier line failure), and the direction (R or Y for receive or transmit), NE (near end; DACS II failure), or FE (far end; RT failure). Before reporting the location for a facility trouble, the DACS II automatically performs a line loopback test and checks the data link for remote alarm indications. Line looping at DSX-1 bays is not used to isolate line troubles because it interferes with trunk conditioning and protection switching.

1. If alarm cutoff is needed, enter **`OPR-ACO-ALL;`**.
2. Notice the following information in the alarm message: the alarm status MN, RT or DCLU ID, digroup, NPC (after digroup), and trouble location (NE, FE, CLF). See Table 3-9 for the interpretation of the alarm message keywords.

Table 3-9. Alarm Interpretation

Keyword	Location	Interpretation
INH	NE or FE	Protection switching inhibited on digroup.
MSW	NE or FE	Protection switching manually activated at DACS II.
PSW	NE or FE	Protection switching automatically activated at DACS II or far end.
DLF	CLF	Series 5 data link failure.

3. Enter **`RTRV-PRMTR-EQPT::NPC-<npc No.>::SCDG:STATE;`** for the NPC and check the output message for the protection switch (PLSW) status (either manual or automatic requested/activated - SWMR, SWAR) and LLB status.

NOTE:
Protection switching occurs only on the RT side.

4. Consider the following possible causes of the alarm:
   - — A line failed (or NPC was removed from service) and service was switched to the protection line.
   - — LLB was received from far end and line loopback was activated.

— The protection line alone failed.

— Protection switching is inhibited (with no current line failures).

5. Check for INH (inhibit) keyword in message.
   - If NE (near end) is inhibited, determine if the inhibit is required (see Note). If it is not required, enter command to remove the inhibit: **ALW-SW-T1::NPC-<npc No.>::{RT|DL}-ffff;**.
   - If FE (far end) is inhibited on *SLC* Series 5 FPC, determine if the inhibit is required; if it is not required, contact far end or dispatch maintenance to remove the inhibit.
   - If INH keyword does not occur, continue with Step **6**.

NOTE:
The switch may have been inhibited to free up the switch to protect other lines or for maintenance.

6. Check message for DGP and location CLF keywords (see Table 3-9 and Note).
   - If these keywords appear in the message, contact far end or dispatch maintenance.
   - If the DLF keyword appears in the message, it indicates that the Series 5 data link has failed either at the near or far end. If the NE keyword appears, the DACS II NPC is implicated; if the FE keyword appears, the trouble is at the RT site. Continue with this procedure for further testing.

- Which message word appears after the NPC number in the alarm message?
  - If **NE,** continue with Step **9.**
  - If **FE,** proceed to Step **12.**
  - If **CLF,** proceed to Step **16.**

- Verify that NPC named for alarmed digroup is out-of-service (RMV NPC ...COMPLD in printout). If necessary, enter **RMV-EQPT::NPC-<npc No.>:[:INCL];** to remove NPC from service.

  Where:
  <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01101).
  INCL = Optional, needed to remove NPC special circuits.

- Enter **DGN-EQPT::NPC-<npc No.>;** for the same NPC.

  ⇒ NOTE:
  The diagnostic checks the NPC transmission paths except for the line transformers. So, if the diagnostic passes but there is no trouble in office wiring, the NPC could still be causing the trouble.

- Is DGN ...STF message received?
  - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed NPC diagnostic.
  - If DGN ...STF message is not received, check printout for related trouble messages and go to *Trouble Identification* to find the trouble reference. For SC ALM MJ CGA message, go directly to Section 3.7.

- Connect an external test set to check for line errors at the DSX-1 MON jack for the *outgoing* span line.
  - If signal loss or high errors are detected, continue with Step **13.**
  - If no signal loss or high errors are detected, the trouble is either on ongoing span line or at RT equipment or DCLU. Before dispatching crew to RT or testing DCLU, you can use the fault-locate test set to isolate the trouble on the ongoing span line or test at DSX-1 for DCLU.

- Verify that NPC named for alarmed digroup is out-of-service (RMV NPC ...COMPLD in printout). If necessary, enter **RMV-EQPT::NPC-<npc No.>:[:INCL];** to remove NPC from service.

  Where:
  <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01101).
  INCL = Needed to remove NPC with designated special circuits.

- Enter **DGN-EQPT::NPC-<npc No.>;** for the same NPC.

  ⇒ NOTE:
  The diagnostic checks the NPC transmission paths except for the line transformers. So, if the diagnostic passes but there is no trouble in office wiring, the NPC could still be causing the trouble.

- Is DGN ...STF message received?
  - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed NPC diagnostic.
  - If DGN ...STF message is not received, check printout for related trouble messages and go to *Trouble Identification* to find the trouble reference.

- From alarm message, notice the direction of the failure which is given in the message as either R for local/receive or Y for remote/transmit. If the following steps show that the line is good, the direction of the alarm will dictate where to look for the problem.
- Use an external test set to check for errors *in both directions* at DSX-1 **MON** jacks for connecting equipment and for the DACS II.
  - If errors or signal loss are found on the digital line, continue with Step **18.**
  - If errors or signal loss are not found, for R CLF alarm, repair or replace cabling alarm between the DSX-1 bay and the DACS II. For Y CLF alarm, have far-end isolate the trouble.

- If the failed facility connects to RT equipment and you want to use the fault-locate test set to isolate the trouble on the incoming line, unseat the NPC for the failed primary and connect the test set to the DSX-1 jacks for the failed facility.

  ⇒ **NOTE:**
  The OPR-LPBK-T1 command can be used to produce a loopback at the RT in order to use the fault-locate test set to isolate trouble on the incoming line.

  ⇒ **NOTE:**
  The NPC is moved to prevent the protection switch from releasing when the test set signal is received. The NPC must be installed after the test set is disconnected.

- Refer line trouble to line maintenance personnel.

3.9 Clear SC ALM COMP MN RT Message

Overview: This message indicates that the handshaking exchange required to initiate communications over the data link for *SLC*® Series 5 carrier has failed. This compatibility negotiation takes place at system startup and after the ADD command is used to change the configuration when the digroup A NPC is restored to service.

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**.
2. Which explanatory keyword appears after the RT ID in the message?
   - If **AB or CD**, continue with Step **3**.
   - If **P**, proceed to Step **4**.
   - If **INDX**, proceed to Step **5**.
   - If **LBRV or ALP**, proceed to Step **6**.
3. The alarm indicates that the status of the digroup pairs is different. To clear the alarm, enter **RST-EQPT::NPC-<npc No.>;** for the remaining digroup NPCs. These digroup pairs (A and B, C and D) are associated at the RT controller, are assigned together in the ADD command, and must be restored without delay so that the pairs have the same status.

   Proceed to Step **7**.
4. The alarm indicates that the status of the protection digroup NPC is different from that of the primary digroup NPCs. To clear the alarm, enter **RST-EQPT::NPC-<npc No.>;** for the protection digroup NPC.
   Where:

   <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01-1-01).

   Proceed to Step **7**.

5. The alarm indicates that DACS II is not able to adjust its software within its limits to match the controller at the RT. Verify that the RT equipment is correct for *SLC* Series 5 carrier and for direct connection to DACS II. After the trouble is cleared, enter DLT command to delete the digroup NPC designations and repeat the entire procedure at the DACS II to establish the facility.

   Proceed to Step **7**.

6. These alarms identify the portion of the handshaking exchange that failed. Contact technical consultant, and, after trouble is cleared, attempt to restore the NPCs to service or repeat the entire procedure at DACS II to establish the facility.

7. After all the digroup NPCs have been restored to service, verify that same alarm does not recur. Enter **`RTRV-ALM-EQPT::RT-ffff;`** for the target RT and verify that there is no COMP alarm (by the presence of a dash under heading).

8. If there is an alarm on any of the associated digroup NPCs, enter **`RTRV-STATE-EQPT::NPC-<npc No.>;`** and check for timing slips. If present, enter **`INIT-REG::NPC-<npc No.>;`** to clear the counts.

3.10 Clear SC ALM MN {RT/DL} FE Message

Overview: This trouble message applies to *SLC*® Series 5 carrier. The message indicates an alarm was received from the RT or DCLU (as shown by the FE keyword). Since the message indicates a problem with the far-end equipment, no digroup is named in the message.

1. If the alarm cutoff is needed, enter **`OPR-ACO-ALL;`**.
2. Obtain the RT (or DCLU) bank identifier from the message.
3. Report the trouble to far-end personnel or dispatch maintenance to the far end. Check for possible failure of the ringing generator at the far end.

3.11 Check Facility REPT ALM IDLD or INFO Message

Overview: This procedure deals with facility alarm IDLD (idled) and INFO (information) messages. Alarm idled messages are received after the line signal is restored on a facility that previously had a CGA (carrier group alarm). Alarm information messages are received on 2.048-Mb/s lines when an alarm condition designated as maintenance information occurs. Alarm idled messages do not occur after minor alarms due to facility error (for example, for SLIP or BER) are cleared. The error counts for these parameters are checked and the counts are cleared using utility commands.

1. Which one of the following keywords appears in the message?
   - If **IDLD**, then continue with Step **2.**
   - If **INFO**, proceed to Step **6.**
2. This message reports that an alarm has cleared. For facility alarms, the NPC (or DS3 position in the unit) and the type of alarm are given in the message; for example, CGA (carrier group alarm), PBA (primary block alarm), and facility parameter BER.
3. If the message is the CGA type, refer to Table 3-10 for the meaning of the alarm type given at the end of the IDLD message.

Table 3-10. CGA Alarm Types

Indicator	Meaning
A	Alarm Indication Signal
B	Both red and yellow (not registered with TG80/TG80B NPC)
F	Frame format error rate (TG180 NPC)
L	Local multiframe alarm (DMI equipment)
M	Remote multiframe alarm (DMI equipment)
R	Red; incoming line failure
V	Line format violation (TG180 NPC)
X	Multiple alarms (TG180 NPC)
Y	Yellow; outgoing line failure

4. If the message is for a timing link failure (ESR SYNC messages) or for a DS3 line failure, refer to Table 3-11 for the meaning of the alarm type.
5. If the message is the PBA type for a 2.048-Mb/s line, refer to Table 3-12 for the meaning of the alarm type given at the end of the IDLD message.

Table 3-11. Keyword Meanings

Alarm Keyword	Meaning
AIS	Alarm indication signal (DS3)
BER	Bit error rate high (DS3)
LOS	Loss of signal
LEN	Loss of energy
EXJ	Excessive jitter
PHS	Phase shift
OOF	Out of frame
MAJ	Error rate, major alarm
MIN	Error rate, minor alarm

6. An "A" after the CGA word and NPC number reports the receipt of an AIS (alarm indication signal, all 1s, blue signal) from the far end.
7. Consider the following situations in which the far end will send an all 1s signal:
   - — On a DS1 facility connecting to multiplexers, the all 1s signal originates at the alarmed terminal (red) in the failed span and is forwarded along the route to prevent multiple red alarms that would hinder troubleshooting.
   - — The far-end NPC can be grown to send an all 1s signal when it is removed from service.

Table 3-12. PBA Alarm Parameters

Indicator	Meaning
A	All 1s signal (AIS) received from far end.
B	Incoming high bit error rate (BER).
E	Excessive errors received at far end (REER).
G	Far-end loss of CRC4 multiframe alignment in TS0 (FLCMA).
I	Remote all 1s indication (RAIS).
L	Loss of multiframe alignment (LMA). [Note 1]
M	Remote loss of alignment sent on TS16 (R16). [Note 1]
P	TS0 pseudo-frame word out-of-frame (PFWOOF).
R	Loss of signal primary block failure (LOS PBF); loss of frame primary block failure (LOF PBF). [Note 2]
S	Far end sync has gone into holdover (Sync Fail Indication).
V	All 1s indication on TS16 (A16). [Note 1]
X	Incoming excessive error rate (EER).
Y	Remote alarm indication (RAI).

Note 1: These only occur with CAS line format.

Note 2: R can be either LOF PBF or LOS PBF for PB/PC NPCs.

Hardware Failures

4

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Hardware Failures

4

This chapter contains the procedures for clearing hardware troubles that are detected and processed by the DACS II error recovery operation.

Error recovery is an autonomous operation in the DACS II. This activity is evidenced by ERR ESR messages and the service removal and diagnostic failure on a plug-in. The failure brings a major office alarm. For failures in the duplicated circuit groups (sync, cross-connect network, etc.), the service removal is preceded by a side switch to the duplicated side (or DS3 protection) to maintain service.

NOTE:
Never replace packs or take packs from the active side of a duplicated group (for example, SYNC) when the other side is failed. The in-service side is carrying service; it is not a source of spare plug-ins.

Error Recovery Operation

Error recovery begins with the detection of an internal hardware error, proceeds with a monitoring period (hit timing) to verify that the trouble was not a transient, and results in the service removal of the failed pack. This recovery process evaluates all error inputs (including power converters) and, if the trouble is not transient, reports the service removal and the diagnostic failure on the most likely cause of the trouble. When more than the failed pack itself can cause the trouble, the other packs are listed in the ERR ANALYSIS REPORT. A side switch (or DS3U protection switching) occurs for any single failure on the active side of a duplicated (or protected) circuit group. For a power converter failure, only high-level control packs are removed from service so that fewer packs need to be restored after the trouble is cleared. If needed to enable maintenance on the MC, error recovery will place the frame in the maintenance condition as evidenced by the RST MC MCOND message.

DS3 Equipment Considerations

The following items summarize the service status of a duplicated circuit group when a plug-in fails on both sides:

- When the plug-in on one side is already out-of-service and the mate on the other side fails, the service removal of the failed plug-in will be denied. That side of the duplicated circuit group will also be pested (alarms inhibited).
- Clearing the trouble on the out-of-service side will enable the side switch and work on the other side. The alarm status will change from critical to major.
- When the failure on the pested side is cleared and the service restored on the replacement plug-in, the whole side will be unpested.

The following items summarize the service status of the protected DS3 equipment when more than one plug-in fails:

- The first MMFG (MXR MIU function group) to fail will be the one served by the protection MMFG. If all the MMFGs have failed, MMFG 1 will probably be put on protection.
- If a failed MMFG cannot be switched to protection, it will be given an ISF (in-service and failed) status. The service removal of an MMFG with ISF status will be denied because switching is not available, and service restoral (after plug-in replacement) will be denied because the plug-in is already in-service.
- When a failed MMFG (on protection) is cleared and the MMFG restored to service, the next failed MMFG will switch to protection. If only two MMFGs failed, the alarm status will change from critical to major.
- The preferred configuration is to have FLI S and the service MMFGs selected because the reset/reboot operations revert to that configuration.

CAUTION:
To prevent transmission hits whenever the protection plug-in is selected, enter command to remove the FLI S or service MMFG (or disconnect plug-in if command is ineffective) before doing a frame reset, a boot frame, or remove and restore unit UC.

4.1 Cross-Connect Side Out-of-Service

4.1.1 Clear ALM ECCN OOS Message

Overview: This alarm indicates that one side of the ECCN is out-of-service and troubleshooting is required to return the side to service. The alarm must be cleared because a failure on the other side or inadvertent maintenance activity on the other side could cause loss of customer service. To force this maintenance effort, the DACS II goes to a major alarm if the initial minor alarm indication is pested for more than 2 minutes because of other alarms. The DACS II does not remove a failed pack when its mate on the other side is already out-of-service; the alarms on the active side are pested.

CAUTION:
Never replace packs or take packs from the active side of a duplicated group (for example, ECCN) when the other side is failed. The in-service side is carrying service; it is not a source of spare plug-ins.

NOTE:
If you have not checked for power troubles (per the *Trouble Identification* section), do so before proceeding.

1. If REPT ALMDET ...ANALYSIS REPORT message occurs in the printout, notice the listing of implicated plug-ins (see Note) in the message and proceed to Step **3**; otherwise, continue with Step **2**.

   NOTE:
   The plug-ins are listed in the order of likelihood of causing the trouble, and the first plug-in will already be removed from service.

2. If the pack has been autonomously removed from service (with no failed DGN), try restoring the pack to service per Figure 4-1 and proceed to Step **11**.
   - If pack has not been removed, notice the pack named in the DGN ...STF message and continue with Step **3**.

3. Replace the first pack named in the ANALYSIS REPORT message or the pack named in the DGN ...STF message if no ANALYSIS REPORT.
4. Enter command to restore the replacement to service per Figure 4-1. If associated ETSIs on mate NPC were removed, enter command to restore those packs to service.

NOTE:
For DS3U, clearing a failure in the ECCN which caused MMFGs to be failed (and MXRs and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

- If DGN ...STF message is received, continue with Step **5**.
- If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.
- If RST ...COMPLD message is received, proceed to Step **8**.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-1. Maintenance Command Construction

5. If the single pack (or all packs) listed in the ANALYSIS REPORT has been replaced, proceed to Step **10**.
   - If all the packs have not been replaced, continue with Step **6**.
6. The previous pack was not the cause of trouble. Enter the command to remove the next pack from service per Figure 4-1. Replace the pack and repeat from Step **4**.
7. If trouble persists or same trouble recurs, repeat the procedure, but this time work with the next pack listed in the ANALYSIS REPORT.
8. If another pack was autonomously removed (on other side or other protection group) after the original trouble cleared, repeat the procedure to clear next trouble.
   - If another pack was not removed, continue with Step **9**.
9. Enter **`RTRV-STATE-EQPT:::ALL;`** to find packs which are still failed, pested, or out-of-service, and perform the necessary corrective action to place all equipped packs in service.

   NOTE:
   The conditions are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) for each pack. Unequipped NPCs are indicated by dashes.

10. From Table 4-1, find the explanation of the COND code which appears in the ERR,ESR message for the subject pack.
11. If you were able to clear the trouble using the meaning of the ESR code, go to Step **9**.
    - If you were not, continue with Step **12**.
12. If there are any other ERR ESR messages involving packs in other circuit groups, go to Section 4.3.
    - If there are no other ERR ESR messages, continue with Step **13**.

13. To make a record of the error history on the disk (for use by technical consultant), enter one of the following commands (see Note):

    Time of Day/Time Interval:
    RTRV-LOG:[xy]::[ww]:ERR:HWER,{INT-mn|[DATE-mo-da-yr,]TOD-hr-mn-sc};

    Suspect Entity:
    RTRV-LOG:[xy]::[ww]:ERR:HWER,ENTY-eee;

    Where: INT = Interval of time (past 59 minutes)
    TOD = Time of day consisting of hour (hh=00 through 23), minutes (mm=00 through 60), seconds (ss=00 through 60). Date (month, day, year) is optional.
    eee = Plug-in designation for example: CCI, DMB, EBX, ETSI, FC, FMT, SYNC, or TLI.

    NOTE:
    All error events are logged on disk; however, the file is overwritten when the file capacity is reached. If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

14. Contact technical consultant.

Table 4-1. ESR Condition Codes - CCI, ETSI

COND 01	Software could not access CCI; pack does not acknowledge. Corrective Action: (1) verify that CCI is securely seated; (2) look for loss of sync to CCI and replace CCI; (3) look for MC, EBX, or CPU interface trouble.
02	Incorrect version number on CCI.
03	Summary bit set, but no other errors.
04	CCI ERR bit set in system status register.
05	ETSI ERR bit set in system status register.
06	Peripheral unit bit set in system status register.
07	Bus terminator pack absent.
08	32-MHz clock out of phase lock.
09	240 frame sync misaligned.
0A	Loss of 240 frame sync.
0B	Loss of 8-kHz frame sync.
0C	CCI detected address parity error.
0D	CCI detected low byte data parity error.
0E	CCI detected high byte data parity error.
0F	CCI -5.2 power supply failure.
10	CCI detected bus status parity error.
11	Peripheral unit alarm.
12	Sync summary bit set on CCI pack.
20	Software could not access ETSI; pack does not acknowledge. Corrective Action: see CCI action and substitute ETSI for CCI in wording.
21	Incorrect version number on ETSI pack.
22	Summary bit set, but no other errors.
23	Loss of 32.768-MHz clock.
24	Loss of 240 frame sync.
25	Receive MDX summary bit set.
26	Control RAM summary bit set.
27	Transmit MDX summary bit set.
28	Loss of 3.3-volt power from CCI pack.
29	Peripheral unit port alarm (receive MDX).
2A	Receive MDX data source time-slot parity error.
2B	Receive MDX sync error.
2C	Receive MDX address parity error.
2D	Receive MDX write data parity error.
2F	Receive cannot be accessed; incorrect chip ID.
30	Transmit MDX data parity error.
31	Transmit MDX data source time-slot parity error.
32	Transmit MDX sync error.
33	Transmit MDX address parity error.
34	Transmit MDX write data parity error.
35	Transmit MDX cannot be accessed; incorrect chip ID.
37	Control RAM parity error.
38	Control RAM sync alarm.
39	Control RAM port alarm.
3A	Control RAM BIST flag is set.
3B	Data RAM BIST flag is set.
3C	Control RAM address parity error.
3D	Control RAM write data parity error.
3E	Control RAM device cannot be accessed; incorrect chip ID.
3F	Control RAM circuit pack parity.
40	Control RAM device is in reset state.
41	Control RAM port alarm summary bit set.
42	TRD3 status exercise bit is set.
43	Ready high error detected from CCI.
44	Ready timeout error from CCI; CCI cannot access ETSI.
45	Control RAM stuck bit error.

4.1.2 Clear ALM CCN OOS Message

Overview: This alarm indicates that one side of the CCN is out-of-service and troubleshooting is required to return the side to service. The alarm must be cleared because a failure on the other side or inadvertent maintenance activity on the other side could cause loss of customer service. To force this maintenance effort, the DACS II goes to a major alarm if the initial minor alarm indication is pested for more than 2 minutes because of other alarms. The DACS II does not remove a failed pack when its mate on the other side is already out-of-service; the alarms on the active side are pested.

CAUTION:
Never replace packs or take packs from the active side of a duplicated group (for example, CCN) when the other side is failed. The in-service side is carrying service; it is not a source of spare plug-ins.

NOTE:
If you have not checked for power troubles (per the *Trouble Identification* section), do so before proceeding.

1. If REPT ALMDET ...ANALYSIS REPORT message occurs in the printout, notice the listing of implicated plug-ins (see Note) in the message and proceed to Step **3**: otherwise, continue with Step **2**.

   NOTE:
   The plug-ins are listed in the order of likelihood of causing the trouble, and the first plug-in will already be removed from service.

2. If the pack has been autonomously removed from service (with no failed DGN), try restoring the pack to service per Figure 4-2 and proceed to Step **11**.
   - If pack has not been removed, notice the pack named in the DGN ...STF message and continue with Step **3**.

3. Replace the first pack named in the REPT ...ANALYSIS REPORT or the pack named in the DGN ...STF message if no ANALYSIS REPORT.

4. Enter command to restore the replacement to service per Figure 4-2. If associated TSIs on mate NPC were removed, enter command to restore those packs to service.

   NOTE:
   For DS3U, clearing a failure in the CCN which caused MMFGs to be failed (and MXRs and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

- If DGN ...STF message is received, continue with Step **5**.
- If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.
- If RST ...COMPLD message is received, proceed to Step **8**.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-2. Maintenance Command Construction

5. If the single pack (or all packs) listed in the ANALYSIS REPORT has been replaced, proceed to Step **10**.
   - If all the packs have not been replaced, continue with Step **6**.
6. The previous pack was not the cause of trouble. Enter the command to remove the next pack from service per Figure 4-2. Replace the pack and repeat from Step **4**.
7. If trouble persists or same trouble recurs, repeat the procedure, but this time work with the next pack listed in the ANALYSIS REPORT.

8. If another pack was autonomously removed (on other side or other protection group) after the original trouble cleared, repeat the procedure to clear next trouble.
   - If another pack was not removed, continue with Step **9**.

9. Enter **RTRV-STATE-EQPT:::ALL;** to find packs which are still failed, pested, or out-of-service, and perform the necessary corrective action to place all equipped packs in service.

   ⇒ **NOTE:**
   The conditions are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) for each pack. Unequipped NPCs are indicated by dashes.

10. From Table 4-2, find the explanation of the COND code which appears in the ERR,ESR message for the subject pack.
    - If you were able to clear the trouble using the meaning of the ESR code, go to Step **9**.

11. If there are any other ERR ESR messages involving packs in other circuit groups, go to Section 4.3.
    - If there are no other ERR ESR messages, continue with Step **12**.

12. To make a record of the error history on the disk (for use by technical consultant), enter one of the following commands (see Note):

    Time of Day/Time Interval:
    RTRV-LOG:[xy]::[ww]:ERR:HWER,{INT-mn|[DATE-mo-da-yr,]TOD-hr-mn-sc};

    Suspect Entity:
    RTRV-LOG:[xy]::[ww]:ERR:HWER,ENTY-eee;

    Where: INT = Interval of time (past 59 minutes)
    TOD = Time of day consisting of hour (hr=00 through 23), minutes (mn=00 through 60), seconds (sc=00 through 60). Date (month, day, year) is optional.
    eee = Plug-in designation for example: CCB, CCNI, DMB, DSPI, EBX, FC, SYNC, TLI, TSI.

    NOTE:
    All error events are logged on disk; however, the file is overwritten when the file capacity is reached. If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

13. Contact technical consultant.

Table 4-2. ESR Condition Codes - CCNI, CCB, TSI

CCNI Pack	
COND 90	Software could not access CCNI; pack does not acknowledge. Corrective Action: (1) verify that CCNI is securely seated; (2) look for loss of sync to CCNI and replace CCNI; (3) look for MC, BX or CPU interface trouble.
91	RAM error in high data byte on MC-MP. Trouble in MC (BX or CPU), or CCNI.
92	RAM error in low data byte on MC-MP. See COND 91.
93	Address parity error. Corrective Action: enter command to restore CCNI.
94	Autonomous switch error. Circuit in CCNI for side switch independent of MP disagrees with mate CCNI.
95	Bus status error. Circuit cannot determine active side. Corrective Action: (1) replace CCNI; (2) if persists, report possible software error.
96	Stuck summary bit. Error leads from CCB or TSI stuck high, but no trouble can be found. Subject CCB and TSI packs are identified in messages.
CCB Pack	
COND A0	Software could not access CCB; pack does not acknowledge. Corrective Action: (1) verify that CCB is securely seated; (2) look for loss of sync to CCB and replace CCB; (3) look for MC, BX or CPU interface trouble.
A1	Loss of sync pulse signal for approx. 100 ms. Trouble in CCB or SYNC or sync interface between.
A2	Loss of 8 MHz clock. See COND A1.
A3	Bad data from TSI ports. If most ports are reported in ESR, probably the CCB is bad. If only a few ports are reported, probably the TSIs are bad.
A4,A5	Zero bit stuck at 1 in CCB (A4) or CCNI (A5).
TSI Pack	
B0	Software could not access TSI; pack does not acknowledge. Corrective Action: (1) verify that TSI is securely seated; (2) look for loss of sync through CCB and replace TSI; (3) look for MC, BX or CPU interface trouble.
B1	Stuck summary bit that indicates troubles from TSI devices, but no actual trouble can be found.
B2	TSI device error that clears during recovery; transient error.
B3	Software could not access TSI device; device failed or lost sync clock.
B4	Diagnostic exercise bits set on TSI device. Replace TSI.
B5	Error on address bus to TSI device. Trouble in TSI, CCNI, or MC-BX pack.
B6	TSI device not receiving good sync clock. Trouble in TSI, related CCB, or SYNC.
B7	Error on TSI control RAM which defines maps. Replace TSI.
B8	Parity error on port from FC or DSPU-DMB. If most all TSI ports are reported in ESR message, replace TSI. If isolated ports are reported, the FCs or DMBs are probably bad. Adjacent NPCs that share the DBM ports will be reported although only one is bad.
B9	Parity error from CCNI.

4.2 Clear ERR ESR ANALYSIS REPORT Message

1. If a CRITICAL alarm is being registered (CRITICAL lighted on status panel LED and "*C" message prefix), continue with Step **2**.
   - If a CRITICAL alarm is not registered, go to Step **5**.
2. Which of the following conditions caused the CRITICAL alarm?
   - If **multiple NPCs removed**, continue with Step **3**.
   - If **both duplex sides alarmed**, proceed to Step **4**.
   - If **unprotected failure in DS3U** (see Note), go to Section 4.9.

   NOTE:
   Either the DS3 protection switch is already active for another failure or protection switching is inhibited. For unprotected DS3 failures, the DACS II does not remove (no protection deny) the second failed pack but pests alarms from the second failed pack. After the first failure is cleared, the protection switch can serve the second failure.

3. Check the frame for blown fuses or failed power units. A blown fuse feeding NPCs or two failed power units for a unit would cause multiple NPC failures. Also check for DS3 failure that would cause all 28 DS1s to fail. If neither of these conditions exist, proceed to Step **5**.
4. From the trouble printout, determine which side of the ECCN/CCN (0 or 1) has been removed from service; that will be the side on which the failed plug-in has been autonomously removed. Proceed to Step **5** and clear the trouble **on the out-of-service side**.

   NOTE:
   For duplex (both sides) failures, clearing out-of-service side will enable side switch and work on the other side. The alarm status will also change from critical to major.

   NOTE:
   The DACS II does not remove a duplicated pack when its mate is already out-of-service; instead, the DACS II pests alarms on the active side.

5. See Figure 4-3 for the general format and sequence of messages of the error recovery operation with a REPT ALMDET ...ANALYSIS REPORT. The plug-in which is most suspect will be removed from service and the diagnostic results given. Other likely causes of the trouble will also be listed in the report.

```
A ff REPT EVT EQPT
   "<entity>,TN-X-dddd,EVENT-eeee,ESR,ERR"
   "<error data bytes>

A ff REPT ALMDET EQPT
   /* [0.01391] */
   "ANALYSIS, REPORT,EVENT-eeee,ESR,ERR"
   "<action>,<suspect plug-in No.1>
   "<action>,<suspect plug-in No.2>
   "<action>,<suspect plug-in No.3>
   "<action>,<suspect plug-in No.4>

A ff REPT RMV EQPT
   /* [0.33xxx] */
   "<entity>:<state>"

A ff REPT DGNDET EQPT
   /* [0.41xxx] */
   "<entity>:{ATP|CATP-cc|STF-ppqq},<data bytes>"
```

Figure 4-3. Error Analysis Report

6. Replace the first pack named in the ESR ...ANALYSIS REPORT.
7. Enter command to restore the replacement to service per Figure 4-4. If associated ETSIs or TSIs on mate NPC were removed, enter command to restore those packs to service.

NOTE:
For DS3U, clearing a failure in the ECCN which caused MMFGs to be failed (and MXRs and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

- If DGN ...STF message is received, continue with Step **8**.
- If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.
- If RST ...COMPLD message is received, proceed to Step **11**.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-4. Maintenance Command Construction

8. If all the plug-ins listed in the ERR ANALYSIS REPORT have been replaced, proceed to Step **10**.
   - If all the listed plug-ins have not been replaced, enter the command to remove the next pack from service per Figure 4-4 (see Note) and replace that plug-in. The previous pack was not the cause of trouble.

     NOTE:
     When facility NPCs are removed from service, the service on all channels is interrupted. Arrangements must be made to patch service or notify data customers.

9. Enter command to restore the replacement to service per Figure 4-4. If associated ETSIs or TSIs on mate NPC were removed, enter command to restore those packs to service.
   - If DGN ...STF message is received, continue with Step **10**.
   - If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.
   - If RST ...COMPLD message is received, proceed to Step **11**.
10. If you are clearing ERR SYNC messages, go to Section 4.4.
    - If you are not clearing ERR SYNC messages, go to Section 4.7.
11. If another pack was autonomously removed on the other side (or other protection group) after the original trouble was cleared, then repeat the procedure to clear the next trouble.
12. Enter **`RTRV-STATE-EQPT:::::ALL;`** to find packs which are still failed, pested, or out-of-service and perform the necessary corrective action to place all equipped packs in service.

    NOTE:
    Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in respective columns (out-of-service, failed, and pested) of the output for each plug-in; unequipped NPCs are indicated by dashes.

4.3 Clear ERR [ESR] <entity> Messages

1. Check for a blown fuse (see Note) and failed power units (which give ERR PWR message). Loss of power causes removal of transmission plug-ins.
   - If power trouble is present, go to *Power Failures* to clear power trouble.

NOTE:
Blown fuses are indicated by one of the following: (1) for a 48 V fuse, lighted FAL indicator and extended color bead on 48 V fuse and alarm panel, or (2) lighted LED fuse or LED indicator on unit fuse board.

2. If sync error messages occur in the printout, check if there are any timing link troubles or if timing link trouble has cleared (COND E800 series messages). See Table 4-3 for meaning of alarm keywords in ERR [ESR] SYNC TLI SSP messages.

NOTE:
If the timing link for the highest priority sync port fails and the DACS II switches to the port on the other side, it can take up to 35 minutes for the DACS II to switch back to the higher priority port.

   - To force the switch back to the higher port after the timing link trouble is cleared, enter the commands to remove and restore the higher priority port as follows (the query output shows the priorities):

```
RTRV-STATE-COM:::ALL;
RMV-EQPT::SYNC-a::TLI-n:SSP-s;
RST-EQPT::SYNC-a::TLI-n:SSP-s;
```

Table 4-3. Sync Alarm Keywords

Alarm Keyword	Meaning
LOS	Loss of signal
LEN	Loss of energy
EXJ	Excessive jitter
PHS	Phase shift
OOF	Out of frame
MAJ	Error rate, major alarm
MIN	Error rate, minor alarm

3. If the plug-in named in the [ESR] ERR message was autonomously removed but there was no failed diagnostic (DGN ...STF) for that plug-in, enter the RST command for that plug-in.

   NOTE:
   If hardware mismatch condition (COND 43) accompanies the removal of the plug-in, it indicates that the plug-in code is not correct for the type that was grown.

4. If there is a failed diagnostic (DGN ...STF), enter the command to remove the plug-in (if not already removed) per Figure 4-5, and replace the failed plug-in.

   NOTE:
   When facility NPCs are removed from service, the service on all channels is interrupted. Arrangements must be made to patch service or notify data customers.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-5. Maintenance Command Construction

5. Enter command to restore the replacement to service per Figure 4-5. If associated ETSIs or TSIs on mate NPC were removed, enter command to restore those packs to service.

   NOTE:
   For DS3U, clearing a failure in the ECCN which caused MMFGs to be failed (and MXRs and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

   - If DGN ...STF message is received, continue with Step **6**.
   - If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action.
   - If RST ...COMPLD message is received, proceed to Step **7**.

6. If you are clearing ERR [ESR] SYNC messages, go to Section 4.4.
   - If you are not clearing ERR [ESR] SYNC messages, go to Section 4.7.

7. If another pack was autonomously removed on the other side (or other protection group) after the original trouble was cleared, repeat this procedure to clear next trouble.

8. Enter `RTRV-STATE-EQPT:::ALL;` to find packs which are still failed, pested, or out-of-service and perform the necessary corrective action to place all equipped packs in service.

   NOTE:
   Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) of the output for each plug-in; unequipped NPCs are indicated by dashes.

4.4 Clear ERR SYNC Message

Overview: This procedure is used for sync troubles after completing Section 4.2 or 4.3 which deals with the error messages on sync plug-ins. The corrective action is based primarily on the ERR SYNC COND code. The series of codes beginning with E0 implicate the DPLL pack, the interface with the controller MP, or the SPU power. The E1 series indicates an internal DPLL problem; the E2 series implicates the DPLL and the TB; the E3 series indicates a phase-locked loop problem or input timing problem; and the E4 series indicates a cross-couple problem in which the two syncs are not locked together in phase.

⚠ CAUTION:
Never attempt to troubleshoot and replace packs on the in-service side and never take packs from the in-service side for use as replacements for the failed side.

1. Check the printout for RMV ...SYNC message to verify that the failed SYNC was removed from service.
2. If the trouble is found before you reach the end of this procedure, ignore "if trouble persists" steps and go to the end of the portion to restore the sync to service.
3. Which series of COND codes does your ERR SYNC message fall into?
   - If **E2 SERIES,** continue with Step **4.**
   - If **E0** or **E1 SERIES,** proceed to Step **9.**
   - If **E3** or **E4 SERIES,** proceed to Step **14.**

COND E2-- CODES

4. For COND E205, the TB (time base) oven has not reached operating temperature. Wait at least 30 minutes and enter **`RST-EQPT::SYNC-a;`** (a = failed sync side). Although the sync can be restored after 30 minutes, it can take up to 2 hours for a stratum 2 sync to reach rated precision.
5. For other COND code or if E205 persists, replace the TB pack and wait for oven to reach operating temperature. Then, enter **`RST-EQPT::SYNC-a;`**.
6. If sync failure persists, unplug TB pack and check the slot for broken pins or damaged backplane. Reinstall TB after inspection and allow for warmup time.

7. If no wiring problem is found, replace the DPLL pack and enter `DGN-EQPT::SYNC-a;` for the subject sync side.
8. After the TB ovens have reached temperature (30 minutes), enter `RST-EQPT::SYNC-a;`.

COND E0-- OR E1-- CODES

9. Unplug and reseat the DPLL pack and enter `DGN-EQPT::SYNC-a;`.
10. If failure persists (for original E0-- code trouble), unplug DPLL and check plug-in position for bent pins or damaged backplane. Reinstall DPLL after inspection.
11. If sync failure persists, replace DPLL pack and reenter sync diagnostic.
12. If ERR SYNC ...COND E004 message is received with the failed diagnostic, continue with Step **13**.
    - If the COND E004 message is not received, replace the TB pack for the sync and reenter the sync diagnostic. If the trouble cleared, allow time for the TB ovens to reach temperature (30 minutes) and enter `RST-EQPT::SYNC-a;`.
13. Replace SPU pack for failed sync side and reenter sync diagnostic command.
    - If DGN ...ATP (or CATP) is received, enter `RST-EQPT::SYNC-a;` for the subject sync side (0 or 1) and to clear all power alarms, enter `INIT-REG::PWR-00!`.
    - If sync failure persists, enter `RMV-EQPT::MC;`, unplug the same CPU, and check plug-in position for bent pins or damaged backplane. Reinstall CPU, enter `RST-EQPT::MC;` and reenter sync diagnostic.
    - If trouble persists, remove the MC from service, replace the CPU in the main controller, and enter restore MC to service.

COND E3-- OR E4-- CODES

14. Replace the DPLL pack and enter `DGN-EQPT::SYNC-a;`.
15. If DGN ...STF message is received, continue with Step **16**.
    - If the message is not received, proceed to Step **22.**

16. Which ERR SYNC ...COND code message do you have?
    - If **COND E3--**, continue with Step **17**.
    - If **COND E4--**, proceed to Step **19.**
17. Enter **RTRV-STATE-EQPT::SYNC;** to determine the active SSP. Remove the active SSP on the failed side as follows: **RMV-EQPT::SYNC-a::TLI-n:SSP-s;**. Enter command to remove the same SSP on the other side.
18. Reenter the sync diagnostic command and watch for the reoccurrence of the sync error.
    - If the trouble was found, enter **RST-EQPT::SYNC-a;**.
    - If the trouble was not found, there is an obscure trouble; contact technical consultant.
19. Unplug the DPLL and check the plug-in position for bent pins or backplane damage. Reinstall DPLL after inspection.
20. If no wiring problem is found, the other sync side may be causing the problem. During nonbusy hours, make attempts to restore the failing sync by entering **RST-EQPT::SYNC-a;**. If the sync will remain in service even for a brief time, enter **DGN-EQPT::SYNC-a;** for the other sync, and repeat this portion of troubleshooting if other side fails.
21. If the trouble was found (or diagnostic passed), continue with Step **22.**
    - If the trouble was not found, there is an obscure trouble; contact technical consultant.
22. Enter **RST-EQPT::SYNC-a;**.
23. If TLI-SSP was removed from service (in Step 17), the timing link was probably causing the trouble. Either check or replace the timing link. Enter **RST-EQPT::SYNC-a::TLI-n:SSP-s;** for both removed SSPs.

4.5 Respond to Failed Status for Plug-In

1. To obtain listing of equipped CPs (circuit packs), enter **RTRV-STATE-EQPT::[{UNIT-[q]q|UNIT|ETSI|TSI|NPC|MXR}]::EQPD;** See Figure 4-6 for link and CCN/ECCN plug-ins if entire frame is checked.

   Where:

   UNIT-[q]q, UNITs, ETSIs, TSIs, NPCs, MXRs = Optional, to request the equipage in specific unit or of specific plug-ins instead of entire frame.

   NOTE:
   Equipped CPs are indicated by a "1" alongside the CP or by the CP number in the sequence. For duplicated entities (FC, ETSIs/TSIs), there will be listings for both the zero and one sides for each duplicated plug-ins.

2. To obtain a listing of out-of-service, failed, and pested CPs (see Notes), enter **RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;** where: [q]q = Unit number (1 through 16).

   NOTE:
   The conditions are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) for each pack. For duplicated entities (FC, ETSIs/TSIs), there will be listings for both the zero and one sides for each duplicated plug-ins. Unequipped NPCs are indicated by dashes.

   NOTE:
   If XON option is selected, you can use CTRL-S and CTRL-Q to stop and start the output.

3. To check only common equipment, enter **RTRV-STATE-COM:::{OOS|FAIL|PEST|ALL};** and see Figure 4-6 to read the link and ECCN/CCN output.

```
M RTRV STATE EQPT .. COMPLD
"<subject>:g,h,i,j,k,l,m,n,o,p"

g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-Connect Side 0
n = Cross-Connect Side 1
o = CCI 0 / CCNI 0
p = CCI 1 / CCNI 1
```

Figure 4-6. Common Equipment Readout

4. See Note. If any CPs are equipped but out-of-service, enter the RST (restore) command per Figure 4-7 for the pack.
   - If command denial occurs, find the reason for denial in the output message and perform corrective action to obtain command completion.

NOTE:
When a CP in a duplex/protected network (ECCN/CCN, DSPU, DS3U) fails, service is switched and all the CPs on the failed side/group are removed from service and pested. To correct the problem, the failure must be cleared and the side (or all CPs) can be restored. If both sides/groups are failed, trouble must be cleared on the out-of-service side/group first; removal of the other side will be denied.

5. If any CPs are failed, enter the DGN (diagnose) command per Figure 4-7 for the pack.
   - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed diagnostic.
   - If diagnostic passes (ATP or CATP), enter RST command.

6. To check for out-of-service, failed, and pested CPs, enter **`RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;`**.
7. If any CPs are still pested, enter the commands to first remove and then restore the CPs per Figure 4-7.
   - If command denial occurs, find the reason for denial in the output message and perform corrective action to obtain command completion.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-7. Maintenance Command Construction

4.6 Clear Transient Trouble Using ERROR LOG Message

Overview: All error messages are recorded on the disk and can be read on command; transient errors for which the DACS II does not produce autonomous output messages are also recorded. A transient trouble that affects several other packs can be noticed when it happens by the steady flashing of the LED on the disk drive when there is no other activity at the frame. Almost constant flashing often occurs when a unit UC is reporting errors. When there is an overload of messages, the lighted LED may be accompanied by an ERR MSGS TO LOG DISCARDED message. DGNDET messages and the autonomous removal of units with a COND D1 (unknown error) may also occur.

1. To get the history of hardware errors, enter **RTRV-LOG:[xy]::[ww]:ERR:HWER,INT-tt;** where tt is interval up to 59 minutes ago. It is advisable to start with a small interval (say 1 minute) because a dump of the whole contents could take hours.
2. Familiarize yourself with the ERR message output per Figure 4-8.

HOST00xx	ENTT00xx	ERRC00xxxx	ERRTxxxx	TRANxxxx	EVENxxxx
<data7>	<spare>	<spare>	<data10>	<data11>	<data12>
<data13>	<data14>	<data15>	<data16>	<data17>	<data18>

Figure 4-8. General Error History Message Format

3. Refer to Table 4-4 for the meaning of the first 2 data bytes (HOST -host ID and ENTT -entity) and to Table 4-5 for the meaning of data 3 (ERRC -error class).

Table 4-4. Host ID and Entity

Host	Meaning	ENTT	Meaning
0000	UC1 error	1	unit UC
0001	UC2 error	2	UBX
0002	UC3 error	3	EBX
0003	UC4 error	4	FTMI
0004	UC5 error	5	FC
0005	UC6 error	6	DDC
0006	UC7 error	7	DSPI
0007	UC8 error	8	DMB
0008	UC9 error	9	CCNI
0009	UC10 error	a	CCB
000A	UC11 error	b	TSI
000B	UC12 error	c	SSC
000C	UC13 error	d	EMTC
000D	UC14 error	e	Sync
000E	UC15 error	f	TLI
000F	UC16 error	10	Timing Link
0010	CI error	11	DISK
0011	MP error	12	TAPE
0012	CCN error	13	MP
0013	Frame error	14	CI
0014	Local error	15	LINK
0015	Unknown error	16	NPC
0016	MC error	17	MC
0017	Disk error	18	MJU
0018	Tape error	19	SRM
		1a	DS3U MXR
		1b	DS3U FLI
		1c	DS3U FMT
		1d	DS3U MIU
		1e	PR
		1f	EMTC
		20	EBX
		21	CCI
		22	ETSI

Table 4-5. Error Class Meanings

Code	Meaning
1	Hardware error
2	Transient error
3	Power error
4	Sanity bit error
5	CI link errors
6	Sync mode switch
7	Software error recovery
8	Error not found
9	Sync booted
A	Sync timing link errors
B	Background audits
C	Facility errors
D	Hardware error detected by application software

4. Use data 10 (or data 13 for DSPU NPC) to identify the hardware entity as follows:
   - — For a duplicated unit entity, the left half (4 digits) of data 10 gives the unit number (0 through 5 for units 1 through 6) and the right half gives the module (0 through 3 for FTM 1 through 4).
   - — For an ETSI entity, the left half (4 digits) of data 10 gives the side (0, 1) and the right half gives the unit (0 through F for units 1 through 16).
   - — For an FTU NPC entity, the left half (4 digits) of data 10 gives the unit number (0-5 for units 1 through 6) and the right half gives the NPC number in HEX. To get the NPC number, convert the HEX number to decimal and add 1 (see Figure 4-9 and Table 4-6).
   - — For a DSPU NPC entity, the left half (4 digits) of data 13 gives the side (0, 1) and the right half gives the NPC number in HEX. To get the NPC number, convert the HEX number to decimal and add 1 (see Figure 4-9).

Powers of 16 = 16^3 16^2 16^1 16^0

Example: Hex = 005A
Decimal Number = (0×16^3)
$+ (0 \times 16^2)$
$+ (5 \times 16^1)$
$+ (A \times 16^0)$, where $16^0 = 1$

0s = $(0 \times 0) = 0$
5 = $(5 \times 16) = 80$
A = $+ (A \times 1) = 10$, where A = 10
Decimal Number = 90
(NPC Number = 90 + 1 because internal count started with 0)

Hex Characters: = A = 10, B =11, C = 12, D = 13, E = 14, F = 15

Figure 4-9. Hexadecimal-to-Decimal Conversion Example

Table 4-6. Hexadecimal Numbers

(1) 01	(21) 15	(41) 29	(61) 3D	(81) 51	(101) 65	(121) 79	(141) 8D
02	16	2A	3E	52	66	7A	8E
03	17	2B	3F	53	67	7B	8F
04	18	2C	40	54	68	7C	90
05	19	2D	41	55	69	7D	91
06	1A	2E	42	56	6A	7E	92
07	1B	2F	43	57	6B	7F	93
08	1C	30	44	58	6C	80	94
09	1D	31	45	59	6D	81	95
(10) 0A	(30) 1E	(50) 32	(70) 46	(90) 5A	(110) 6E	(130) 82	(150) 96
0B	1F	33	47	5B	6F	83	97
0C	20	34	48	5C	70	84	98
0D	21	35	49	5D	71	85	99
0E	22	36	4A	5E	72	86	9A
0F	23	37	4B	5F	73	87	9B
10	24	38	4C	60	74	88	9C
11	25	39	4D	61	75	89	9D
12	26	3A	4E	62	76	8A	9E
13	27	3B	4F	63	77	8B	9F
(20) 14	(40) 28	(60) 3C	(80) 50	(100)64	(120) 78	(140) 8C	(160) A0

5. Find the meaning of the condition code given in data 4 (ERRT) from Table 4-7 or Table 4-8 in Section 4.7.

   NOTE:
   The CCI and ETSI errors are interactive; errors on one will affect the other. If most of the ETSIs for a unit are reporting errors, the common CCI for the unit has probably failed. If a CCI is reporting errors, one of the connecting ETSIs may have failed.

6. Enter command to remove the entity from service per Figure 4-10.
7. Enter command to diagnose same pack per Figure 4-10.

   NOTE:
   Attempt to clear pested packs on the same side before working on the other side. Only, if both sides are pested, you will need to bring the entire side up to service before attempting restoral of any failed or pested packs on the other side.

8. If DGN ...STF message is received, then go to *Manual Diagnostic Failures* to clear failed diagnostic.
   - If the message is not received, continue with Step **9**.
9. Replace the plug-in for the subject entity (or other replacements per Section 4.7) and enter commands to restore replacement packs to service per Figure 4-10.
10. If same transient messages are recorded again in error history on disk, contact technical consultant.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-10. Maintenance Command Construction

4.7 Isolate Trouble with ERR COND Code Meanings

1. From Table 4-7 or Table 4-8, find the explanation of the COND code which appears in the ERR,ESR message for the subject pack.
2. If you were able to clear the trouble using the meaning of the ERR code, go to Step **4**.
   - If you were not, continue with Step **3**.
3. Check printout for ERR SOFTWARE message.
   - If ERR SOFTWARE message also occurs in printout, go to *Software Error*.
4. To make a record of the error history on the disk (for use by technical consultant), enter one of the following commands (see Note):

   Time of Day/Time Interval:
   ```
   RTRV-LOG:[xy]::[ww]:ERR:HWER,{INT-mn|
   [DATE-mm-dd-yy,]TOD-hh-mm-ss}];
   ```

   Suspect Entity:
   ```
   RTRV-LOG:[xy]::[ww]:ERR:HWER,ENTY-eee;
   ```

   Where:

   INT = Interval of time (past 59 minutes)
   TOD = Time of day consisting of hour (hh=00 through 23), minutes (mm=00 through 60), seconds (ss=00 through 60). Date (month, day, year) is optional.
   eee = Plug-in designation, for example: BX, CCB, CCI, CCNI, FC, FTMI, LINK, MC, MP, MTC, NPC, DDC, FLI, FMT, MIU, MJU, MXR, SRM, SSC, SYNC, TAPE, TLI, TSI, UBX, UC.

   NOTE:
   All error events are logged on disk; however, the file is overwritten when the file capacity is reached. If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.
5. Contact technical consultant.

Table 4-7. ESR Condition Codes - CCNI,CCB,TSI

CCNI Pack	
COND 90	Software could not access CCNI; pack does not acknowledge. Corrective Action: (1) verify that CCNI is securely seated; (2) look for loss of sync to CCNI and replace CCNI; (3) look for MC, BX or CPU interface trouble.
91	RAM error in high data byte on MC-MP. Trouble in MC (BX or CPU), or CCNI.
92	RAM error in low data byte on MC-MP. See COND 91.
93	Address parity error. Corrective Action: enter command to restore CCNI.
94	Autonomous switch error. Circuit in CCNI for side switch independent of MP disagrees with mate CCNI.
95	Bus status error. Circuit cannot determine active side. Corrective Action: (1) replace CCNI; (2) if persists, report possible software error.
96	Stuck summary bit. Error leads from CCB or TSI stuck high, but no trouble can be found. Subject CCB and TSI packs are identified in messages.
CCB Pack	
COND A0	Software could not access CCB; pack does not acknowledge. Corrective Action: (1) verify that CCB is securely seated; (2) look for loss of sync to CCB and replace CCB; (3) look for MC, BX or CPU interface trouble.
A1	Loss of sync pulse signal for approx. 100 ms. Trouble in CCB or SYNC or sync interface between.
A2	Loss of 8 MHz clock. See COND A1.
A3	Bad data from TSI ports. If most ports are reported in ESR, probably the CCB is bad. If only a few ports are reported, probably the TSIs are bad.
A4,A5	Zero bit stuck at 1 in CCB (A4) or CCNI (A5).
TSI Pack	
B0	Software could not access TSI; pack does not acknowledge. Corrective Action: (1) verify that TSI is securely seated; (2) look for loss of sync through CCB and replace TSI; (3) look for MC, BX or CPU interface trouble.
B1	Stuck summary bit that indicates troubles from TSI devices, but no actual trouble can be found.
B2	TSI device error that clears during recovery; transient error.
B3	Software could not access TSI device; device failed or lost sync clock.
B4	Diagnostic exercise bits set on TSI device. Replace TSI.
B5	Error on address bus to TSI device. Trouble in TSI, CCNI, or MC-BX pack.
B6	TSI device not receiving good sync clock. Trouble in TSI, related CCB, or SYNC.
B7	Error on TSI control RAM which defines maps. Replace TSI.
B8	Parity error on port from FC or DSPU-DMB. If most all TSI ports are reported in ESR message, replace TSI. If isolated ports are reported, the FCs or DMBs are probably bad. Adjacent NPCs that share the DBM ports will be reported although only one is bad.
B9	Parity error from CCNI.

Table 4-8. ESR Condition Codes

MC-CI Pack	
COND D0	RAM parity error.
D5	Illegal/unknown condition code.
MC-MP Pack	
COND D0	RAM parity error.
D5	Illegal/unknown condition code.
2E	Unused bit error.
2F	Unknown error source.
30	Power failure.
31	Processor not sane. Corrective Action: verify that MP pack is securely seated.
MC-MTC Pack	
COND D5	Illegal/unknown condition code.
2B	Unknown interrupt from MTC.
2C	Stuck summary bit.
2D	Unused bit error.
30	Power failure.
31	Pack no same.
MC-EBX Pack	
COND D5	Illegal/unknown condition code.
16	Write RAM parity error, low byte.
17	Write RAM parity error, low byte.
18	RAM parity, CPU-EBX.
19	D9 bit error.
1A	D10 bit error.
1B	D11 bit error.
20	Access error. Corrective Action: (1) verify that EBX is securely seated; (2) replace EBX pack.
21	RAM parity error, low byte.
22	RAM parity error, high byte.
23	Fan Bank 0 error flag.
24	D5 spare bit error.
25	Fan Bank 1 error flag.
26	D5 spare bit error.
27	Stuck summary bit.
28	Unknown interrupt.
29	Error from side 0 bus extension.
2A	Error from side 1 bus extension.

Continued on next page

Table 4-8. *Continued*

MC-SSC Pack	
COND D4	SSC error.
31	SSC not sane. Corrective Action: verify that SSC is securely seated.
Unit-UC or UBX Pack (Types UA, UD, UC)	
COND 10	CPU parallel bus parity error.
11	CPU serial bus parity error.
0F	CPU internal bus error.
31	Unit UC is not sane. Corrective Action: verify that unit CPU is securely seated.
D0	Unit UC has RAM parity error. Corrective Action: replace unit CPU.
D1	Unknown error.
D2	Error source not found.
D3	Stuck bit in register on the pack.
D4	Failed UBX pack. Corrective Action: replace UBX pack.
D5	Invalid condition code.
30	Power failure.
FTMI Pack	
COND D5	Illegal/unknown condition code.
40	Error detected on bus from FTMI. Trouble either in FTMI, UBX, or MC-CPU.
41	Communications device (CIA) error.
42	Communications device (CIB) error.
43	Communications device (CIC) error.
44	Software could not access FTMI; pack does not acknowledge. Corrective Action: (1) verify that the FTMI is securely seated; (2) verify that FCs are securely seated and not failed; (3) verify that CCIs and ETSIs for unit are securely seated and not failed.
45	Loss of sync clock from UBX.
46	Device ID disagreement.
47	Data strobe signal.
48	Address parity error. Corrective Action: enter command to restore FTMI.
49	Stuck bit on port from FC. If most of the ports are listed in ESR, the FTMI is probably bad. If isolated ports are reported, an FC is probably bad.
4A	Stuck bit on port from NPC. If most of the ports are listed in ESR, the FTMI is probably bad. If isolated ports are reported, an FC is probably bad.
4B	All FTMIs have lost sync clock. Trouble on related CCB or SYNC.

Continued on next page

Table 4-8. *Continued*

FC Pack	
COND D5	Illegal/unknown condition code.
4C	Software could not access FC; pack does not acknowledge. Corrective Action: (1) verify that FC is securely seated; (2) look for loss of sync from CCIs and ETSIs and replace FC; (3) look for unit UBX or UC trouble.
4D	Pack timer error.
4E	Circuit ID error.
4F	Transmit formatter error on ports from NPCs. If most of the ports are listed in ESR, the FC is probably bad.
50	Receive formatter error on ports from NPCs. Corrective action: (1) Restore FC; if restore denies, replace pack. (2) If FC is removed again and NPC is implicated in message, replace NPC.
51	Sanity timer interrupt.
52	RF bus error.
DS3U MXR Pack	
COND 14	DS3 loss of signal.
15	Unknown error.
34	M23 summary register stuck bit.
97	Communications link error.
A6	Chan controller transmit data error.
A7	Chan controller receiver data error.
A8	Chan controller exercise error.
A9	Chan controller register stuck bit.
AA	Transceiver framer error.
AB	Transceiver receive sync error.
AC	Transceiver transmitter error.
AD	M23 device error.
AE	M12 device error.
AF	M12 summary stuck error.
D5	Illegal/unknown condition.
D8	MXR ROM error.
D9	MXR LCA error.
DA	MXR queue overflow.
DB	Chan controller loss of clock.
DC	Chan controller frame sync error.
DD	Chan controller config register error.
DE	Chan controller instruction RAM error.
DF	Chan controller parity error.

Continued on next page

Table 4-8. *Continued*

DS3U MXR Pack (contd)	
COND E1	MXR access error.
E2	Hard error stuck bit.
E3	Facility error stuck bit.
E4	MXR is in reset state.
E5	PIF bus parity error.
E6	Loss of clock from unselected FLI.
E7	45 MHz not phase locked to system clock.
E8	Firmware error.
E9	HSCC device error.
EA	PIF I/O device error.
EB	M13 summary register stuck bit.
EC	Transceiver summary stuck bit error.
ED	Program error.
EF	RAM error.
DS3U MIU Pack	
COND 01	CEC bit (on HSCC) not cleared.
02	Firmware error.
03	Excessive transmit data underruns.
04	Invalid acknowledge from MXR.
05	No acknowledge from MXR.
06	RAM data error.
07	Invalid code checksum.
08	FDL (on HSCC) register error.
09	MXR (on HSCC) register error.
0A	EPROM checksum error.
0B	Timer 1 error.
0C	Timer 2 error.
0D	DUART error.
0E	MIU access error.
D5	Illegal/unknown condition.
D6	Communication error.

Continued on next page

Table 4-8. *Continued*

DS3U FLI Pack	
COND 12	Register bit stuck.
13	Switch lock and key alarm.
3B	FLI access error.
3C	Communication error.
BA	Loss of clock.
BB	Loss of signal.
BC	Circuit ID error.
BD	Frame sync or internal error.
BE	Address bus parity error.
D5	Illegal/unknown condition.
DS3U FMT Pack	
COND 33	TF control bus error.
35	Multiple TF network error.
36	Single TF network error.
37	TF device or clock receiver error.
38	Multiple TF clock error.
39	Single TF sync error.
3A	Multiple TF sync error.
D5	Illegal/unknown condition.
D7	Communication error.
F0	FMT access error.
F1	Timing error.
F2	Link ID error.
F3	FMT bus timeout.
F4	Serial address parity error.
F5	0-4 TF timing error.
F6	0,4 TF timing error.
F7	RF data parity timing error.
F8	Error summary register 1 stuck bit.
F9	Error summary register 2 stuck bit.
FA	Lock override, active select, or kill parity error.
FB	FIFO or control PROM error.
FC	RF control bus error.
FD	RF port and monitor alarms.
FE	RF port alarm, no monitor alarms.

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Table 4-8. *Continued*

FTU-NPCs (Common for DPCs and DDCs)	
COND 53	DDC bus error.
54	Software could not access NPC; pack does not acknowledge. Corrective Action: (1) verify that NPC is securely seated; (2) check loss of sync from FC; (3) check unit UBX or UC trouble; (4) if persists, replace NPC.
55	NPC is sending a port alarm to the FC.
56	Facility processor on NPC is not sane.
57	SYNC error on FC.
58	Loss of sync clock to channel controller.
59	Loss of frame sync error to channel controller.
5A	Channel controller configuration error.
5B	Channel controller RAM error. Corrective Action: enter command to restore NPC.
5C	Channel controller parity error. Corrective Action: enter command to restore NPC.
5D,5E	Channel controller transmit (5D) or receive (5E) error.
5F	Channel controller exercise error.
60	Channel controller summary bit error.
61	Hard RAM error.
62	Hard ROM check error.
63	Hard error stuck bit.
64,67	Transceiver A (64) or B (67) stuck bit.
65,68	Transceiver A (65) or B (68) transmit slip.
66,69	Transceiver A (66) or B (69) error.
6A	Circuit ID error.
6B	Facility errors.
6C	DDC address parity error.
6D	Invalid FPA state.
6E	Invalid DDC pack ID.
D5	Illegal/unknown condition.
DSPU NPC - MJU	
	Corrective Action for COND BF-C7: replace MJU (subject side).
COND BF	Serial access error.
C0	Clock error.
C1	Processor interface error.
C2	Input data interface error.
C3	Error correction circuitry failure.
C4	Control memory failure.
C5	Output block failure.
C6	Sampling circuitry failure.
C7	Control memory or state machine failure.

Continued on next page

Table 4-8. *Continued*

DSPU NPC - SRM	
	Corrective Action for COND C8-CF: replace SRM (subject side).
COND C8	Serial access error.
C9	Clock error.
CA	Processor interface failure.
CB	Input data interface failure.
CC	Error correction block failure.
CD	Control memory failure.
CE	Multiplexer block failure.
CF	Output block failure.
FTU NPC - CEPT DPC	
COND 3D	ROM error.
3C	TS0 monitoring overflow.
3E	Loss of timing.
3F	OOS test ran while pack was in service.
DSPU-DSPI	
COND 6D	Software could not access DSPI; pack does not acknowledge. Corrective Action: (1) verify that DSPI is securely seated; (2) look for loss of sync from UBX and replace DSPI; (3) look for unit CPU trouble.
6E	Bus parity error. Trouble either on unit CPU or DSPI.
6F	Bus address parity error. Corrective Action: enter command to restore DSPI.
D3	Stuck bit on unit CPU, but no ESR bits set on DSPI.
CPR Packs	
COND 98	CPR serial access error.
99	CPR clock error.
9A	CPR processor interface failure.
9B	CPR input data interface failure.
9C	CPR D-bit interface parity error.
9D	CPR control memory failure.
9E	CPR control memory or state machine failure.
9F	CPR FIFO FRDY/FFULL stuck bit.

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Table 4-8. *Continued*

DSPU NPC - DMB	
COND 70	Software could not access DMB. Corrective Action: (1) verify that DMB is securely seated; (2) check clock loss from DSPI; (3) replace DMB; and (4) replace DSPI.
71	No reply on serial interface bus to NPC pair.
72	No reply on parallel interface bus to NPC pair.
73	Diagnostic exercise bits for DMB set on DSPI. If error persists after DSPI replacement, report possible software trouble.
74	DMB data processing error.
75	Multiple data parity error; however, check bit in DMB not set. Corrective Action: replace associated unit ETSI pack.
76	Sync clock error. Trouble in NPC or associated unit ETSI.
77	Sync clock error on multiple DMBs. Trouble in associated unit ETSI or the SYNC.
78	DMB FIFO error.
79	Power failure on DSPU side.
7A,7B	Transient error on control memory 0 (7A) or mem 1 (7B).
7C,7D	RAM parity error on control memory 0 (7C) or mem 1 (7D).
7E,7F	Interface error on control memory 0 (7E) or mem 1 (7F).
80,81	Loss of sync on control memory 0 (80) or mem 1 (81).
82,83	Input data parity error on control memory 0 (82) or mem 1 (83).
84,85	Transient on conferencer 0 (84) or conferencer 1 (85).
86,87	Control interface error on conferencer 0 (86) and 1 (87).
88,89	Control RAM parity error in control data or configuration field for conferencer 0 (88) or conferencer 1 (89).
8A,8B	Input data parity error on conferencer 0 (8A) or 1 (8B).
8C,8D	Parity, configuration, or reset error on conferencer 0 (8C) or conferencer 1 (8D).
8E,8F	Bit alarms on control memory 0 (8E) or mem 1 (8F).
D5	Illegal/unknown condition.
CCI Pack	
COND 01	Software could not access CCI. Corrective action: (1) verify that CCI is securely seated; (2) look for loss of clock (3) replace CCI; and (4) check MC, EBX, or CPU interface trouble.
02	Incorrect version number on CCI.
03	Summary bit set, but no other errors.
04	CCI ERR bit set in system status register.
05	ETSI ERR bit set in system status register.
06	Peripheral unit bit set in system status register.
07	Bus terminator pack absent.
08	2-MHz clock out of phase-lock.
09	240 frame sync misaligned.
0A	Loss of 240 frame sync.
0B	Loss of 8-kHz frame sync.
0C	CCI detected address parity error.
0D	CCI detected low byte data parity error.
0E	CCI detected high byte data parity error.
0F	CCI -5.2 power supply failure.
10	CCI detected bus status parity error.
11	Peripheral unit alarm.
12	Sync summary bit set on CCI pack.

Continued on next page

Table 4-8. *Continued*

ETSI Pack	
COND 20	Software could not access ETSI; pack does not acknowledge. Corrective Action: (1) verify that ETSI is securely seated; (2) look for loss of sync to ETSI and replace ETSI; (3) look for MC, EBX, or CPU interface trouble.
21	Incorrect version number on ETSI pack.
22	Summary bit set, but no other errors.
23	Loss of 32.768-MHz clock.
24	Loss of 240 frame sync.
25	Receive MDX summary bit set.
26	Control RAM summary bit set.
27	Transmit MDX summary bit set.
28	Loss of 3.3-volt power from CCI pack.
29	Peripheral unit port alarm (receive MDX).
2A	Receive MDX data source time-slot parity error.
2B	Receive MDX sync error.
2C	Receive MDX address parity error.
2D	Receive MDX write data parity error.
2F	Receive cannot be accessed; incorrect chip ID.
30	Transmit MDX data parity error.
31	Transmit MDX data source time-slot parity error.
32	Transmit MDX sync error.
33	Transmit MDX address parity error.
34	Transmit MDX write data parity error.
35	Transmit MDX cannot be accessed; incorrect chip ID.
37	Control RAM parity error.
38	Control RAM sync alarm.
39	Control RAM port alarm.
3A	Control RAM BIST flag is set.
3B	Data RAM BIST flag is set.
3C	Control RAM address parity error.
3D	Control RAM write data parity error.
3E	Control RAM device cannot be accessed; incorrect chip ID.
3F	Control RAM circuit pack parity.
40	Control RAM device is in reset state.
41	Control RAM port alarm summary bit set.
42	TRD3 status exercise bit is set.
43	Ready high error detected from CCI.
44	Ready timeout error from CCI; CCI cannot access ETSI.
45	Control RAM stuck bit error.

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Table 4-8. *Continued*

SYNC Packs	
COND 96	Transient error on sync pack.
D5	Illegal/unknown condition.
E000	Gross SYNC error registered at CCI. Communications with SYNC failed. Corrective Action: check if SYNC plug-ins have been disconnected.
E001	SYNC reports bad DPLL pack to error recovery.
E002	SYNC reports bad TB pack to error recovery.
E003	SYNC restarted itself autonomously.
E004	Software could not communicate with SYNC. Trouble with SYNC or in MC-MP.
E100	Transient caused by MP to SYNC communications failure. This error also brings E004 and remove SYNC.
E101	SYNC ROM checksum failure.
E102	SYNC RAM data or address error.
E103	SYNC has phase/freq. output latch error.
E104	Loss of 2.048 MHz output from frequency synthesizer.
E105	Loss of 2.048 MHz output from phase shift circuit.
E106	Loss of generated sync pulse output.
E107	Loss of time base strobe pulse.
E108	SYNC interrupt controller error.
E109	SYNC interrupt holding register error.
E10A	SYNC UART error.
E10B	SYNC control data output latch error.
E200	Unknown TB transient error; brings E004 message and RMV SYNC.
E201	Loss of output from TB.
E202	SYNC could not read TB pack ID or oven temperature.
E203	For MASTER timing, SYNC finds its TB has drifted out of limits.
E204	Ovens in both SYNC TBs are cold.
E205	New TB pack oven has not reached temperature. For Stratum 3, message appears once, though subsequent restorals will fail until temperature is reached. For Stratum 2, the message is repeated.
E300	Unknown PLL transient error; also brings E004 and RMV SYNC.
E301	One or both SYNCs report that PLL remains at end of range for 1 minute. If both SYNCs report the TLI is removed. If one reports, that SYNC is removed.
E302	Reporting SYNC finds excessive phase error (125 μ out of phase).
E303	Reporting SYNC found PLL violations.
E304	Noise on timing link caused PLL to go from fast start to normal mode.
E305	Accompanies E301 to declare timing link (SSP) failure.
E400	Unknown mate SYNC transient; also brings E004 and RMV SYNC.
E401	Reporting SYNC found bad mate. Mate declared out-of-service; ESR bits are from reporting SYNC.
E402	One SYNC communicated failure to reporting SYNC. ESR bits are from reporting SYNC.
E403	One SYNC communicated loss of cross-coupling for 1 millisecond to reporting SYNC. ESR bits are from reporting SYNC.

Continued on next page

Table 4-8. *Continued*

SYNC Packs (contd)	
COND E404	One SYNC communicated loss of cross-coupling for 30 msec. See E403.
E405	Communication link with mate is down. ESR bits are from reporting SYNC.
E406	Cross-coupling violation that indicates trouble with mate rather than DPLL. ESR bits are from reporting SYNC.
E407	Cross-couple fast lock circuit failed to align phase of two syncs.
E408	For MASTER timing, the TB in the mate SYNC has drifted out of limits.
E409	One SYNC communicated loss of cross-couple lock to reporting SYNC.
E500	Transient TLI error; no further communication. Brings E004 message and RMV SYNC.
E501	TLI hardware error as defined by the ESR message bits. For TE type, one or both SSPs may be effected.
E600	Unknown SSP error; no further communication. Brings E004 message and RMV SYNC.
E601	Subject SSP has errors and cannot be used as timing source. Error brings diagnostic on SSP. Trouble either on incoming link or in TLI-SSP.
E602	Subject TLI-SSP was found to be cause of errors and was removed from service.
E603	Incoming unipolar clock does not match frequency field requirements defined in ESR message bits.
E700	Unknown CRO error; no further communication. Error brings E004 message and RMV SYNC.
E701	Loss of CRO clock signal.
E702	Loss of CRO clock signal. If one SYNC declares error, trouble is probably TB or DPLL. If both declare error, trouble is probably CRO which will be removed.
E703	SYNCs report that CRO has drifted out of limits.
E704	SYNC declared that CRO is out-of-service.
E800	Unknown clear message.
E801	Mate error cleared.
E802	PLL error cleared.
E803	TB error cleared.
E804	CRO error cleared.
E805	Timing link error cleared; link can once again be used as source. Error brings diagnostic and updated link status.
E806	TLI error cleared.
EF00	Transient unknown SYNC side switch error. Error brings E004 message and RMV SYNC.
EF01	SYNC changed to NORMAL mode and is on named SSP source.
EF02	SYNC changed to HOLDOVER mode and is on internal osc.
EF03	SYNC changed to FAST START and is on named SSP source.
EF04	SYNC switched to different TLI for timing source.
EF05	SYNC changed to CROSS-COUPLE and derives timing from mate.

4.8 Clear ERR HARDWARE Message

1. Notice which plug-in is named in the last line of the REPT ALMDET EQPT "ERR,HARDWARE" message. Also check for error code or further explanation in the message.
2. Study the associated messages to determine if the subject plug-in has been removed and diagnosed.
3. Check for a blown fuse on the 48-volt fuse and alarm panel and on the frame fuse boards. Also check for ERR PWR message (for failed power unit) in printout.
   - If there is a blown fuse, go to *Power Failures* to clear the blown fuse trouble.
   - If there is a failed power unit, go to *Power Failures* to clear the failed power unit.
4. Which of the following codes/explanations are given in the ERR message?
   - If **hardware database mismatch**, then continue with Step **5.**
   - If **can't access link**, then proceed to Step **8.**
   - If **hardware boot failed**, then proceed to Step **10.**
   - If **other code**, then proceed to Step **12.**
   - If **no code or explanation**, check trouble printout for associated trouble messages. If you cannot identify the trouble using printout and the *Trouble Identification* section, contact technical consultant.
5. Hardware does not match inventory in data base or there is a hardware failure. Enter following command and check if correct equipment code plug-ins are installed for sync or NPC plug-ins that have growth specifications.
   `RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;` where UNIT field limits NPC information to one unit.

   ⇒ NOTE:
   The conditions are indicated in the output message by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

   - If incorrect plug-in installation was found and if the plug-in named in message was removed from service, enter RST-EQPT command for CP per Figure 4-11. This procedure is completed.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-11. Maintenance Command Construction

6. If plug-in named in message was not removed from service and diagnosed, enter the RMV-EQPT and DGN-EQPT commands for the CP per Figure 4-11.
   - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear the failed diagnostic.
7. Enter RST-EQPT command for plug-in.
   - If trouble persists, contact technical consultant.

For Can't Access Link, Continue Here

8. Software could not access subject pack. Verify that the pack is installed.
9. If the subject pack has not been diagnosed, enter DGN command to diagnose pack per Figure 4-11.
    - If DGN ..STF message is received, go to *Manual Diagnostic Failures* to clear the failed diagnostic.

For Hardware Boot Failed, Continue Here

10. Hardware boot failed. If the subject pack has not been removed from service, enter RMV command to remove pack per Figure 4-11.
11. Enter RST command to restore same pack to service per Figure 4-11.
12. Find expanded explanation in Table 4-9 and perform corrective action. Refer to Figure 4-11 for command construction. Remember to enter commands to remove pack before replacing, and restore after replacing.
    - If you were not able to find the trouble, check trouble printout for associated trouble messages. If you cannot identify the trouble using printout and the *Trouble Identification* section, contact technical consultant.

Table 4-9. Error Hardware Explanations

Code	Explanation/Corrective Action
Hardware database mismatched	Hardware code and data base do not agree.
Hardware failure	Attempt to write to named pack failed.
Hardware boot failed	Attempt to boot (reset or restore) pack failed.
Can't access link	X.25 layer 3 protocol failure; far-end is not transmitting or responding. Check far-end equipment or software failure.
Transmit time-out	For X.25 link, there is a layer 1 (clear-to-send) failure; check link cabling and connections. For Snider link, there is a possible CI (DUART circuit) failure; enter **DGN-EQPT::LINK-j;** and replace CI to clear failure.
Receive time-out	X.25 layer 1 or 2 protocol failure; far-end is not transmitting or responding. Check far-end equipment or software failure.
Software failure... link removal	Software failure forced link out-of-service. Enter **RST-EQPT::LINK-j;**.
Unit could not be reset	Unit could not be reset for boot. Enter appropriate RMV command (UNIT-[q]q, UC or MC), replace CPU (in UNIT) and EMTC (in MC), and restore pack. Check unit to MC cabling.
Unit failed sanity check	Unit failed sanity check for boot. Enter **RMV-EQPT::UNIT-[q]q::UC;**, replace CPU in unit, and restore pack.
Failure to insert TCC	NPC failed to insert trunk conditioning. Enter **DGN-EQPT::NPC;**. Remove and replace if necessary.
Failure to remove TCC	NPC failed to remove trunk conditioning. Remove and replace NPC.
Failure to switch CNN sides	Failure to verify ECCN side switch. Enter **DGN-EQPT::CCI-s;** for each side. If no failure is found, enter commands to remove and restore each CCI to reestablish active side.
NPCs facility queue overflow	NPCs/facilities hardware error overflow. Check for DS3 or multiple facility failure or all NPCs in unit failing because of common equipment.

4.9 Clear DS3 Equipment Critical Alarm

NOTE:
One thing to remember about DS3 protection switching is that a failed MMFG that cannot be automatically switched to protection will be marked ISF (in-service, failed). An MMFG with ISF status cannot be removed because the protection switch is in use, and the MMFG cannot be restored (after plug-in replacement) because it is already in-service. After one MMFG failure is cleared, another failed MMFG will switch to protection.

1. If alarm cutoff is needed, enter **OPR-ACO-ALL**.
2. Consider the following possible causes of the critical alarm:
   - — The DS3 facility has failed. The DS3U protection switching only protects against loss of service due to DS3U plug-in failures.
   - — More than one MXR function group has failed. Only one protection MXR function group is provided for backup protection.
   - — An MXR function group has failed and the protection switching for that group is inhibited.
3. Study printout to find the trouble message(s). Look for REPT ALMDET ...ANALYSIS REPORT messages. The DACS II analyzes all the error inputs and reports packs that have failed diagnostics and related packs that can also cause the failure.
4. Check for blown fuses. If whole units of packs have failed, check the fuse and alarm panel for lighted **FA** lamp and a blown 48-volt feeder fuse. In the unit and other circuit groups, check for lighted LED indicator on fuse boards or 80-type LED fuses.
   - ■ If there is a blown fuse at the frame, go to *Power Failures*.
5. If there is an REPT ALM T3 ...UNIT DS3 message, go to *Facility Alarms* to clear UNIT DS3 alarm.
   - ■ If there is no unit DS3 alarm message, continue with Step **6.**
6. There are two vital retrieve commands for the DS3 equipment:
   - — **RTRV-STATE-T3::UNIT-[q]q::DS3-c[&&-d];** which shows the protection state (PSTATE) and status of the MXR function group and the facility (or continuous range of MMFGs and facilities).
   - — **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** which shows the MXR and MIU maintenance and the protection states for each MMFG and FLI circuit pack.

7. Enter the query commands from above and study the output information using the following:
   - — Facility failures are indicated by the presence of OOF (out-of-frame), LOS (loss of signal), or HBER (high BER) in the DS3 query.
   - — Table 4-10 gives the meanings of the various codes in the PSTATE output. The message is as follows: (1) the protection MMFG is listed first on the left, and (2) for each MMFG, the top code is the MXR maintenance status, next down the MIU (if any) status, next the MMFG protection status, and lastly, the protection availability.
8. Which problem is indicated by the outputs of the query commands?
   - If **More Than One MMFG Has Failed,** proceed to Step **15.**
   - If **Protection Switching Inhibited,** continue with Step **13.**
   - If **Undetermined,** continue with Step **9.**
9. Enter command to switch FLI to protection as follows:
   `SW-TOPROTN-EQPT:[xy]:UNIT-[q]q:[ww]:FLI;`
10. If critical alarm clears, continue with Step **11**.
    - If alarm does not clear, enter following command to switch back to service FLI and go to Section 4.3 to *clear ERR <entity> messages.*
      `SW-TOWRG-EQPT:[xy]:UNIT-[q]q:[ww]:FLI;`
11. Enter command to remove FLI per Figure 4-12 and replace service FLI plug-in (FLI S).
12. Enter command to restore replacement per Figure 4-12.
    - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion.
    - If RST ...COMPLD message is received, enter following command to switch back to service FLI; this procedure is completed.
      `SW-TOWKG-EQPT:[xy]:UNIT-[q]q:FLI;`
13. Enter `ALW-SW-EQPT::UNIT-[q]q::MMFG-c:PROTN;` for the MMFG for which switching is inhibited.
14. If alarm status changes from critical to major, then proceed to Step **17**.
    - If the status does not change, repeat from Step **8**.

Table 4-10. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

15. From the query information and the trouble printout, determine which MMFG is switched to protection.

NOTE:
The first MMFG to fail will be served by the protection MMFG, and the other failed MMFGs are marked ISF (in-service and failed). If all the MMFGs in the unit have failed, MMFG 1 will probably be the one that is switched to protection.

16. If you need to cause the protection switch to move to another failed MMFG, enter **SW-TOPROTN-EQPT::UNIT-[q]q::MMFG-c:FRC;** for the MMFG which you want to place on protection to maintain service or to enable maintenance (see Note).

    NOTE:
    If an MMFG is in-service and failed (because another MMFG was being served by protection), plug-ins cannot be replaced and restored to service. When switched to protection, the same MMFG will be removed from service (OOS) allowing maintenance.

17. Use the ERR ESR messages for the DS3U plug-ins to determine which MMFG plug-in(s) are implicated and replace the named pack(s). The implicated circuit packs have either an OOS (out-of-service) or ISF (in-service and failed) status.

18. Enter command to restore the replacement plug-in to service per Figure 4-12.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 4-12. Maintenance Command Construction

19. If you were able to clear the trouble, then continue with Step **20**.
    - If you were not, then go to Section 4.3.

NOTE:
When the service MMFG is restored to service, the next failed MMFG will switch to protection. If only two MMFGs failed, the alarm status will change from critical to major.

NOTE:
If a failed MMFG cannot be switched to protection, it will be marked ISF (in-service, failed). An MMFG with ISF status cannot be removed because the protection switch is in use, and the MMFG cannot be restored (after plug-in replacement) because it is already in-service.

20. Repeat Steps 15 through 19 to clear remaining DS3 alarms.
21. Enter `RTRV-STATE-EQPT::UNIT-[q]q::PROTN;` to check the maintenance and protection status of each of the MMFGs.
22. If the protection switch was operated (or inhibited) manually to enable maintenance, enter the command to reverse the operation as follows:

    Release Protection
    `SW-TOWKG-EQPT::UNIT-[q]q::MMFG-c;`

    Allow Switching
    `ALW-SW-EQPT::UNIT-[q]q::MMFG-c:PROTN;`

23. Enter `RTRV-STATE-EQPT::UNIT-[q]q::ALL;` to check for failed or out-of-service plug-ins. Clear failures as follows:
    - — For failed plug-ins, enter RMV command for plug-in, replace it, and enter RST command per Figure 4-12.
    - — For failed facilities, check facility errors and clear counts. If NPC was removed from service, enter RST command for NPC per Figure 4-12.

Manual Diagnostic Failures

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Manual Diagnostic Failures

5

This chapter contains the procedures to clear failed diagnostic tests on the DACS II plug-ins or circuit groups. The failed diagnostic will be reported as a result of a manual entry of the diagnostic command or autonomous error recovery operation. A failed diagnostic is always indicated by the STF keyword in the message.

NOTE:
If you already have isolated the trouble to a failed diagnostic, proceed directly to the procedure for that failed diagnostic; otherwise, go to *Trouble Identification* to first isolate the trouble.

The following equipment considerations pertain to the diagnostic tests:

- The diagnostic for a plug-in specifically tests that plug-in, and the plug-in itself is always the first one implicated by the failure.
- Except for the disk and tape, the diagnostic tests are also run as part of the command to restore the plug-in to service.
- The diagnostics for facility NPCs include loopback tests which check the internal transmission paths (except line transformers) and tests which checks the facility error detecting circuits.
- With the CEF (capacity expansion frame), diagnostic tests for various plug-ins also include cabling tests. The FC , FMT (for DS3), and DSP NPC diagnostics check wiring between the unit and the ECCN. The unit UC diagnostic checks wiring between the unit and the EFC. The ETSI diagnostic sources and reads time slots in and out of the ECCN bus.

5.1 Clear Failed MC Diagnostic

1. If alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Locate the diagnostic trouble number that appears immediately after the STF word in the output message.
3. On CEF frame, if the trouble number is 0C00, check if the CCI packs are installed in both sides of the network.
   - If the packs are not installed, clear the trouble by installing and restoring the CCI packs, using the command **RST-EQPT::CCI-s;** (s = Side 0 or 1).
   - If the MC (main controller) was removed from service (REPT RMV EQPT ...MC), proceed to Step **7**.
4. If trouble number is in the range from 0100 to 0500, enter the diagnostic command for the implicated plug-in per Table 5-1 and refer to the trouble procedure for the failed diagnostic.
5. If an REPT RMV EQPT ...MC message did not accompany the DGN MC ...STF message, enter **RMV-EQPT::MC;** to remove the MC from service.
6. If the trouble number is greater than 0500, replace the pack implicated by the diagnostic trouble number per Table 5-1.

Table 5-1. Implicated MC Plug-Ins

Trouble Number	Implicated CP	Diagnostic	Reference
0100	MP	DGN-EQPT::MP;	Section 5.2
0200	CI	DGN-EQPT::CI;	Section 5.3
0300	SSC	DGN-EQPT::SSC;	Section 5.5
0400	DISK	DGN-EQPT::DISK;	Section 5.4
0500	TAPE	DGN-EQPT::TAPE;	Section 5.17
0600, 0700, 0800, or 0900	EMTC/MTC	None	None
0A01, 0A02, 0A03, 0A04, 0A05, or 0C00	EBX/BX2	None	None
0B00, 1000	EBX/BX2 or CCI (active side)	None	None

7. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the hard disk (or from tape if the disk cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and SSC and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

   - If RESET...COMPLD (with no error explanation) message is received, this procedure is completed.
   - If RESET...COMPLD (with error explanation) message is received, go to *Data Base Troubles* to clear conditional reset completion.

8. Enter `DGN-EQPT::MC;`
   - If DGN MC ...STF message is received, contact technical consultant.

5.2 Clear Failed MP Diagnostic

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Find the diagnostic trouble number that is located immediately after STF in the message.
3. Which trouble number appears in the failed diagnostic message?
   - If the trouble number is 0800 or 0900 (see Note), continue with Step **4**.

     NOTE:
     If you previously had a failed MC diagnostic with trouble numbers 0800 and 0900, those trouble numbers have different meanings for the failed MP diagnostic. Consequently, different plug-ins are implicated by those numbers in this procedure.

   - If the trouble number is not 0800 or 0900, proceed to Step **7**.
4. Enter **DGN-EQPT::SSC;** to diagnose the SSC.
   - If DGN SSC ...STF message is received, continue with Step **5**.
   - If DGN SSC ...STF message is not received, proceed to Step **7**.
5. If the MC (main controller) has not been removed from service (as shown by previous RMV MC COMPLD or RST MC DENY in printout), enter **RMV-EQPT::MC;**.

   NOTE:
   If the remove command is entered and the MC is already out of service, the entity out of service deny message will be received.

6. Replace the SSC (code TM659C) and proceed to Step **9**.
7. If the MC (main controller) has not been removed from service (as shown by previous RMV MC COMPLD or RST MC DENY in printout), enter **RMV-EQPT::MC;**.

   NOTE:
   If the remove command is entered and the MC is already out of service, the entity out of service deny message will be received.

8. Replace the CPU (code TM657B) located in the MC.
9. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the hard disk (or from tape if the disk cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and SSC and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

   - If STARTUP STF message is received in the reset sequence, and if the CPU in the MC has not been replaced, follow the same sequence to replace the CPU.
   - If RESET ...COMPLD (with no error explanation) message is received, you have completed this procedure.
   - If RESET ...COMPLD (with error explanation) message is received, refer to *Data Base Troubles* to clear conditional reset completion.

10. If trouble persists, contact technical consultant for assistance.

5.3 Clear Failed CI Diagnostic

1. If the alarm cutoff is not already operated, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the MC (Main Controller) has not been removed from service, enter `RMV-EQPT::MC;`.

   NOTE:
   If the remove command is entered and the MC is already out of service, the entity out of service deny message will be received.

3. Replace the CI (TM658C), ECI (TM736C), or HECI (TM762), whichever is installed, circuit pack with the same circuit pack code.
4. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the hard disk (or from tape if the disk cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and SSC and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

5. Early in the reset sequence, if CI STARTUP ATP message is received, continue with the Step **6**.
   - If CI STARTUP ATP message is not received, check CI/ECI slot and backplane for damage. If no wiring problem is found, contact technical consultant for assistance.
6. During the sequence, if STARTUP STF is received for MP or SSC, refer to Section 5.2.

- If STARTUP STF is not received, continue with Step **7**.

7. If MC RESET COMPLD (with no error explanation) is received, you have completed this procedure.
   - If MC RESET COMPLD (with error explanation) is received, refer to *Data Base Troubles* to clear reset completed conditionally.

5.4 Clear Failed Disk Diagnostic

NOTE:
If the disk is out-of-service (not running), it will be powered up when it is restored either by command or by the reset operation. Whenever the disk is replaced, the new disk must be initialized and loaded with the executable (PROG) programs and data bases from the backup tape using CPY-MEM commands.

NOTE:
To use all the commands herein, you must have RMON (restricted maintenance enabled) via **SET PRVG command.**

NOTE:
Commands that require a failsafe YES/NO answer to execute must be entered at the frame; the YES/NO answer will not pass through an OS interface and the DACS II command will time out.

Supplementary Information — Tape Cartridge Replacement

If you do not know how to replace the tape cartridge, familiarize yourself with the following procedure.

- If the tape is not already out-of-service, enter `RMV-EQPT::TAPE;` to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).
- Remove tape cartridge from the drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.
  - — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.

- Insert tape cartridge into the tape drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

    NOTE:
    Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
    Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

  - — **Tape Drive With the Drawer**. Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

    NOTE:
    Metallic side of the cartridge faces down and the door faces to the right.

- Enter `RST-EQPT::TAPE;` to power up the tape drive and retension the tape.
  - — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.
  - — If other denial message is received, the reason for denial will be in the output message.

Trouble Clearing Procedure

1. If the alarm cutoff is needed, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the status panel.
2. Verify that the most up-to-date backup tape (with executable software) is in the tape drive for backup in case the disk data bases are lost. If not in place, install tape cartridge (see *Supplementary Information — Tape Cartridge Replacement* at the beginning of this procedure).

   NOTE:
   Formatted tapes (without executables) can be ordered for use as backup tapes. One of the generic tapes (or backup tape with executables) is required as source for executables (PROG)

3. Enter `DGN-EQPT::DISK;` to determine the state of the frame.

   NOTE:
   The DGN ...ATP response is not expected; but if it occurs, the problem is no longer present and you can discontinue this procedure.

4. Which response is obtained?
   - If **DGN ...STF**, continue with Step **5**.
   - If **DGN DENY (MC OOS)**, proceed to Step **12**.
5. Enter `DGN-EQPT::SSC;`.
   - If DGN ...STF message is received, go to Section 5.5 to Clear the failed SSC diagnostic.
6. Enter `RST-EQPT::MC::MCOND;` to place the frame in the maintenance condition.
7. Enter `RMV-EQPT::DISK;` and `RST-EQPT::DISK;`.
   - If RST ...DENY message is received, proceed to Step **9**.
   - If denial message is not received, continue with Step **8**.

8. Enter `RST-EQPT::MC;`.
   - If RESET COMPLD (with error explanation) message is received, go to *Data Base Troubles* to clear the trouble.
   - If the reset completion with no conditions or errors is received, proceed to Step **14**.

9. Replace the DACS II disk drive unit.

Replace Disk Drive

On the main controller shelf, locate the disk drive plug-in to be replaced.

- If the DACS II is executing commands (not disabled by trouble), continue with Step **b**.
- If the DACS II is not executing commands, proceed to Step **d**.

a. If the DACS II is not already in the maintenance condition (MCOND COMPLD in printout) from the previous procedure, enter `RST-EQPT::MC::MCOND;`.

b. Enter `RMV-EQPT::DISK;` and proceed to Step **e**.

c. Disconnect SSC plug-in from MC to remove power from disk. The disk will stop spinning in about 30 seconds.

d. See Caution. Disconnect the disk plug-in from the shelf slot and place it out of the way to prevent accidental damage to it.

CAUTION:
Do not allow the mounting assembly or drive unit to drop. The drive unit is sensitive to shock damage and can be damaged by a 1-inch fall.

e. Insert most current backup tape cartridge into tape drive if not already done in Step **2**. If the SCC was disconnected, insert the SSC plug-in that was previously disconnected.

f. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

NOTE:
Without the disk in the frame, the reset will cause a boot from tape. The reset may take up to 30 minutes. Wait until boot from tape has completed before inserting the replacement disk drive.

g. Verify that the edge protector is removed from the disk plug-in connector. Install the disk drive as follows:

CEF Configuration:

Align the new disk plug-in with the guides on the right side of the slot and insert the new disk plug-in into the slot; be sure the plug-in is securely seated.

Non-CEF Configuration:

Insert the new drive into the slot and screw in the thumb-screw to take up the slack. Push in again to be sure it is seated. Finally, hand tighten the screw to secure.

10. Enter `RST-EQPT::DISK::CLR;` to power up and initialize the new disk. Answer YES when prompted to answer if you want to enter the command to clear the disk.

⇒ NOTE:
This command may take up to 30 minutes to complete.

11. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI:PROG;` to copy the software onto the disk. Answer YES when prompted. Wait for the command to complete before continuing.

⇒ NOTE:
formatted tapes (without executables) can be ordered for use as backup tapes. One of the generic tapes (or backup tape with executables) is required as source for executables (EXCT).

- If CPY ...DENY message was received, go to *Data Base Troubles* to clear the backup memory transfer failed.

12. Verify that the most current backup tape is in the tape drive. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI;` to copy the data base information onto the disk. Answer YES when prompted.

- If CPY ...DENY message was received, go to *Data Base Troubles* to clear the backup memory transfer failed.

13. On status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

⇒ NOTE:
Reset may take up to 30 minutes.

- If RESET COMPLD (with error explanation) message is received, go to *Data Base Troubles*.

14. Enter `DGN-EQPT::DISK;` to run diagnostics on the new disk.
    - If DGN ...STF message is received, contact technical consultant.
    - If DGN ...STF message is not received, check back through the printout to the time of the last backup memory transfer to tape to determine what cross-connections and equipment provisioning must be reentered.

5.5 Clear Failed SSC Diagnostic

1. If the alarm cutoff is needed, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the MC (main controller) is not already out-of-service (RMV MC COMPLD or RST MC DENY in printout), enter `RMV-EQPT::MC;`.
3. Retry the diagnostic as follows: `DGN-EQPT::SSC;`.
   - If DGN ...STF message is received, continue with Step **4**.
   - If DGN ...STF message is not received, proceed to Step **5**.
4. Replace the SSC pack (TM659C) in the MC.
5. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the hard disk (or from tape if the disk cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and SSC and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

   If RESET ...COMPLD (with no error explanation) message is received, continue with the next step.
   - If RESET ...COMPLD (with error explanation) message is received, refer to *Data Base Troubles* to clear reset completed conditionally.
6. After reset completes, enter `DGN-EQPT::SSC;`.
   - If DGN ...STF message is received, continue with Step **7**.
   - If DGN ...STF message is not received, this procedure is completed.

NOTE:
Regardless of trouble code after the DGN ...STF message, the following steps require you to replace the CPU pack. However, the trouble code 0700 after DGN ...STF message implicates trouble with the CPU pack.

7. Enter `RMV-EQPT::MC;`.
8. Replace the CPU (code TM657B) in the MC.
9. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If RESET ...COMPLD (with no error explanation) message is received, continue with Step **10**.
   - If RESET ...COMPLD (with error explanation) message is received, refer to *Data Base Troubles* to clear reset completed conditionally.
   - If SSC STARTUP STF message is received, contact technical consultant for assistance.
10. After reset completes, enter `DGN-EQPT::SSC;`.
    - If DGN ...STF message is received, contact technical consultant for assistance.
    - If DGN ...STF message is not received, this procedure is completed.

5.6 Clear Failed Sync Diagnostic

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.

   ⚠ CAUTION:
   Never attempt to troubleshoot and replace packs on the in-service side and never take packs from the in-service side for use as replacements for the failed side.

2. If the SYNC has not been removed from service (RMV SYNC COMPLD or RST SYNC DENY in printout),
   RMV-EQPT::SYNC-a;

   Where: a = Sync side (0 or 1).

3. If SYNC ESR ...E001 message is found in connection with failed sync, disengage and reinsert the DPLL pack (on the same side as failed sync) for the sync and proceed to Step **17**.
   - If ESR ...E001 message does not occur, continue with Step **4**.

4. If required to prevent circuit noise (see Note), enter commands to remove all unit FCs **on the same side** as follows: **RMV-EQPT::UNIT-[q]q::FC-sb;** for all units (q) and modules (1through 4) in each unit. The FC number (sb) consists of the side and the unit module.

   ⇒ NOTE:
   If a series G2 backplane (printed wiring) is used for the FTU or if CN 00118.1mv has been implemented on the G1 backplane (hard wiring), it is not necessary to remove the FCs before replacing sync packs. The CN (change notice) involved adding a wiring termination board to the FTU backplane.

   ⚠ CAUTION:
   Be sure to unplug packs from the inactive side because unplugging FC packs on the active side of the network will cause loss of service in the unit.

5. Unplug the same FCs that were previously removed from service.
6. Replace DPLL pack (TM590 code) for the sync side named in failed sync message. The TLIs are not implicated by this failure; separate messages occur for the TLI and CRO.

7. Enter **DGN-EQPT::SYNC-a;**.
   - If DGN ...STF 0100 message is received, continue with Step **8**.
   - If DGN ...STF 0200 message is received, proceed to Step **14**.
8. If failed diagnostic is accompanied with the ESR SYNC COND E004 message, replace SPU pack for failed sync side and reenter sync diagnostic command.
   - If ESR ...E004 does not occur, proceed to Step **14**.
9. If trouble persists, enter **RMV-EQPT::MC;**.
10. Replace the CPU (TM657B) located in the main controller.
11. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
12. Reenter **DGN-EQPT::SYNC-a;** for subject sync side.
13. If trouble persists, enter **RMV-EQPT::MC;**. Unplug the same CPU pack and check plug-in position for bent pins or damaged backplane. The connections between the CPU and the sync are suspect. Reinstall CPU after inspection and perform frame reset.
    - If trouble is found, proceed to Step **17**.
    - If trouble is not found, check backplane for damage. If no wiring trouble is found, contact technical consultant for assistance.
14. Replace the TB pack and wait at least 30 minutes for the TB oven to warm up. The TB can be restored; but, for stratum 2 operation, it may take up to 2 hours to reach rated precision.
15. Reenter **DGN-EQPT::SYNC-a;** for subject side.
16. If trouble persists, unplug the DPLL and TB and check positions for bent pins or damaged backplane. The connections between the two positions are suspect. Reinstall packs after inspection.
    - If trouble is cleared, continue with Step **17**.
    - If trouble is not cleared, check backplane for damage. If no wiring trouble is found, contact technical consultant for assistance.
17. Enter **RST-EQPT::SYNC-a;** to restore the sync.
18. Enter **ENT-EQPT::SYNC-a::FPLL;** to initiate sync fast start.

19. After approximately 5 minutes, enter **RTRV-STATE-EQPT::SYNC;** to verify that the MODE for the subject side is NORMAL. Table 5-2 lists the outputs for each field of the query.

Table 5-2. SYNC Status Outputs

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

20. Reinstall FC packs in their slots and enter the command(s) to restore each one as follows: **RST-EQPT::UNIT-[q]q::FC-sb;**

    Where: sb = FC number which consists of side (s) and unit module (b).

21. Enter **RTRV-STATE-EQPT:::ALL;** to find any packs that are failed or out-of-service and perform corrective action.

    NOTE:
    The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

22. See Note. If any CPs are equipped but out-of-service, enter the RST (restore) command per Figure 5-1 for the pack.

    - If command denial occurs, find the reason for denial in the output message.

    NOTE:
    When a CP fails in the sync, ECCN/CCN, DSPU, or DS3U, service is switched and all the CPs on the failed side/group are removed from service and pested. To correct the problem, the failure must be cleared and the side (or all CPs) can be restored. If both sides/groups are failed, trouble must be cleared on the out-of-service side/group first; removal of the other side will be denied.

23. If any CPs are failed, enter the DGN (diagnose) command per Figure 5-1 for the pack.
    - If DGN ...STF message is received, refer to appropriate procedure in this chapter to clear the failed diagnostic.
    - If diagnostic passes (ATP or CATP), enter RST command.
24. To check for out-of-service, failed, and pested CPs, enter **`RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;`**.
25. If any CPs are still pested, enter the commands to first remove and then restore the CPs per Figure 5-1.
    - If command denial occurs, find the reason for denial in the output message.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 5-1. Maintenance Command Construction

5.7 Clear Failed CRO Diagnostic

1. If the alarm cutoff is not already operated, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If TLI 3 has not been removed from service (RMV COMPLD in printout), enter **RMV-EQPT::TLI-3::CRO;**.
3. Replace the CRO (clock reference oscillator) (that is, the additional TB pack on lower shelf) with the same code as the original one.
4. Enter **DGN-EQPT::SYNC::TLI-3:CRO;**.
   - If DGN ...STF message is received, continue with Step **5**.
   - If DGN ...STF message is not received, wait 30 minutes for TB oven to reach temperature and then enter **RST-EQPT::TLI-3::CRO;** to restore the CRO and to complete this procedure.
5. Locate diagnostic trouble number which appears immediately after STF in the diagnostic message.
   - If trouble number is 0600, continue with Step **6**.
   - If the trouble number is not 0600, check CRO slot and backplane for damage. If no wiring trouble is found, contact technical consultant for assistance.
6. Verify that the same code of TB is used for all the sync TBs and determine if the sync configuration was changed subsequent to installation. The CRO (TLI 3 CRO) must be grown with the same TYPE designation as the other TBs in the sync.
   - If the CRO was equipped incorrectly, enter create command as follows:

     RMV-EQPT::TLI-3::CRO; to remove additional TB pack from service.

     DISC-EQPT::SYNC::TLI-3; to degrow the additional TB.

     Enter command to regrow same TB with same type field as the TBs on the sides, **CRTE-EQPT::SYNC::TBpqr:TLI-3;**

     Wait 30 minutes for TB oven to reach temperature and then enter **RST-EQPT::TLI-3::CRO;**.
   - If the CRO was equipped correctly, contact technical consultant for assistance.

5.8 Clear Failed TLI Diagnostic

1. If alarm cutoff has not already been operated, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Locate the trouble number which appears immediately after STF in the failed diagnostic message.
   - If trouble number is 0400, continue with Step **3**.
   - If trouble number is not 0400, proceed to Step **4**.
3. Check for ESR,ERR SYNC ...COND E601 message which indicates the T1 timing link connecting to the failed TLI has failed or has errors.
   - If you could determine there is trouble on the associated facility timing link, proceed to Step **8**.
   - If not, continue with Step **4**.
4. If the failed TLI has not been removed from service (as shown by previous RMV TLI COMPLD or RST TLI DENY in printout), enter **RMV-EQPT::SYNC-a::TLI-m[:SSP-b];**

   Where:
   a = Subject sync side (0 or 1)
   m = TLI number (1 through 4)
   b = SSP number (0 or 1); required for all TLI types except type TD.

   NOTE:
   If the remove command is entered and the TLI is already out of service, the entity out of service denial message will be received.

5. Replace the subject TLI pack with the same code as the original.
6. Enter **DGN-EQPT::SYNC-a::TLI-m[:SSP-b];**.
   - If DGN ...STF message is received, continue with Step **7**.
   - If DGN ...STF message is not received, enter **RST-EQPT::SYNC-a::TLI-m[:SSP-b];** to restore the sync and to complete this procedure.
7. If the trouble number in the failed diagnostic is 0400, continue with Step **8**.
   - If the trouble number in the failed diagnostic is not 0400, check TLI slot and backplane for damage. If no wiring problem is found, contact technical consultant.

8. Trouble is on facility timing link. Isolate trouble on timing link or contact network timing coordinator about using another facility. The TLI must be restored after the timing link is operating; the command is
   RST-EQPT::SYNC-a::TLI-m[:SSP-b];

   Where:
   a = Sync side
   m = Subject TLI number.
   b = SSP number (0 or 1); required for all TLI types except type TD.

5.9 Clear Failed Unit UC Diagnostic

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If failed unit UC is in a DS3 unit, continue with Step **3**.
   - If failed unit UC is not in a DS3 unit, proceed to Step **6**.
3. Enter **RTRV-STATE-EQPT::UNIT-[q]q::PROTN;** and determine which FLI (S or P) is selected. The selected one will have SLT under the heading for it in the FLI portion of the message.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   Steps 4 and 5 are needed to prevent unnecessary transmission hits caused by repeated operation of the FLI protection switching when the unit UC is removed and restored.

4. Which FLI is selected?
   - If **FLI P**, continue with Step **5.**
   - If **FLI S**, proceed to Step **6.**
5. Enter **RMV-EQPT::UNIT-[q]q::FLI-s;** to remove FLI S from service.
   - If the remove is denied (unit UC out of service), the FLI S can be disconnected (that is, if FLI S is selected and the unit UC is out of service so that the FLI can be eventually restored) to prevent transmission hits.

     NOTE:
     If the FLI S is failed (DGN FLI S STF in the trouble printout), also replace it while the unit UC is out of service. The preferred configuration is to have FLI S selected because reset/reboot operations revert to that configuration.

6. If the UC (unit controller) has not been removed from service (as shown by previous RMV UC COMPLD or RST UC DENY in printout), enter **RMV-EQPT::UNIT-[q]q::UC;**

   NOTE:
   If the remove command is entered and the unit UC is already out of service, the entity out of service denial message will be received.

7. Find the diagnostic trouble number that appears immediately after STF in the diagnostic message.
   - If trouble number 0A00 or 0B00 is received, then replace the UBX (UM28 code) and proceed to Step **9**.
   - If other trouble number is received, continue with Step **8**.
8. Which unit is affected?
   - If IFTU, or DSPU, replace the CPU (TM657 or TM657B code) for the unit.
   - If DS3U, replace the UC (KER2 code) for the unit.
9. Enter **`RST-EQPT::UNIT-[q]q::UC;`**

   Where: [q]q = Unit number (1 through 16).
   - If DGN ...STF message is received, check UC slot and backplane for damage. The diagnostic includes continuity tests:
     — STF 0700 indicates LAN wiring (two twisted pairs)
     — STF 0900 indicates CPU error wiring (one wire with ground)
     — STF 0600 indicates CPU reset wiring (one wire with ground)
     — If no wiring problem is found, contact technical consultant.
   - If RST ...DNY is received, find the reason for denial in the output message.
10. If FLI S was removed from service (or disconnected) in this procedure, (install the plug-in and) enter **`RST-EQPT::UNIT-[q]q::FLI-S;`** to restore FLI S to service.

5.10 Clear Failed FTMI Diagnostic

1. If alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check if the UBX pack (UM28 code) associated with the unit is installed. If it is not, install the pack and enter respective restore commands.
3. Enter **DGN-EQPT::UNIT-[q]q::FTMI-d;**

   Where:
   [q]q = Unit number (1 through 16)
   d = FTMI number (1 through 4).

   - If DGN ...STF message is received, continue with Step **4**.
   - If DGN ...STF message is not received, proceed to Step **12**.

4. If the FTMI (facility terminating module interface) has not been removed from service (RMV FTMI COMPLD or RST FTMI DENY in printout), enter **RMV-EQPT::UNIT-[q]q::FTMI-d;**.
5. Replace the FTMI (TG81 code) for the unit. This pack is implicated by any of the DGN FTMI ...STF trouble numbers.
6. Enter **DGN-EQPT::UNIT-[q]q::FTMI-d;** to diagnose the FTMI.
   - If DGN ...STF message is received, continue with Step **7**.
   - If DGN ...STF message is not received, proceed to Step **12**.
7. Locate the data bytes on the line below the STF number in the failed diagnostic message. These are referred to as data 5 through data 0, going from left to right.
   - If data 5 byte is equal to FF, continue with Step **8**.
   - If not, proceed to Step **9**.
8. The FTMI is not functioning, possibly because it is not receiving timing which is delivered through the associated FC. Verify that these packs are in-service and check printout for string of failure messages; also check the backplane for obvious damage to pins at the involved plug-in positions.
   - If the trouble is found and corrected, proceed to Step **12**.
   - If not, contact technical consultant for assistance.
9. Enter **RMV-EQPT::UNIT-[q]q::UC;**

   Where: [q]q = Unit number (1 through 16).

10. Replace UBX (UM28 code).
11. Enter **RST-EQPT::UNIT-[q]q::UC;**.
12. Enter **RST-EQPT::UNIT-[q]q::FTMI-d;**.
    - If DGN ...STF message is received, contact technical consultant for assistance.
    - If not, this procedure is completed.

5.11 Clear Failed DSPI Diagnostic

1. If the alarm cutoff is not already operated, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Notice which DSPU is named in the failed diagnostic message.
3. Enter **RTRV-STATE-COM:::ALL;** to determine if the ETSI on one side for the unit is in-service and not failed. Ones in the 3-digit field for each ETSI indicate out-of-service, failed, or pested conditions.
   - If the ETSIs on both sides for the unit are failed, refer to Section 5.13 to clear the CCI failure which is causing the DSPI failure.
4. If the DSPI has not been removed from service (RMV DSPI COMPLD or RST DSPI DENY in printout), enter **RMV-EQPT::UNIT-[q]q::DSPI;**.

   Where: [q]q = Unit number (1 through 16).
5. Replace the DSPI pack (UM29 code) for that DSPU. There is only one DSPI in the unit and it is the interface between the unit UC and the other DSP packs; it does not carry service channels.
6. Enter **RST-EQPT::UNIT-[q]q::DSPI;**.
   - If DGN ...STF message is received, check connector pins at DSPI slot and check backplane for damage. If no wiring trouble is found, contact technical consultant.
   - If RST ...COMPLD message is received, this procedure is completed.
   - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion.

5.12 Clear Failed FC Diagnostic

NOTE:
The FC diagnostic runs continuity tests between the FC and the ECCN. These tests actually involve accessing time slots on an NPC in the unit and checking the connection through the cables and the ECCN. Similarly, when the ETSI for the unit was diagnosed, the interconnection between it and the other ETSIs was tested.

1. If alarm cutoff is needed, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check if the UBX (UM28 code) and the network CCI/CCNI and ETSI/TSI packs associated with the unit are installed and/or restored. If they are not, install the pack(s) and enter the respective restore commands.
3. If all the FCs on the inactive side have failed, check for SYNC ...ERR,ESR messages (see Note). To check for change from cross-couple timing, enter `RTRV-REG-EQPT::SYNC-a::STR;` (a = Side 0 or 1), and see Figure 5-2.

   NOTE:
   A sync error can cause the mate sync to lose cross-couple timing which will cause loss of timing to the FCs. If there are no cross-connections on the frame, this condition will not be reported.

4. Enter `DGN-EQPT::UNIT-[q]q::FC-sb;`

   Where:
   [q]q = Unit number (01 through 16)
   sb = FC number consisting of side (0 or 1) and FC in module (1 through 4).

   - If DGN ...STF message is received, continue with Step **5**.
   - If DGN ...STF message is not received, proceed to Step **16**.

5. If the FC has not been removed (RMV FC COMPLD or RST FC DENY), enter
   RMV-EQPT::UNIT-[q]q::FC-sb;.
6. Replace subject FC pack (TG79 code). The FC itself is always implicated by any of the DGN FC ...STF trouble numbers.
7. Enter **DGN-EQPT::UNIT-[q]q::FC-sb;** for the same unit and FC numbers.
   - If DGN ...STF message is received, continue with Step **8**.
   - If DGN ...STF message is not received, proceed to Step **16**.
   - If message has one of the following trouble numbers: STF 0F03 through 0F06 and optional second line giving UPN and XPN numbers, proceed to Step **10**.

/*STR:b01,b02,b03,b04,b05,b06*/
"STR:byte1,byte2,byte3,byte4,byte5,byte6"

BYTE 1 (BITS abcdefgh)

a = spare	e = TLI 1 in service
b = sync hardware failed	f = TLI 2 in service
c = mate failed or OOS	g = TLI 3 in service
d = TB failed or OOS	h = TLI 4 in service

BYTE 3 (BITS abcdefgh)

a = sync reset, needs config.	e = crosscouple trouble
b = DPLL hardware error	f = CRO timing trouble
c = TB error	g = spare
d = PLL symmetry error	h = spare

BYTE 5 BIT POSITIONS: ab cde fgh

SOURCE (BITS ab)	ACTIVE PORT (BITS cde) (if BITS ab = 01)
00 = holdover	000 = TLI 1, SSP 0
01 = timing link	001 = TLI 1, SSP 1
10 = cross-couple	010 = TLI 2, SSP 0
11 = CRO	011 = TLI 2, SSP 1
	100 = TLI 3, SSP 0
	101 = TLI 3, SSP 1
	110 = TLI 4, SSP 0
BITS fgh (unused)	111 = TLI 4, SSP 1

BYTE 9 (BITS abcdefgh)

a = loss of energy	d = TB oven still cold
b = TB command error	e = spare
c = TB oscillator drift (master mode)	fgh = 000 for stratum 3, 001 for 2-Mb/s local 010 for 2-Mb/s toll, 011 for stratum 2

Figure 5-2. Sync Status Register

8. Convert the first data byte after the STF number in the diagnostic message to binary. The right HEX-digit gives bits 4,3,2,1. If bit 2 equals 1, a network ETSI or CCB could be causing the diagnostic failure; check the printout for ETSI or SYNC ...ERR,ESR messages.
9. If you found an ETSI or CCB related failure, continue with Step **10.**
   - If you did not find an ETSI or CCB related failure, proceed to Step **13.**
10. If the ETSI or CCB for the same unit and side as the failed FC is not out-of-service, enter appropriate command as follows:

    RMV-EQPT::ETSI-sqq;.
    RMV-EQPT::CCB-sf;.

    Where: s = Side
    qq = Unit number
    f = CCB number (1 through 6).

11. Replace that ETSI or CCB and enter appropriate command as follows:

    RST-EQPT::ETSI-sqq;.
    RST-EQPT::CCB-sf;.

12. Enter **DGN-EQPT::UNIT-[q]q::FC-sb;** for the subject unit and FC.
    - If DGN ...STF message is received, continue with Step **13.**
    - If DGN ...STF message is not received, proceed to Step **16.**
    - If message has one of the following trouble numbers: STF 0F03 through 0F06 and optional second line giving UPN and XPN numbers, proceed to Step **17.**
13. Enter **RMV-EQPT::UNIT-[q]q::UC;.**
14. Replace the UBX (UM28 code) for the subject unit.
15. Enter **RST-EQPT::UNIT-[q]q::UC;** for the subject unit.
16. Enter **RST-EQPT::UNIT-[q]q::UC;** for the subject unit and FC.
    - If DGN ...STF message is received, obscure problem; contact technical consultant.
    - If DGN ...STF message is not received, this procedure is completed.

17. From Table 5-3, identify the faulty cable connecting to the subject FC pack by the UPN (unit plug number) and XPN (ECCN plug number) named in the message. Notice that there are different listings for the flexible interface and original interface bays and that the ECCN plug number includes the unit number.
18. Replace (or have repaired) the cable identified above. The unit and ECCN plug numbers are stamped alongside the connectors on the ECCN panel; see Figure 5-3.
19. Enter `RST-EQPT::UNIT-[q]q::UC;` for the subject unit and FC.

NOTE:
The diagnostic reports one cable problem at a time; so if different UPN and XPN numbers occur, clear that trouble before contacting the technical consultant.

- If DGN ...STF message is received, obscure problem; contact technical consultant.

Table 5-3. Cable Identification

Unit Plug (Flex Bay)	Unit Plug (Orig. Bay)	ECCN Plug	Direction	Involved FC
P1	P2	P<unit>A	Receive	FC 01
P2	P1	P<unit>E	Transmit	FC 01
P3	P7	P<unit>B	Receive	FC 02
P4	P6	P<unit>F	Transmit	FC 02
P5	P12	P<unit>C	Receive	FC 03
P6	P11	P<unit>G	Transmit	FC 03
P7	P17	P<unit>D	Receive	FC 04
P8	P16	P<unit>H	Transmit	FC 04
P10	P5	P<unit>A	Receive	FC 11
P11	P4	P<unit>E	Transmit	FC 11
P12	P10	P<unit>B	Receive	FC 12
P13	P9	P<unit>F	Transmit	FC 12
P14	P15	P<unit>C	Receive	FC 13
P15	P14	P<unit>G	Transmit	FC 13
P16	P20	P<unit>D	Receive	FC 14
P17	P19	P<unit>H	Transmit	FC 14

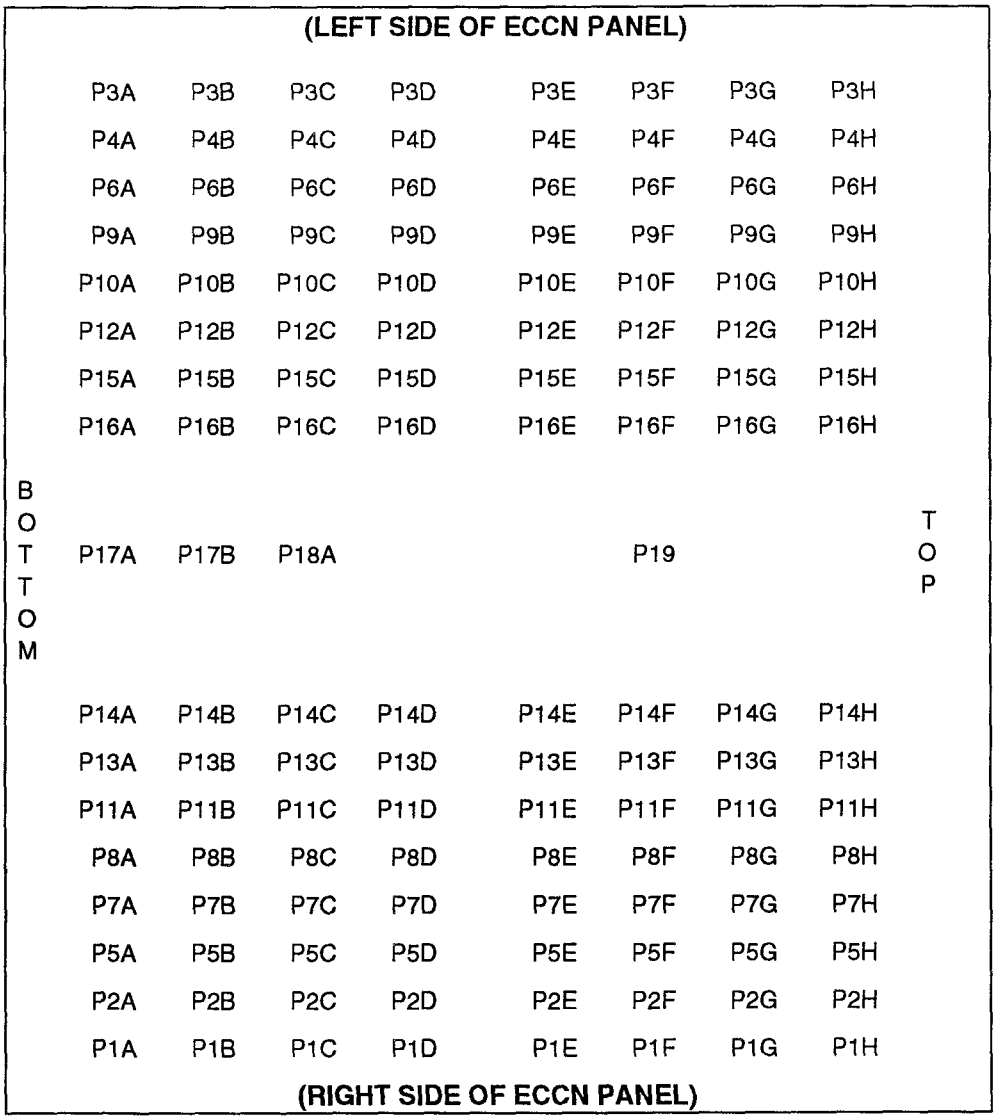

Figure 5-3. Cable Connectors on ECCN Panel

5.13 Cross-Connect Interface

5.13.1 Clear Failed CCI Diagnostic

Overview: This procedure deals with a failed CCI (clock control interface) diagnostic. If the trouble is not the CCI pack itself, it can be caused by circuit packs associated with ECCN, MC, or SYNC depending on the diagnostic trouble code. For an associated ETSI (trouble code 0800), the raw data bytes in the DGN CCI STF message are used to identify the particular ETSI.

1. If alarm cutoff is needed, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the CCI has not been removed from service (RMV CCI COMPLD or RST CCI DENY in printout), enter `RMV-EQPT::CCI-s;` for the side (0 or 1) that failed.
3. Locate the trouble number which appears immediately after STF in the diagnostic message.
4. If trouble number 0080 appears in the message, then check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between the top of P19 and P37 for ECCN1 and the bottom of P19 and P36 for ECCN0. If no wiring problem is found, contact technical consultant.
   - If trouble number 0080 does not appear, proceed to Step **7.**
5. Unseat the CCI pack for the side of the network named in the message and reinsert the pack to reset it.
6. Enter `DGN-EQPT::CCI-s;` for the same CCI pack.
   - If DGN ...STF message is received, continue with Step **7.**
   - If DGN ...STF message is not received, proceed to Step **27.**
7. Replace CCI pack (BBS1 code) named in the diagnostic message.
8. Enter `DGN-EQPT::CCI-s;` for same pack.
   - If DGN ...STF message is received, continue with Step **9.**
   - If DGN ...STF message is not received, proceed to Step **27.**

9. Which trouble number appears in the diagnostic message?
   - If **0000**, proceed to Step **12.**
   - If **0100**, continue with Step **10.**
   - If **0001** or **0010**, proceed to Step **12.**
   - If **0004, 0040,** or **0200**, check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
   - If **0020**, proceed to Step **12.**
   - If **0002** or **0008**, proceed to Step **18.**
   - If **0800**, proceed to Step **20.**
   - If **8000**, proceed to Step **10.**

10. Verify that the BT on each side of the ECCN shelf is securely installed.

    NOTE:
    The bus terminators contain only passive components and are not likely to fail. However, if the same diagnostic trouble number persists after all suspect packs have been replaced, you may want to try replacing the BTs, one at a time.

11. If DGN ...STF message is received after BTs are reseated (or replaced) and diagnostic is reentered, continue with Step **12.**
    - If DGN ...STF message is not received, proceed to Step **27.**

Continue for Trouble No. 0000, 0001, 0010, 0020, 0100, or 8000

12. Enter `RMV-EQPT::MC;`.
13. Disconnect and reseat appropriate pack in the MC for trouble number as follows:
    - — For 0020, replace the EMTC (UM75 code).
    - — For others, replace the EBX (UM71 code).
14. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    NOTE:
    It is important to remember that after this RESET is complete, the frame will be in simplex mode. Resetting the frame does not automatically restore the side containing the new CCI circuit pack.

15. Enter `DGN-EQPT::CCI-s;`.
    - If DGN ...STF message is received, continue with Step **16.**
    - If DGN ...STF message is not received, proceed to Step **27.**
16. Replace the plug-in that was previously reseated.
17. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button and proceed to Step **26.**

Continue for Trouble No. 0002 or 0008

18. Enter `RMV-EQPT::SYNC-s;` for the sync on the same side as the failed CCI.
19. Replace the DPLL (TM590 code) in the same side of the sync and enter `RST-EQPT::SYNC-s;` to restore the same sync.
    - If DGN ...STF message is received, go to Section 5.6.
    - If DGN ...STF message is not received, proceed to Step **27.**

Continue for Trouble No. 0800

20. Notice the data bytes starting on the second line of the failed CCI diagnostic message. These bytes are referred to as data 21 through data 00, starting on the second line and running to the end of the third line.
21. If data 19 (third from the left in the top row of data) equals 07, continue with Step **22.**
    - If data 19 (third from the left in the top row of data) does not equal 07, then check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
22. Convert data 21 and 20 (first two data bytes in the top row of data) from hexadecimal to binary as follows:
    - Work with each digit of a data byte individually.
    - Convert each hexadecimal digit to the 4-place binary equivalent. Hex numbers run from 1 through 9 and a through f (for 10 through 16); for example, hex 5 = 0101 binary.
23. Combine the patterns of the binary numbers for data 21 and 20 and locate the bit position where the value is a 1. For example, if data 21 equals 00000000 binary and data 20 equals 10000000 binary, the combined pattern would be 0000000010000000, and the value 1 is located in position 8 (counting from right to left).
24. Enter `RMV-EQPT::ETSI-sqq;` for the ETSI of the unit number that matches the bit position with the value 1. (In the above example, that would be unit 08.)

    Where:
    s = Side 0 or 1

    qq = Unit number (01 through 16).
25. Replace the same ETSI (BBS2 code) and enter `RST-EQPT::ETSI-sqq;` for that pack.

26. Enter **DGN-EQPT::CCI-s;**.
    - If DGN ...STF message is received, check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
    - If DGN ...STF message is not received, continue with Step **27.**
27. Enter **RST-EQPT::CCI-s;** to restore CCI to service.
28. If DGN ...STF message is received, check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
29. If DGN ...STF message is not received, enter **RTRV-STATE-EQPT:::ALL;** to find any packs that are failed or out-of-service and perform corrective action.

    NOTE:
    The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

5.13.2 Clear Failed CCNI Diagnostic

Overview: This procedure deals with a failed CCNI (cross-connect network interface) diagnostic. If the trouble is not caused by a failed CCNI or BX in the MC, it may be caused by an error from a unit FTMI, a network CCB, or a TSI connected to the CCNI. When the failed diagnostic is caused by an error from an associated pack, that pack is identified by the raw data fields of the DGN CCNI STF message.

1. If alarm cutoff is needed, enter **OPR-ACO-ALL;**.
2. If the CCNI has not been removed from service (RMV CCNI COMPLD or RST CCNI DENY in printout), enter **RMV-EQPT::CCNI-s;** for the side (0 or 1) that failed.
3. Replace CCNI pack (UM30 code) for the side of the CCN network named in the diagnostic message.
4. Enter **DGN-EQPT::CCNI-s;**.
    - If DGN ...STF message is received, continue with Step **5.**

- If DGN ..STF message is not received, proceed to Step **12.**

5. Locate trouble number which appears immediately after STF in the diagnostic message.
   - If the trouble number does NOT start with 074 or 07B, proceed to Step **9.**
6. Enter **RMV-EQPT::MC;**.
7. Replace BX pack in the MC.
8. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button, and proceed to Step **12.**
9. Locate the data bytes to the right of the STF number in the failed diagnostic message. These bytes are referred to as data 5 through data 0, going from left to right.
   - If any of the these bytes (data 5 through data 1) have nonzero characters, then continue with Step **10.**
   - If not, check CCNI slot and backplane for damage. If no wiring problem is found, contact technical consultant.
10. From Table 5-4, determine the pack which is sending an error to the CCNI. The value of the character (8,4,2,1) and its position in the 4-place data byte indicates the associated pack. For example, if data byte d2 =0040 (row "cccc" in table), the 4 in the column implicates TSI s54. The side (s) is the same as the subject CCNI.
11. Enter command to remove the same pack from service and replace the pack. For FTMI, enter **RST-EQPT::UNIT-q::FTMI-b;** to restore it to service.

    Where: q = Unit number
    b = FTMI number (1 through 4) in the unit.

12. Enter **RST-EQPT::CCNI-s;**.
    - If DGN ...STF message is received in restore sequence, check CCNI slot and backplane for damage. If no wiring problem is found, contact technical consultant.
13. If an associated TSI or CCB was removed from service, enter command to restore it using the appropriate command, **RST-EQPT::TSI-sft;** or **RST-EQPT::CCB-sf;**.

    Where:
    sf = CCB number consisting of side (0 or 1) and unit number.

sft = TSI number consisting of side (0 or 1),
from-side unit number, and to-side number.

14. Enter **RTRV-STATE-EQPT::[UNIT-q]::ALL;** to find any packs that are failed or out-of-service and perform corrective action.

NOTE:
The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

Table 5-4. Port Alarms (CCNI Diagnostic)

SINGLE CHARACTER VALUE	DATA 1 (ESR1, TSI FROM, TO UNIT ID)			
	b	b	b	b
8	43	63	22	41
4	33	52	12	31
2	23	42	61	21
1	13	32	51	11
	DATA 2 (ESR2, TSI FROM, TO UNIT ID)			
	c	c	c	c
8	26	45	64	24
4	16	35	54	14
2	65	25	44	63
1	55	15	34	53
	DATA 3 (ESR3, FTM NO. OR TSI FROM, TO UNIT ID)			
	d	d	d	d
8	Unit 3,FTMI 4	Unit 2,FTMI 4	Unit 1,FTMI 4	66
4	Unit 3,FTMI 3	Unit 2,FTMI 3	Unit 1,FTMI 3	56
2	Unit 3,FTMI 2	Unit 2,FTMI 2	Unit 1,FTMI 2	46
1	Unit 3,FTMI 1	Unit 2,FTMI 1	Unit 1,FTMI 1	36
	DATA 4 (ESR4, FTM NO. OR CCB NO.)			
	e	e	e	e
8	CCB4	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 4
4	CCB3	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 3
2	CCB2	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 2
1	CCB1	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 1
	DATA 5 (ESR5, CCB NO.)			
	f	f	f	f
8	-	-	-	-
4	-	-	-	-
2	-	-	-	CCB 6
1	-	-	-	CCB 5

5.14 Time Slot Interchange

5.14.1 Clear Failed ETSI Diagnostic

Overview: This procedure deals with the failed ETSI (expanded time slot interchange) diagnostic. If the trouble is not the ETSI pack itself, it can be caused by other ECCN packs or an associated MC or Sync pack depending on the diagnostic trouble number. The data bytes in the diagnostic message in some cases identify another suspect ETSI pack; otherwise, the other ETSI is determined by trial and error. *Multiple ETSI failures are usually caused by a failed CCI pack; autonomous error recovery operations may have already removed the CCI to allow replacement.*

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the subject ETSI has not been removed from service (RMV ETSI COMPLD or RST ETSI DENY in printout), enter **RMV-EQPT::ETSI-sqq;**

   Where: sqq = Failed ETSI number consisting of the side (s) and unit number (qq) that it serves.
3. To avoid the possibility of alarms on ETSI ports, enter command to remove service from side with failed ETSI, **RMV-EQPT::CCI-s;** (s = side).
4. Replace the subject ETSI pack (BBS2 code) named in the failed diagnostic message. If a second ETSI pack is named in the message, that ETSI pack will be addressed (as an additional suspect pack) in subsequent steps.
5. Enter command to restore side to service, **RST-EQPT::CCI-s;** (s = side).
6. Enter **DGN-EQPT::ETSI-sqq;**.
   - If DGN ...STF message is received, continue with Step **7.**
   - If DGN ...STF message is not received, enter **RST-EQPT::ETSI-sqq;** for the subject ETSI pack. This procedure is completed.
7. Locate the trouble number which appears immediately after STF in the diagnostic message. Also notice the data bytes starting on the second line of the failed ETSI diagnostic message. These bytes are referred to as data 15 through data 00, starting on the second line and running to the end of the third line.

8. Which trouble number (or keyword) appears in the message?
   - If **additional ETSI named in message**, proceed to Step **22.**
   - If **0080**, continue with Step **9.**
   - If **0100**, continue with Step **9.**
   - If **0008**, proceed to Step **14.**
   - If **0020, 0040, 0800,** or **1000**, proceed to Step **27.**
   - If **8000**, proceed to Step **15.**
   - If **other number**, proceed to Step **15.**

9. Locate data 1; the data bytes occur in left-to-right order from d15 to data 00. Convert the 2 lower digits (right half) to binary as follows:
   — Work with each digit of the data byte individually.
   — Convert each hexadecimal digit to the 4-place binary number equivalent. Hex numbers run 1 through 9 and a through f (for 10 through 16); for example, hex 5 = 0101 binary.

10. The resulting 8-bit binary number represents the connecting ports from the FC (in FTU), FMT (in DS3U), or NPC (in DSPU), as applicable; a 1 in the port position indicates a trouble. Identify the suspect pack as follows:
    — For FCs, each pair of bits (in the 8-bit number) represents the FC for the module as follows: pair 8-7 is module 4, pair 6-5 is module 3, pair 4-3 is module 2, and pair 2-1 is module 1.
    — For FMT, a 1 in any of the 8 bits indicates the FMT for the side.
    — For DSPU NPC, each bit (in the 8-bit number) represents one of the DSPs in the unit (**the odd bits are for the even DSPs and the even bits are for the odd DSPs**) as follows:

bit 2 is DSP 1	bit 1 is DSP 2
bit 4 is DSP 3	bit 3 is DSP 4
bit 6 is DSP 5	bit 5 is DSP 6
bit 8 is DSP 7	bit 7 is DSP 8

11. If any ports are alarmed, enter the RMV-EQPT command for the suspect pack per Figure 5-4 and reseat the same pack. Enter commands to restore the subject ETSI (for timing to unit) and the suspect pack.

⇒ NOTE:
If DSPU NPC is to be replaced, remove the side from service before doing replacement (`RMV-EQPT::CCI-s;`). Restore side to service after replacement (`RST-EQPT::CCI-s;`).

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 5-4. Maintenance Command Construction

12. If either a DGN ...STF or RST ...DENY message is received, enter command to remove the suspect pack, replace it, and enter the command to restore it to service.
13. Enter **`DGN-EQPT::ETSI-sqq;`** for the subject ETSI pack.
    - If DGN ...STF message is received, proceed to Step **15.**
    - If DGN ...STF message is not received, enter **`RST-EQPT::ETSI-sqq;`** for the subject ETSI pack.
14. Check for any 48-volt fuse feeding the ECCN on the ED-2C945-30 fuse panel blown (indicator fuse bead extended).
    - If there is a blown fuse, go to *Power Failures.*

15. If not already removed from service, enter **RMV-EQPT::CCI-s;** to remove the CCI for the failed side.

    Where: s = Side (0 or 1).

16. Replace CCI pack (BBS1 code) for failed side.

17. Enter **RST-EQPT::CCI-s;**.

18. Enter **DGN-EQPT::ETSI-sqq;** for subject ETSI pack.

    - If DGN ...STF message is received, continue with Step **19.**
    - If DGN ...STF message is not received, enter **RST-EQPT::ETSI-sqq;** for the subject ETSI pack.

19. If there is another pack listed in Table 5-5 for the trouble number, continue with Step **20.**

    - If there is not another pack, proceed to Step **21.**

20. Enter command to remove next pack listed in Table 5-5, replace the pack, and enter command to restore the pack to service considering the following:

    — For DPLL, work on same side of Sync as failed ETSI.

    — To restore EBX or CPU, reset frame using RESET controls on the status panel.

    — The BTs contain passive components for resistive termination. If suspect, check if they are securely inserted and enter ETSI diagnostic; if secure, replace one at time and reenter diagnostic each time.

    NOTE:
    To prevent alarms, remove the side before replacing an ECCN plug-in (**RMV-EQPT::CCI-s;**). Restore the side after the replacement (**RST-EQPT::CCI-s;**).

    Repeat from Step **18.**

Table 5-5. Implicated Plug-Ins

Trouble No.	Plug-Ins	Commands
0001	ETSI CCI DPLL (in sync)	{RMV|RST}-EQPT::ETSI-sqq; {RMV|RST}-EQPT::CCI-s; {RMV|RST}-EQPT::SYNC-a;
0002, 0010, 0020, 0040, 0100, 0200, or 0800	ETSI	{RMV|RST}-EQPT::ETSI-sqq;
0004	ETSI CCI EBX (in MC) BTs	{RMV|RST}-EQPT::ETSI-sqq; {RMV|RST}-EQPT::CCI-s; RMV-EQPT::MC;
0008, 0400, or 8000	ETSI CCI	{RMV|RST}-EQPT::ETSI-sqq; {RMV|RST}-EQPT::CCI-s;
0080 or 1000	ETSI BTs	{RMV|RST}-EQPT::ETSI-sqq;

NOTE:
Trouble number 0800 may also indicate a ribbon cable problem.

21. If you are clearing trouble number 0004, proceed to Step **27.**

    - If you are not clearing trouble number 0004, check ETSI slot and backplane for damage. If no wiring problem is found, contact technical consultant.

NOTE:
For STF 0100, the port alarm pack identification also identifies the suspect wiring.

Continue for Additional ETSI in Message

22. Notice the suspect ETSI identified by the optional SNN designation in the failed ETSI diagnostic.
23. Enter `RMV-EQPT::ETSI-sqq;`.
24. Enter `RMV-EQPT::CCI-s;` to remove the side from service. Replace the ETSI.
25. Enter `RST-EQPT::CCI-s;` to restore the side to service.
26. Enter `DGN-EQPT::ETSI-sqq;` for the ETSI that originally failed.
    - If DGN ...STF message is received, check ETSI slot and check backplane for damage. If no wiring problem is found, contact technical consultant.
    - If DGN ...STF message is not received, enter `RST-EQPT::ETSI-sqq;` commands to restore the ETSI packs.

Continue for Trouble No. 0020, 0040, 0800, or 1000

27. If diagnostic trouble 0020 or 0040 is received, continue with Step **28.**
    - If diagnostic trouble 0020 or 0040 is not received, proceed to Step **30.**
28. Locate data byte 04 and convert it to binary as follows:
    — Work with each digit of the data byte individually.
    — Convert each hexadecimal digit to the 4-place binary number equivalent. Hex numbers run 1 through 9 and a through f (for 10 through 16); for example, hex 5 = 0101 binary.
29. The resulting 16-bit binary number represents the ETSIs in the frame, with ETSI 16 on the left and 1 on the right. Identify each suspect ETSI which is indicated by a 1 in the 16-bit binary number.
30. See Notes 1 and 2. Select one of the implicated plug-ins and enter command to remove that ETSI and unplug it. Enter `DGN-EQPT::ETSI-sqq;` for the original ETSI. Repeat as necessary for each of the suspect ETSIs.

⇒ NOTE 1:
To prevent alarms, remove the side before replacing ETSI (`RMV-EQPT::CCI-s;`). After replacement, restore the side to enable ETSI diagnostic and restoral (`RST-EQPT::CCI-s;`).

⇒ NOTE 2:
The implicated ETSIs are either the ones identified by data 04 in Step 28 or all the remaining ones if none were identified by data 04.

31. If DGN ...ATP (or CATP) was received when one of the implicated ETSIs was unplugged, replace ETSI found to be causing the failure and install ETSIs that were unplugged. Enter **RST-EQPT::ETSI-sqq;** commands to restore ETSI packs.
    - If the DGN ...ATP (or CATP) was not received, continue with Step **32**.

32. If there is another pack listed in Table 5-5 for the trouble number, continue with Step **33.**
    - If there is not another pack, contact technical consultant.

33. Enter command to remove next pack listed in Table 5-5, replace the pack, and enter command to restore the pack to service considering the following:
    — For DPLL, work on same side of sync as failed ETSI.
    — To restore EBX or CPU, reset frame using RESET controls on the status panel.
    — The BTs contain passive components for resistive termination. If suspect, check to see if they are securely inserted and enter ETSI diagnostic; if secure, replace one at a time and reenter diagnostic each time.

    NOTE:
    To prevent alarms, remove the side before replacing an ECCN plug-in (**RMV-EQPT::CCI-s;**). Restore the side after the replacement (**RST-EQPT::CCI-s;**).

34. Enter **DGN-EQPT::ETSI-sqq;**.
    - If DGN ...STF message is received, repeat from Step **32**.
    - If DGN ...STF message is not received, enter **RST-EQPT::ETSI-sqq;** for the subject ETSI pack.

5.14.2 Clear Failed TSI Diagnostic

1. If the alarm cutoff is not already operated, enter **OPR-ACO-ALL**.
2. If the subject TSI (time slot interchange) has not been removed from service (RMV TSI COMPLD or RST TSI DENY in printout), enter **RMV-EQPT::TSI-sft;**

   Where: sft = Failed TSI number.

3. Replace the TSI pack (TM660 code) named in the failed diagnostic message.
4. Enter **DGN-EQPT::TSI-sft;**

   Where: sft = Failed TSI number which consists of Side (0 or 1), From-unit (1 through 6), and To-unit (1 through 6). For example, TSI 013 is on side 0 and receives data from unit 1 and connects to unit 3.

   - If DGN ...STF message is not received, proceed to Step **10**.

5. Locate the trouble number which appears immediately after STF in the diagnostic message.
   - If none of the following trouble numbers are received (01B0, 0540, 05B0, or any starting with 014), check connector pins at failed TSI slot and check backplane for damage. If no wiring trouble is found, contact technical consultant.
6. Enter command to remove the CCNI for the failed side as follows: **RMV-EQPT::CCNI-s;**

   where: s = Side (0 or 1).

7. Replace that CCNI pack (UM30 code).
8. Enter **RST-EQPT::CCNI-s;**.
9. Enter **DGN-EQPT::TSI-sft;** to diagnose TSI that originally failed.
   - If DGN ...STF message is received, check connector pins at failed TSI slot and check backplane for damage. If no wiring trouble is found, contact technical consultant.
10. Enter command to restore subject TSI pack to service as follows: **RST-EQPT::TSI-sft;**.
    - If trouble persists, contact technical consultant.

5.15 Clear Failed NPC (FTU) Diagnostic

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Enter **DGN-EQPT::NPC-<npc No.>;**. where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, continue with Step **3.**
   - If DGN ...STF message is not received, proceed to Step **12.**

   ⇒ NOTE:
   The diagnostic includes looped tests that check the NPC transmission paths and tests that check the facility performance monitoring.

3. In order to see if the ECCN packs are affecting the failure, configure the ECCN to the other side as follows:
   - Enter **RTRV-REG-EQPT::XC-a::STR;** for each side (a = 0,1) and determine the active side from output (rightmost data byte equals 05 for in-service and active).
   - Enter **RTRV-STATE-COM:[xy]::[ww]:ALL;** to verify that packs on the inactive side are not failed because switching to a failed side could cause loss of service.
   - If the inactive side is not failed, enter **SW-DX-EQPT::XC-a;** (for inactive side) to switch ECCN sides.
4. Enter **DGN-EQPT::NPC-<npc No.>;**. where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, proceed to Step **10.**
   - If DGN ...STF message is not received, continue with Step **5.**
5. Enter **RMV-EQPT::UNIT-[q]q::FC-sb;** for the same unit ([q]q), inactive side, and module (b) in the unit, replace that FC pack, and enter **RST-EQPT::UNIT-[q]q::FC-sb;**.
6. At low traffic time, enter **SW-DX-EQPT::XC-a;** (for inactive side) to switch to other ECCN side.

7. Enter **DGN-EQPT::NPC-<npc No.>;**. where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, continue with Step **8**.
   - If DGN ...STF message is not received, proceed to Step **12**.
8. Perform the appropriate action as follows:
   - If the original failure occurred immediately after a cross-connection was entered, find the implicated ETSI. The ETSI number (sqq) consists of side (opposite - original side) and the unit number associated with the FROM and TO sides of the cross-connection. Enter **RMV-EQPT::ETSI-sqq;** replace the ETSI pack, and enter **RST-EQPT::ETSI-sqq;**.
   - If failure cannot be related to cross-connection, enter commands to individually remove and restore the ETSIs on the inactive side and look for failed diagnostics.
9. Enter **DGN-EQPT::NPC-<npc No.>;**. where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, continue with Step **10**.
   - If DGN ...STF message is not received, proceed to Step **12**.

⚠ CAUTION:
When an NPC is removed, service is interrupted on all the cross-connected circuits of that NPC and trunk conditioning is sent on the channels. Contact special service customers and replace plug-ins quickly.

10. When the other NPC on the affected dual card (for example, DDC) can be removed from service, enter command to remove the other NPC as follows: **RMV-EQPT::NPC-<npc No.>::[:INCL];**.

    Where:
    <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
    INCL = Optional, needed to remove NPC with red circuits and CUS circuits. Enter **PTRV-PRMTR-T1::<npc No.>::MARK;** to see if the NPC has red or CUS circuits.
11. Replace the pack for the two affected NPCs.

12. If needed (see Note), enter `RST-EQPT::NPC-<npc No.>[&&[&]-<range>];` for the subject NPC and for the other NPC on the pack if that NPC was also removed.

    NOTE:
    The NPC restoral is needed if the NPC was removed from service (manually or autonomously as part of error recovery) or if a previous restore command was denied because of a failed diagnostic.

    - If DGN ...STF message is received, check connector pins at plug-in slot and check backplane for damage. If no wiring problem is found, contact technical consultant.
    - If RST ...COMPLD message is received, this procedure is completed.
    - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion.

5.16 Clear Failed DSPU NPC Diagnostic

NOTE:
The DSPU NPC diagnostic runs continuity tests between the DSPU and the ECCN. These tests actually involve accessing timeslots on an NPC in the unit and checking the connection through the cables and the ECCN. Similarly, when the ETSI for the unit was diagnosed, the interconnection between it and the other ETSIs was tested.

1. If the alarm cutoff is needed, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Notice which NPC number and side (0 or 1) are named in the failed diagnostic message.

   NOTE:
   Each DSP position consists of a pair of NPCs and the pair is addressed in commands by the first NPC of the pair. The DSP positions are duplicated on the sides of the DSPU so that service will be switched to the mate when an NPC fails or is removed.

3. If the subject NPC has not been removed from service (RMV COMPLD or RST DENY in printout), enter
   RMV-EQPT::NPC-<npc No.>::SIDE-s[:INCL];

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01-1-01).
   s = Side (0 or 1).
   INCL = Optional, needed to remove NPC with cross-connected red circuits, and subrate circuits with established channels.

4. Enter **DGN-EQPT::NPC-<npc No.>::SIDE-s;** for subject NPC number and side.
   - If DGN ...STF message is received, continue with Step **5.**
   - If DGN ...STF message is not received, proceed to Step **15.**
5. Enter **RMV-EQPT::CCI-s;** or **RMV-EQPT::CCNI-s;** (whichever is appropriate) for the same side as the failed DSP NPC. This prevents an alarm (and DSP removal) on other DSPs. Even though the ECCN side is not active, if it is in-service, a glitch on the bus can trigger the alarm.
6. Replace the DSP plug-in for the NPCs (for example, DMB) on the side.

7. Enter **RST-EQPT::CCI-s;** or **RST-EQPT::CCNI-s;** (whichever is appropriate) to restore the network side to service.
8. Enter **DGN-EQPT::NPC-<npc No.>::SIDE-s;** for subject NPC number and side.
   - If DGN ...STF message is received, continue with Step **9.**
   - If DGN ...STF message is not received, proceed to Step **15.**
   - If message gives a trouble number in the range STF 0F03 through 0F06 and optional second line with UPN and XPN numbers, proceed to Step **13.**
9. Enter **RMV-EQPT::UNIT-[q]q::DSPI;**, replace DSPI, and enter **RST-EQPT::UNIT-[q]q::DSPI;**.
10. Enter **DGN-EQPT::NPC-<npc No.>::SIDE-s;** for subject NPC number and side.
    - If DGN ...STF message is received, continue with Step **11.**
    - If DGN ...STF message is not received, proceed to Step **15.**
11. Enter **RMV-EQPT::UNIT-[q]q::UC;**, replace CPU, and enter **RST-EQPT::UNIT-[q]q::UC;**.
12. Enter **DGN-EQPT::NPC-<npc No.>::SIDE-s;** for subject NPC number and side.
    - If DGN ...STF message is received, continue with Step **13.**
    - If DGN ...STF message is not received, proceed to Step **15.**
13. Perform one of the following (use appropriate commands for the type of frame):
    - — If the original failure occurred immediately after a cross-connection was entered, try replacing the involved ETSIs/TSIs. Enter **RMV-EQPT::ETSI-sqq;** or **RMV-EQPT::TSI-sft;**, replace the ETSI/TSI pack, and enter **RST-EQPT::ETSI-sqq;** or **RST-EQPT::TSI-sft;**.
      The involved ETSI(s)/TSI(s) are those on the same side as the NPC and the unit(s) containing the NPC(s) in the cross-connection.
    - — If failure cannot be related to cross-connection, enter commands to individually remove and restore the ETSIs/TSIs on the inactive side and look for failed diagnostics.

14. Enter `DGN-EQPT::NPC-<npc No.>::SIDE-s;` for subject NPC number and side.
    - If DGN ...STF message is received, obscure problem; contact technical consultant. After trouble is cleared, enter command to restore NPCs to service.
    - If DGN ...STF message is not received, continue with Step **15**.
    - If message gives a trouble number in the range STF 0F03 through 0F06 and optional second line with UPN and XPN numbers, proceed to Step **16.**

15. Enter `RST-EQPT::NPC-<npc No.>::SIDE-s;` for the first NPC (if NPC pair) and side.
    - If RST ...COMPLD message is received, this procedure is completed.
    - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action.

16. From Table 5-6, identify the faulty cable connecting to the subject NPC by the UPN (unit plug number) and XPN (ECCN plug number) named in the message. Notice that the ECCN plug number includes the unit number.

Table 5-6. Cable Identification

Unit Plug	ECCN Plug	Side	Direction	Involved DSP Plug-In
P1	P<unit>A	0	Receive	1st & 2nd DSP
P2	P<unit>E	0	Transmit	1st & 2nd DSP
P3	P<unit>B	0	Receive	3rd & 4th DSP
P4	P<unit>F	0	Transmit	3rd & 4th DSP
P5	P<unit>C	0	Receive	5th & 6th DSP
P6	P<unit>G	0	Transmit	5th & 6th DSP
P7	P<unit>D	0	Receive	7th & 8th DSP
P8	P<unit>H	0	Transmit	7th & 8th DSP
P10	P<unit>A	1	Receive	1st & 2nd DSP
P11	P<unit>E	1	Transmit	1st & 2nd DSP
P12	P<unit>B	1	Receive	3rd & 4th DSP
P13	P<unit>F	1	Transmit	3rd & 4th DSP
P14	P<unit>C	1	Receive	5th & 6th DSP
P15	P<unit>G	1	Transmit	5th & 6th DSP
P16	P<unit>D	1	Receive	7th & 8th DSP
P17	P<unit>H	1	Transmit	7th & 8th DSP

17. Replace (or have repaired) the cable identified above. The unit and ECCN plug numbers are stamped alongside the connectors on the ECCN panel; see Figure 5-5.
18. Enter `RST-EQPT::NPC-<npc No.>::SIDE-s;` for the first NPC (if NPC pair) and side.
    - If DGN ...STF message is received (see Note), obscure problem; contact technical consultant. After trouble is cleared, enter command to restore NPCs to service.

      NOTE:
      The diagnostic reports one cable problem at a time; so if different UPN and XPN numbers occur, clear that trouble before contacting the technical consultant.

    - If RST ...COMPLD message is received, this procedure is completed.
    - If RST ...DENY message is received, find the reason for denial in the output message and perform corrective action.

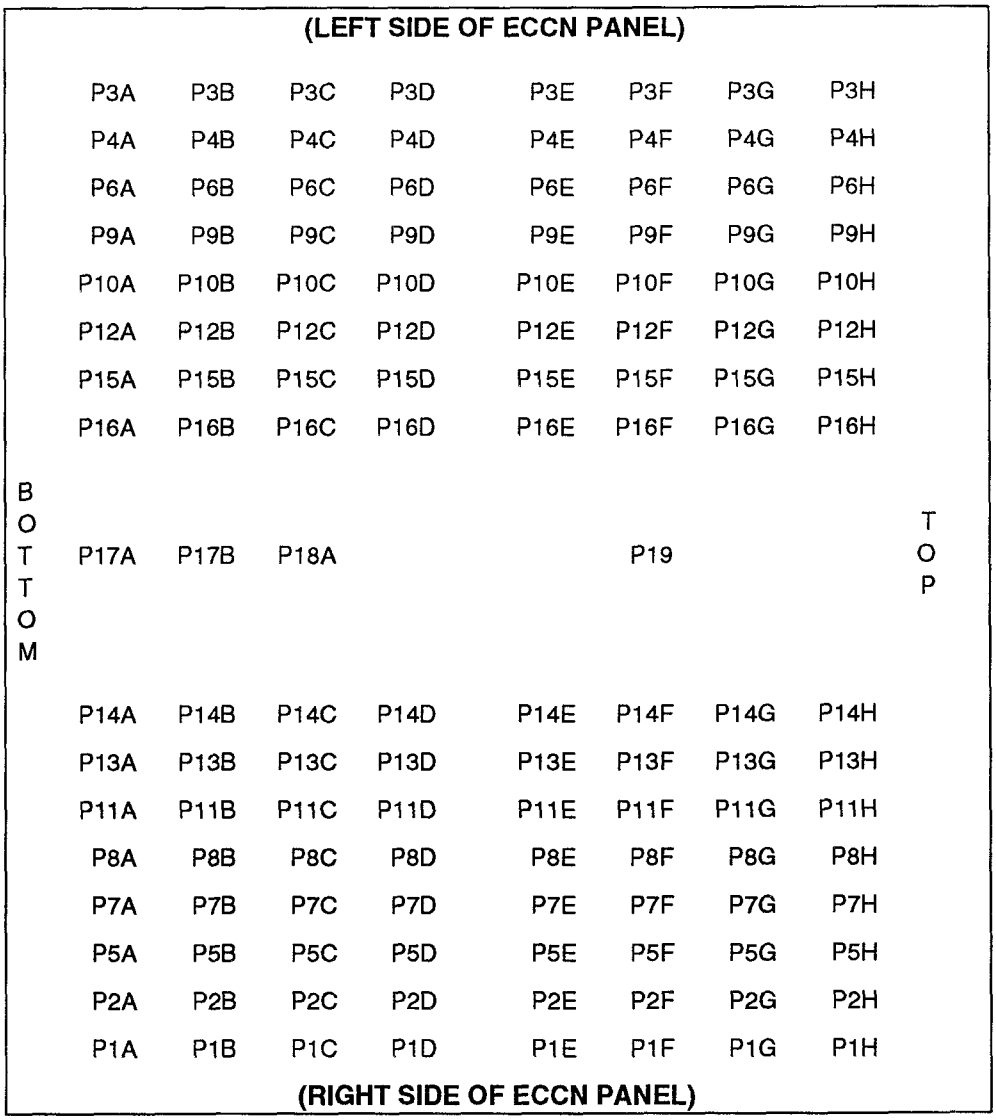

Figure 5-5. Cable Connectors on ECCN Panel

5.17 Clear Failed Tape Diagnostic

NOTE:
If the tape is out-of-service, the drive will be powered up and the tape will be tensioned when the tape is restored to service either by command or by the reset operation.

CAUTION:
The use of at least three backup tapes is recommended. If you are not using at least three backup tapes, DO NOT insert the second backup tape into the tape drive as instructed in Step 6 of this procedure. If the tape drive is damaging tapes, all backups will be lost. Therefore, skip Steps 6 and 7 if you are using less than three backup tapes.

Supplementary Information — Tape Cartridge Replacement

If you do not know how to replace the tape cartridge, familiarize yourself with the following procedure.

- If the tape is not already out-of-service, enter `RMV-EQPT::TAPE;` to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).
- Remove tape cartridge from the drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.
  - — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.
- Insert tape cartridge into the tape drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

    NOTE:
    Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.

Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

— **Tape Drive With the Drawer.** Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

⇒ NOTE:
Metallic side of the cartridge faces down and the door faces to the right.

- Enter `RST-EQPT::TAPE;` to power up the tape drive and retension the tape.
  - — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.
  - — If other denial message is received, the reason for denial will be in the output message.

Trouble Clearing Procedure

1. If the alarm cutoff is needed, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If you have one of the STF trouble numbers listed below, perform following check(s) and take necessary corrective action. See *Supplementary Information — Tape Cartridge Replacement* at the beginning of this procedure.
   - — For STF 0500, verify that the screw-slot on the tape is not set to SAFE (no write).
   - — For STF 0300, verify that DACS II formatted tape is installed; if there is any question, the tape can be inserted into another frame and diagnosed there.
3. If the tape cartridge was removed, enter `RST-EQPT::TAPE;`.
4. Enter `DGN-EQPT::TAPE;`.
   - If DGN ...STF message is received, continue with Step **5**.
   - If DGN ...STF message is not received, this procedure is completed.

5. Enter **RMV-EQPT::TAPE;**.

   NOTE:
   The remove operation takes 2 to 5 minutes because the tape is being rewound; in-progress messages will be received every 20 seconds.

6. Replace tape cartridge with second backup tape. (See *Supplementary Information — Tape Cartridge Replacement* at the beginning of this procedure.)
7. Enter **DGN-EQPT::TAPE;**.
   - If DGN ...STF message is received, continue with Step **8**.
   - If DGN ...STF message is not received, Enter **CPY-MEM:::PRI,SEC;** to copy the data base information. This procedure is completed.
8. Enter **RMV-EQPT::TAPE;**.
9. Replace tape drive and insert tape in new tape drive (see *Supplementary Information — Tape Cartridge Replacement at the beginning of this procedure). On the tape drive in a non-CEF frame, use the thumbscrew to withdraw the drive subassembly and to engage the replacement. On tape drive in a CEF frame, use the plug-in latch to disengage the drive and engage the replacement.*
10. Enter **RST-EQPT::TAPE;** which will power up the tape drive and retension the tape.
    - If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled). Examine tape slot and contact technical consultant if drive is damaging tapes.
    - If other denial is received, find the reason for denial in the output message and perform corrective action to obtain completion message.
11. Enter **DGN-EQPT::TAPE;**.
    - If DGN ...STF message is received, continue with Step **12**.
    - If DGN ...STF message is not received, enter **CPY-MEM:::PRI,SEC;** to copy the data base information.
12. Enter **RMV-EQPT::MC;**.
13. Replace the SSC pack (TM659C code) in the main controller.

14. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    NOTE:
    The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

    NOTE:
    The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the hard disk (or from tape if the disk cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and SSC and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

    - If RESET ...COMPLD (with no error explanation) message is received, continue with the next step.
    - If RESET ...COMPLD (with error explanation) message is received, refer to *Data Base Troubles* to clear reset completed conditionally.

15. Enter **`DGN-EQPT::TAPE;`**.
    - If DGN TAPE ...STF message is received, contact technical consultant.
    - If DGN TAPE ...STF message is not received, enter **`CPY-MEM:::PRI,SEC;`** to copy the data base information.

5.18 Clear Failed Link Diagnostic

1. If the alarm cutoff is not already operated, enter **OPR-ACO-ALL;**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Repeat the diagnostic for the failed link (which is named in the original failed DGN message). Enter the command from another link as follows: **DGN-EQPT::LINK-j;**

   Where: j = Link number (1 through 6).

3. If DGN LINK ...STF 0300 message is received, it means that the clock signal is not received on the synchronous link. So, verify wiring connections to the link at the back of the frame.
   - If DGN LINK ...STF message is not received, there is no problem at this time. If intermittent trouble recurs and another DACS II link is available, move the data link connections to the next link and set the link parameters.
4. Enter the diagnostic command for other links to determine if CI, ECI, or HECI must be replaced.
5. If DGN LINK ...STF message is received for any other link, enter **RMV-EQPT::MC;**.
   - If DGN LINK ...STF message is not received for any other link, proceed to Step **8**.
6. Replace the CI, ECI, or HECI (high-speed) pack, whichever is installed in the MC, with the same type.
7. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
8. If another DACS II link is available, move the data link connections from the failed link to the next available link and set the link parameters.
9. Make a record of the failed link stating that the CI, ECI, or HECI pack in the main controller must be replaced (using the method in this procedure) if the failed link will be needed or at the time of the next reset of the MC.

5.19 Clear Failed DS3 FLI or MXR Diagnostic

NOTE:
This procedure is used primarily for diagnostic failures encountered during turnup (service restoral denied). Almost always, the failed diagnostic implicates the subject pack, but an associated DS3 plug-in can also be implicated. These associated plug-ins are named in the error recovery ANALYSIS REPORT for in-service failures.

1. If the alarm cutoff is not already operated, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Enter `RTRV-STATE-EQPT::UNIT-[q]q::PROTN;` ([q]q = unit 1 through 16) and use Table 5-7 to determine the protection status of the packs.

NOTE:
The output message reads as follows: (1) the protection MMFG is listed first on the left, and (2) for each MMFG, the top code is the MXR maintenance status, next down is the MIU (if any) status, next is the MMFG protection status, and last, the protection availability.

CAUTION:
When there is service on the DS3U, forcing the removal of an entity by the use of MMFG FRC keyword or removing MMFG service to enable FLI removal could result in loss of service.

3. If the subject entity has not been removed from service (RMV COMPLD or RST DENY in printout), enter required RMV-EQPT command for that failed entity per Figure 5-6. Remove MMFG for failed MXR.

NOTE:
The removal of an MMFG (for MXR) or FLI will cause a protection switch. If protection is not available, the RMV-EQPT command will be denied.

NOTE:
If the mate FLI is out-of-service, the remaining FLI can only be removed if all the following are true: no NPCs grown on MXR, no service MXRs grown, protection MIU not grown, and no MMFGs in-service.

Table 5-7. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

4. Replace the plug-in named in the failed diagnostic message.
5. Enter the DGN-EQPT command for the same plug-in per Figure 5-6. The NPCs on an MXR are diagnosed when the MXR is diagnosed.
   - If DGN ...STF message is received, continue with Step **6.**
   - If DGN ...STF message is not received, enter RST-EQPT command for subject pack per Figure 5-6. For MXR, restore MMFG. This procedure is completed.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 5-6. Maintenance Command Construction

6. If you are working with either a failed MXR or MIU diagnostic, continue with Step **8.**
7. If you are not working with either of those diagnostics, there is an obscure problem; contact technical consultant.
8. Locate the trouble number which appears immediately after STF in the diagnostic message.
9. If you have the following trouble number: 0010 (for DGN MXR), 0300 (for DGN MIU), or 0301 (for DGN MIU), continue with Step **10.**
   - If you do not have one of those trouble numbers, there is an obscure problem; contact technical consultant.
10. If you have MXR trouble number 0010, determine from PSTATE query which FLI is SLT (selected). Enter RMV-EQPT command for the selected FLI per Figure 5-6. This will cause any service to switch to the mate FLI and allow you to replace the implicated FLI.

11. If you have MIU trouble number 0300 or 0301, enter the RMV-EQPT command for the associated MMFG per Figure 5-6. This will cause any service to switch to the mate MMFG and allow you to replace the implicated MXR.
12. Replace the implicated pack and enter the RST-EQPT command for the same plug-in per Figure 5-6. If MXR was replaced, restore the MMFG for the MXR.
13. Enter DGN command for the original failed plug-in per Figure 5-6.
    - If DGN ...STF message is received, there is an obscure problem; contact technical consultant.
    - If DGN ...STF message is not received, continue with Step **14.**
14. Enter RST-EQPT command for subject pack per Figure 5-6. For MXR, restore MMFG.
    - If RST ...COMPLD message is received, this procedure is completed.
    - If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.

5.20 Clear Failed DS3 FMT Diagnostic

NOTE:
The FMT diagnostic runs continuity tests between the DS3U and the ECCN. These tests actually involve accessing time slots on an NPC in the unit and checking the connection through the cables and the ECCN. Similarly, when the ETSI for the unit was diagnosed, the interconnection between it and the other ETSIs was tested.

1. If the alarm cutoff is not already operated, enter `OPR-ACO-ALL;`. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check the trouble printout for ERR ESR messages and RMV COMPLD messages.

   NOTE:
   When the FMT fails and is removed from service, service is switched to the other side of the CCN/ECCN and to the FMT pack on the other side.

   NOTE:
   If the FMT on one side is already failed and the FMT on the remaining side fails, that remaining FMT will not be removed from service (COND 19 DNY). It will be pested. The first failure must be cleared to allow the other FMT to be removed.

3. If the subject entity has not been removed from service (RMV COMPLD in printout), enter required RMV-EQPT `RMV-EQPT::UNIT-qq::FMT-s;` (where qq is the unit number and s is the FMT side).
   - If remove command was denied (COND 19), continue this procedure with the FMT on the other side which has been removed from service.
4. Replace the FMT named in the failed diagnostic message. To obtain the coordinate location of the FMT in the frame, enter `RTRV-LOC-EQPT::UNIT-[q]q::FMT-s;`.
5. Enter `DGN-EQPT::UNIT-qq::FMT-s;` for the same FMT plug-in.
   - If DGN ...STF message is received, continue with Step **6.**
   - If DGN ...STF message is not received, enter `RST-EQPT::UNIT-qq::FMT-s;` to restore the subject FMT to service. This procedure is completed.

- If DGN DNY (or CATP) is received because continuity tests were omitted (see Table 5-8), proceed to Step **11**.

6. If the DGN FMT message shows trouble number STF 0F05 or 0F07 and an optional second line with UPN and XPN numbers, proceed to Step **12.**
   - If the DGN FMT message shows trouble number STF 0F0D, proceed back to Step **4** and replace the FMT pack.
   - If the message does not show those trouble numbers, continue with Step **7.**
7. If there is an ESR ANALYSIS REPORT message which lists other suspect plug-ins, continue with Step **8.**
   - If there is not an ESR ANALYSIS REPORT with other plug-ins, there is an obscure problem; contact technical consultant.
8. Enter the command to remove the plug-in listed in the ESR ANALYSIS REPORT from service per Figure 5-7 and replace that plug-in.
9. Enter the command to restore the same plug-in (from above) to service per Figure 5-7.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 5-7. Maintenance Command Construction

10. Enter `DGN-EQPT::UNIT-qq::FMT-s;` for the same FMT plug-in.
    - If DGN ...STF message is received, there is an obscure problem; contact technical consultant.
    - If DGN ...STF message is not received, enter `RST-EQPT::UNIT-qq::FMT-s;` to restore the subject FMT to service. This procedure is completed.
11. Refer to Table 5-8 and, if diagnostic continuity tests must be run, perform corrective action per the table. Repeat Step **10** to reenter diagnostic.

Table 5-8. Cable Test Denial Codes

Code	Explanation	Corrective Action
C3	Cable tests are not run when CFT code is included in DGN command.	Reenter command without CFT code.
C4	Cable tests cannot be run if all ETSI time slots are mapped.	Verify that ETSI for unit is installed/ in-service. Cross-connections would have to be disconnected from the unit to run cable tests.
C5	No available NPCs in unit to run tests	At least one NPC in the unit must be installed/in-service to run tests. Grow and restore NPC if necessary.
C6	No available time slots on in-service NPCs.	Either another NPC must be added or cross-connections must be disconnected from the unit.
C7	No available time slots on in-service DMBs.	Either another DMBs must be added or cross-connections must be disconnected from the unit.
C8	No available time slots on in-service DS3 NPCs.	Either another DS3 NPC must be added or cross-connections must be disconnected from the unit.
C9	Cable tests omitted because there is not an in-service NPC and thus no available time slots.	Grow and restore another NPC in the unit.

12. Enter the command to remove the ETSI pack for the unit from the service per Figure 5-7. Replace the ETSI pack and enter the command to restore the pack in service per Figure 5-7.

13. Enter `DGN-EQPT::UNIT-qq::FMT-s;` for the same FMT plug-in.

    - If the DGN FMT message shows trouble number STF 0F05 or 0F07 and an optional second line with UPN and XPN numbers, continue with Step **14.**
    - If the DGN ...ATP message is received, proceed to Step **16.**

> **NOTE:**
> The diagnostic reports one cable problem at a time; so if different UPN and XPN numbers occur, clear that trouble before contacting technical consultant.

14. From Table 5-9, identify the faulty cable connecting to the subject DS3U by the UPN (unit plug number) and XPN (ECCN plug number) named in the message. Notice that the ECCN plug number includes the unit number.

15. Replace (or have repaired) the cable identified above. The ECCN plug numbers are stamped alongside the connectors on the ECCN panel; see Figure 5-8. The cable leads and terminal numbering on the connector plugs are identified in SD-96699-01.

Table 5-9. FMT Cable Identification

Unit Plug	ECCN Plug	Direction	Involved FMT
P1	P<unit No.>A	Receive	0
P2	P<unit No.>E	Transmit	0
P3	P<unit No.>B	Receive	0
P4	P<unit No.>F	Transmit	0
P5	P<unit No.>C	Receive	0
P6	P<unit No.>G	Transmit	0
P7	P<unit No.>D	Receive	0
P8	P<unit No.>H	Transmit	0
P10	P<unit No.>A	Receive	1
P11	P<unit No.>E	Transmit	1
P12	P<unit No.>B	Receive	1
P13	P<unit No.>F	Transmit	1
P14	P<unit No.>C	Receive	1
P15	P<unit No.>G	Transmit	1
P16	P<unit No.>D	Receive	1
P17	P<unit No.>H	Transmit	1

16. Enter `RST-EQPT::UNIT-[q]q::FMT-s;` to restore the subject FMT.
    - If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.

(LEFT SIDE OF ECCN PANEL)

	P3A	P3B	P3C	P3D	P3E	P3F	P3G	P3H	
	P4A	P4B	P4C	P4D	P4E	P4F	P4G	P4H	
	P6A	P6B	P6C	P6D	P6E	P6F	P6G	P6H	
	P9A	P9B	P9C	P9D	P9E	P9F	P9G	P9H	
	P10A	P10B	P10C	P10D	P10E	P10F	P10G	P10H	
	P12A	P12B	P12C	P12D	P12E	P12F	P12G	P12H	
	P15A	P15B	P15C	P15D	P15E	P15F	P15G	P15H	
	P16A	P16B	P16C	P16D	P16E	P16F	P16G	P16H	
BOTTOM	P17A	P17B	P18A			P19			TOP
	P14A	P14B	P14C	P14D	P14E	P14F	P14G	P14H	
	P13A	P13B	P13C	P13D	P13E	P13F	P13G	P13H	
	P11A	P11B	P11C	P11D	P11E	P11F	P11G	P11H	
	P8A	P8B	P8C	P8D	P8E	P8F	P8G	P8H	
	P7A	P7B	P7C	P7D	P7E	P7F	P7G	P7H	
	P5A	P5B	P5C	P5D	P5E	P5F	P5G	P5H	
	P2A	P2B	P2C	P2D	P2E	P2F	P2G	P2H	
	P1A	P1B	P1C	P1D	P1E	P1F	P1G	P1H	

(RIGHT SIDE OF ECCN PANEL)

Figure 5-8. Cable Connectors on ECCN Panel

5.21 Clear Failed CCB Diagnostic

Overview: This procedure deals with a failed CCB (cross-connect buffer) diagnostic. When a CCB pack fails, the associated unit FC packs and network TSI packs may also be taken out-of-service autonomously; so, utility queries are used to check for associated packs that must be restored to service. Conversely, a failure of a TSI on one of the CCB ports can cause the CCB to fail its diagnostic. When that happens, the accompanying ERR, ESR ...CCB message is used to identify the failed TSI.

1. If the alarm cutoff is not already operated, enter **`OPR-ACO-ALL;`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the CCB has not been removed from service (RMV CCB COMPLD or RST CCB DENY in printout), enter **`RMV-EQPT::CCB-sf;`**

   Where:
   s = Side (0 or 1)
   f = CCB number (1 through 6).
3. Enter **`RMV-CNFGRN-EQPT::UNIT-q::CCN-s,TSIS;`** with the same unit and side as the failed CCB.
4. Locate trouble number that appears after the DGN ...STF keyword in the trouble printout.
   - If trouble number 0200 or 0300 is received, continue with Step **5.**
   - If other trouble number is received, proceed to Step **7.**

   ⇒ NOTE:
   The STF 0200 and 0300 failures indicate a port alarm received from an associated TSI which can be failed or just unplugged.
5. Enter **`RST-EQPT::CCB-sf;`** for the subject CCB.
6. Enter **`RST-EQPT::TSI-sft;`** for each TSI associated with the subject CCB. If any diagnostic fails, replace that TSI pack and restore the replacement.

   Proceed to Step **15.**

7. Replace CCB pack (UM26 code) identified in the failed diagnostic message. There are six CCB slots on each side of the cross-connect network, one for each DACS II unit.
8. Enter **DGN-EQPT::CCB-sf;**
   - If DGN ...STF message is not received, proceed to Step **15.**
9. Enter **RMV-EQPT::CCNI-s;** where: s = failed side (0 or 1).
10. Replace the CCNI pack (UM30 code) for the same CCN side.
11. Enter **RST-EQPT::CCNI-s;** where: s = side 0 or 1.
12. Enter **DGN-EQPT::CCB-sf;**
    - If DGN ...STF message is NOT received, proceed to Step **15.**
13. Locate the ERR ESR CCB message that appears in the original trouble printout and the eight raw data bytes in that message. The data bytes are located under the error analysis heading in the output message.
    - If none of the first 3 data bytes have nonzero characters, check CCB slot and backplane for damage. If no wiring problem is found, contact technical consultant.
    - If any of the first 3 data bytes equal 0100 or 0200, there is a timing signal loss or clock error at the CCB. Check the backplane wiring for bent pins or broken leads at the CCB. If no wiring problem exists, check trouble printout for SYNC messages.
    - If any of the first 3 data bytes have some other nonzero value, use Table 5-10 to determine the related TSI From-Unit identification from one of the first 3 data bytes (referred to as data1, data2, and data3).

      NOTE:
      The To-Unit identification and side for the complete TSI "stf" number are already known from the failed CCB. The bus numbers refer to the connections to the 4 FTMs or DSPU ports.

Table 5-10. TSI Ports on CCB

Byte	Specific Position Value	TSI From-Unit ID
ESR0 (data 1)	xx8x	2 (bus 1)
	xx4x	1 (bus 1)
	xx2x	6 (bus 0)
	xx1x	5 (bus 0)
	xxx8	4 (bus 0)
	xxx4	3 (bus 0)
	xxx2	2 (bus 0)
	xxx1	1 (bus 0)
ESR1 (data 2)	xx8x	4 (bus 2)
	xx4x	3 (bus 2)
	xx2x	2 (bus 2)
	xx1x	1 (bus 2)
	xxx8	6 (bus 1)
	xxx4	5 (bus 1)
	xxx2	4 (bus 1)
	xxx1	3 (bus 1)
ESR2 (data 3)	xx8x	6 (bus 3)
	xx4x	5 (bus 3)
	xx2x	4 (bus 3)
	xx1x	3 (bus 3)
	xxx8	2 (bus 3)
	xxx4	1 (bus 3)
	xxx2	6 (bus 2)
	xxx1	5 (bus 2)

14. Enter **RMV-EQPT::TSI-sft;** for that TSI, replace it, and enter **RST-EQPT::TSI-sft;**.
15. Enter **RST-EQPT::CCB-sf;** for the subject CCB.
16. Enter **RTRV-STATE-EQPT::UNIT-q::OOS;** and RTRV-STATE-COM::::OOS; and check the unit FC and network TSI portions to determine if any are removed from service.

    Where: q = Involved DACS II unit (1 through 6).

17. If any FCs are out-of-service, enter command to restore each one as follows: **RST-EQPT::UNIT-q::FC-sf;**.

    Where:
    q = Unit number (1 through 6)
    sf = FC number consisting of side (0 or 1) and FC number in unit.

18. If entire network side is out-of-service, enter the command **RST-CNFGRN-EQPT:[xy]:UNIT-q:[ww]:CCN-s,TSIS;** for the subject side and unit; otherwise, enter command to restore each TSI as follows, **RST-EQPT::TSI-sft;**.

Controller and Link Troubles

6

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Controller and Link Troubles

6

This chapter contains the procedures to clear various main controller troubles including the communication interface (for administrative link).

NOTE:
If you already have isolated the trouble to one of the troubles in this chapter, proceed directly to the procedure for that trouble; otherwise, go to *Trouble Identification* to first isolate the trouble.

The following equipment considerations pertain to the controller and link troubles.

- The trouble-clearing in this chapter involves the replacement of the main controller plug-ins. If the main controller is still operative, it must be removed from service before making the replacement. When the replacement is plugged in, the frame may be automatically reset. However, the manual reset is always used to ensure uniform completion conditions.
- The frame reset is referred to as a cold boot of the frame circuits and memories; whereas, the boot command is referred to as a warm boot. Both these operations can take from 3 minutes to over 30 minutes depending on how the frame is equipped and the source of the boot (disk or tape). In-progress messages will be issued every 20 seconds.

6.1 Clear Processor Failure Alarm

1. If a reset is in progress, wait to see if the LED goes off after the reset completes. If the LED remains lighted, this trouble procedure is applicable. The processor failure is lighted during the frame reset sequence.
2. If the alarm cutoff is not operated, try pressing the **ACO** button on the DACS II status panel.
3. Check the power units located in the MC (main controller) for a lighted failure LED on any power unit.
   - If an LED is lighted, replace the power unit and close the latch/switch.
   - If an LED is not lighted, proceed to Step **6**.
4. If the LED on the replacement lights, clear wiring trouble between the associated 48-volt fuse and the power unit per SD-96699-01.
5. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If the reset completes and the LED goes out, you have completed this procedure.
   - If the LED is lighted, contact technical consultant for assistance in clearing the trouble.
6. Check printout for recent ERR SOFTWARE message.
   - If recent ERR SOFTWARE message occurred, refer to *Software Error* to clear the error.
   - If recent ERR SOFTWARE message did not occur, continue with Step **7**.
7. Check to see if MC is in maintenance condition (MCOND ...COMPLD in printout).
   - If MC is in MCOND state, continue with Step **8**.
   - If MC is not in MCOND state, proceed to Step **10**.
8. Check printout to locate ERR message for MC, disk, or tape.
9. Enter DGN command for that entity (for example, DGN-EQPT::MC;).
   - If DGN ...STF message is received, go to Section 5.1 to clear the failed diagnostic.

10. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If the FAILURE alarm goes off after the reset sequence completes, you have completed this procedure.
    - If the FAILURE alarm does not go off, check printout for MC packs named (**CPU, CI, SSC, EBX,** and the **EMTC**) in an output error message.
11. If any MC pack is named, replace that pack.
    - If MC pack is not implicated, contact technical consultant for assistance.
12. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If processor LED goes off after the reset completes, you have completed this procedure.
    - If processor LED does not go off, repeat the sequence to replace the next MC pack in an output message until all the MC packs have been replaced.
13. If the trouble persists after all the MC packs have been replaced, check for backplane wiring or plug-in connector trouble.
    - If no pack or wiring trouble is found, contact technical consultant for assistance in clearing the trouble.

6.2 Clear Frame Startup Trouble

Overview: This procedure is used when the DACS II reset operation fails. During the reset, the controller packs (CI, MP, MTC and SSC) and the frame unit UCs are initialized, internal communication networks are established, and programs are transferred from the disk or tape to the respective packs. Depending on the degree to which the frame is equipped, the reset can take up to 30 minutes (from tape) to complete. The RST MC command initiates the same operations as the frame reset except that the unit UCs are not rebooted.

NOTE:
The terminal must be set at 1200 baud rate to read the information as it scrolls on the screen.

1. If there has been recent installation or maintenance activity on the backplane, check behind the MC to verify that wiring loops are installed at connectors CPU and CI. Be careful when removing the metal shield so as not to damage other wiring. The wiring loops (green wires) are on plugs at the CPU and CI connectors which are at the bottom center of the MC backplane (on the CEF).
2. At back of frame, disconnect the administrative link cables (except link 1) from the main controller and tag them for correct installation after the trouble is cleared.
3. Retry the reset as follows. On the DACS II status panel, hold **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If reset does not proceed beyond CI/ECI/HECI startup, replace the CI, ECI, or HECI, whichever is installed in the MC, with the same type and reset the frame again.
   - If any STARTUP STF message is received, replace the implicated pack as follows:
     - — For MP, replace CPU (TM657B) in main controller.
     - — For SSC, replace SSC (TM659C).
     - — For CI/ECI, replace CI (TM658C), ECI (TM736C), or HECI (TM762).
     - — For EBX, replace EBX (UM71) or BX2 for non-CEF (UM72).
     - — For EMTC or MTC, replace EMTC (UM75) or MTC plug-in.

- If BOOT FROM DISK (or TAPE) message is NOT received (see Note), replace the SSC.

  NOTE:
  A BOOT IN PROGRESS message will occur every 20 seconds until the boot is complete.

- If the reset completes with you have completed this procedure. Reconnect link cables.
- If the reset completes go to Section 7.2 to clear reset completed conditionally.
- If **BOOT FAILED; BAD BOOT DEVICE** message is received, refer to Section 6.4 to clear the trouble.
- If **SOFTWARE ID BLOCK CHECK FAILED** message is received, proceed to Step **6**.
- If **BOOT IN PROGRESS (continues for more than 45 minutes)** message is received, continue with Step **4**.
- If **other** message is received, check the trouble printout for other messages. If there are no other messages or trouble indications to work with, contact technical consultant.

4. Attempt to clear the trouble by replacing the plug-ins listed below (which have not already been replaced) one at a time and by checking the reset sequence. If software is being loaded from tape, try using the other source tape and resetting the frame.
   - — For MP, replace CPU (TM657B) in main controller.
   - — For SSC, replace SSC (TM659C).
   - — For CI/ECI, replace CI (TM658C), ECI (TM736C), or HECI (TM762).
   - — For EBX, replace EBX (UM71) or BX2 for non-CEF (UM72).
   - — For EMTC or MTC, replace EMTC (UM75) or MTC plug-in.
5. If trouble persists or other trouble messages are received, contact regional technical consultant for assistance in clearing the trouble.

6. From Table 6-1, determine the meaning of the condition (COND) code in the trouble message.

Table 6-1. Software ID Condition Codes

Code	Meaning
20	Software ID block cannot be read
21	Software ID block failed comparison
22	Generic/release number mismatch
23	Generic/release point issue mismatch
24	Sub-release number mismatch
A5	FPI on tape does not match disk

7. If you suspect that the wrong tape was installed, install the correct tape cartridge in the tape drive as shown in the following steps.

Replace Tape Cartridge

a. If the tape is not already out-of-service, enter **`RMV-EQPT::TAPE;`** to power down the drive and enable restore of new tape. In-progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).

b. Remove tape cartridge from the drive as follows:

— **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.

— **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.

c. Insert tape cartridge into the tape drive as follows:

— **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

NOTE:
Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

— **Tape Drive With the Drawer.** Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

NOTE:
Metallic side of the cartridge faces down and the door faces to the right.

d. Enter `RST-EQPT::TAPE;` to power up the tape drive and retension the tape.

— If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled). Examine tape slot and contact technical consultant if drive is damaging tapes.

— If other denial message is received, the reason for denial will be in the output message.

8. Reset the frame using the RESET controls on the status panel
   - If same trouble indications occur, contact technical consultant.
   - If different trouble indications occur, proceed as directed under Step for the trouble indications.

9. If the reset completes with no conditions or error messages, enter `DGN-EQPT::TAPE!`
   - If DGN ...STF is received, refer to *Manual Diagnostic Failures*, to clear failed tape diagnostic.
   - If DGN ...DENY message is received, the reason for denial is given in the output message.
   - If DGN ...ATP message is received, the tape that was replaced was the cause of the reset trouble.

6.3 Clear RESET TOD/DATE Message

Overview: This procedure deals with clearing ALM RESET TOD/DATE messages which indicate that the TOD (time of day) or date or both have been adjusted after a frame reset or MC restoral. The date is recovered from the tape and the time is obtained from the real-time clock in the CI, ECI, or HECI pack. When these RESET messages are accompanied by a minor alarm, it indicates that the recovered values are suspect and must be set manually. The date must always be set because the tape may not be up-to-date.

1. If the alarm cutoff is needed because of the ALM RESET message, enter **OPR-ACO-ALL;**.
2. Locate the system time and date that appear on the line following the <Date ...year> <Time ...day> explanatory line. The format of the date is modayr and the format of the time is hrmnsc.
3. Check these times against the actual times.

   ⇒ **NOTE:**
   Enter **RTRV-HDR;** to display the time again.

4. Does either time or date need to be reset?
   - If the time needs to be reset, enter **ED-DATE:[xy]::[ww]:hh-mm-ss;** to set the correct time.

     Where:
     hh = Hour (00 through 23)
     mm = Minutes (00 through 59)
     ss = Seconds (00 through 59).

   - If the date needs to be reset, enter **ED-DATE:[xy]::[ww]:[ce]yy-mm-dd:[INT-bb];** to set the correct date.

     Where:
     dd = Day (01 through 31)
     mm = Month (01 through 12)
     ce = Optional, for different century
     yy = Last 2 digits of year (00 through 99, default is 86)
     INT bb = Optional, to set interval at which the date will be printed, 01, 02, 04, 06, 08, 12, or 24 hours (default).

6.4 Clear Failed Boot Trouble

Overview: This procedure is used to clear the following boot failure messages: BOOT FAILURE: BAD BOOT DEVICE, CAN'T BOOT CONFIG, CAN'T BOOT DB, or CAN'T READ BOOT DEVICE.

1. Verify that the proper codes of plug-ins are installed in the main controller per Table 6-2. Install correct codes if necessary.

Table 6-2. Main Controller Equipment

Plug-In	Equipment
4-Mbyte CPU	TM657B
8-Mbyte EBX (Expanded Bus Extender)	UM71 (for CEF)
8-Mbyte BX2 (Expanded Bus Extender)	UM72 (for non-CEF)
EMTC (Expanded MTC)	UM56
8-Mbyte CI	TM658C
8-Mbyte ECI	TM736C
8-Mbyte HECI (High-Speed)	TM762
40-Mbyte Hard Disk	ED-9C015-30
24-Mbyte Tape	ED-9C016-30
SSC for 40-Mbyte Disk	TM659C

2. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If the boot failure message is cleared, this procedure is completed.
   - If not, continue with Step **3**.
3. Replace the SSC plug-in in the main controller and reset the frame.
   - If the boot failure message is cleared, this procedure is completed.

4. Install the most current backup tape (that also contains the software executables) in the tape drive for the main controller.

   a. If the tape is not already out-of-service, enter **`RMV-EQPT::TAPE;`** to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).

   b. Remove tape cartridge from the drive as follows:

      — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.

      — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.

   c. Insert tape cartridge into the tape drive as follows:

      — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

      ⇒ NOTE:
      Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down. **Horizontally Mounted Drive.** Metallic side of the cartridge faces down and the door faces to the left.

      — **Tape Drive With the Drawer.** Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

      ⇒ NOTE:
      Metallic side of the cartridge faces down and the door faces to the right.

d. Enter `RST-EQPT::TAPE;` to power up the tape drive and retension the tape.

   — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.

   — If other denial message is received, the reason for denial will be in the output message.

5. Remove the DACS II hard disk drive from the main controller to cause a boot from tape when the frame is reset.

   a. On the main controller shelf, locate the disk drive plug-in to be replaced.

      - If the DACS II is executing commands (not disabled by trouble), place the main controller in the maintenance condition by entering `RST-EQPT::MC::MCOND;`. Then remove the disk from service by entering `RMV-EQPT::DISK;`.
      - If the DACS II is not executing commands, then disconnect SSC plug-in from MC to remove power from disk. The disk will stop spinning in about 30 seconds.

   b. See Caution. Disconnect the disk plug-in from the shelf slot and place it out of the way to prevent accidental damage to it.

      ⚠ CAUTION:
      Do not allow the mounting assembly or drive unit to drop. The drive unit is sensitive to shock damage and can be damaged by a 1-inch fall.

6. If the SCC was disconnected, insert the SSC plug-in that was previously disconnected. The most current tape containing executables should already be installed in the tape unit.

7. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   ⇒ NOTE:
   Without the disk in the frame, the reset will cause a boot from tape. The reset may take up to 30 minutes.

   - If `COMPLD` **...with error explanation**, message is received, go to Section 7.2.
   - If the reset stops, go to Section 6.2.

8. Verify that the edge protector is removed from the disk plug-in connector. Install the disk drive as follows:

   CEF Configuration:

   Align the new disk plug-in with the guides on the right side of the slot and insert the new disk plug-in into the slot. Be sure the plug-in is securely seated.

   Non-CEF Configuration:

   Insert the new drive into the slot and screw in the thumb-screw to take up the slack. Push in again to be sure it is seated. Finally, hand tighten the screw to secure.

9. Log on as user DAX and enter `RST-EQPT::DISK::CLR;` to initialize the disk. To complete this command, answer YES when prompted.

10. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI:PROG;` to copy the software onto the initialized disk.

    - If CPY ...DENY message was received, refer to Section 7.1 to clear backup memory transfer failed.

11. **See warning.** Enter `CPY-MEM:[xy]::[ww]:SEC,PRI;` to copy the data base information onto the initialized disk.

    ⚠ WARNING:
    The most up-to-date backup tape must be installed for current provisioning and cross-connect information. If the most recent backup tape is not installed, enter `RMV-EQPT::TAPE;`, insert the most recent backup tape, and enter `RST-EQPT::TAPE;` before executing the transfer command. Any cross-connections that are not on the backup tape (cross-connected after backup was made) must be re-entered manually using cross-connect commands.

    - If CPY ...DENY message was received, refer to *Data Base Troubles* to clear backup memory transfer failed.

12. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with no error explanation) message is not received, contact technical consultant for assistance.

6.5 Clear ALMDET OVERLOAD Message

1. If UNIT-[q]q,UC OVERLOAD wording appears in the message, verify that the UBX pack is installed in the unit.
   - If UNIT-[q]q,UC OVERLOAD wording does not appear in the message, proceed to Step **4**.
2. Enter `RST-EQPT::UNIT-[q]q::UC;` to restore subject unit.

   Where: [q]q = Unit number (1 through 16) named in OVERLOAD message.
   - If DGN ...STF message is received, refer to *Manual Diagnostic Failures* to clear the trouble.
   - If OVERLOAD UNIT or RL response is obtained again when frame is used, replace UBX plug-in, and enter `RST-EQPT::UNIT-[q]q::UC;`.
   - If OVERLOAD UNIT or RL response is not obtained again when frame is used, you have completed this procedure.
3. If trouble persists, check unit backplane and pins, and contact technical consultant if no wiring trouble is found.
4. If MJ and processor FAILURE LEDs are lighted on the DACS II status panel, refer to Section 6.1.
   - If those LEDs are not lighted, continue with Step **5**.
5. Determine which pack is implicated from the MP or CI designation in the OVERLOAD message. The MP designation means the CPU in the main controller and the CI means the CI in the main controller. The status panel FAILURE LED (which has its own trouble-shooting procedure) will be lighted with the OVERLOAD MC message.
6. Enter `RMV-EQPT::MC;`. If command cannot be completed, continue with Step **7**.
7. Replace the MC pack implicated from the OVERLOAD message.
8. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If the trouble is cleared, this procedure is completed.
   - If the trouble persists, contact technical consultant for assistance.

6.6 Clear Inoperative Terminal (System Hung)

NOTE:
If trouble is found in any of the preliminary checks, discontinue the procedure.

1. Make the following checks:
   - — Terminal connected to power outlet and power switch on.
   - — Terminal connected to TTY connector at DACS II, either directly or via data sets.
   - — Terminal passes its own self-tests.
   - — Terminal is properly optioned and set to the proper baud rate for the link to which it is connected.
2. Verify that the correct ED-2C646-30 adapter is used to connect the data link to the DACS II.
   - — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).
   - — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).
   - — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).
   - — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

   NOTE:
   The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.
3. Determine if the terminal will work with the printer shut off (failed printer can hang up the terminal); also, reset the terminal by turning it off, then on again.

4. If other links to DACS II are working, from another link, enter
   RTRV-PRMTR-LINK:[xy]:j[mm]:[ww];

   Where:

   j = Suspected link
   mm = Optional virtual circuit (synchronous).

   - If other links to DACS II are not working, proceed to Step **10**.

5. Read the output message per Figure 6-1 to verify that the link baud rate matches the terminal and to check other link status. Mismatched baud rates cause garbled characters to be printed.

   - If the link baud rate does not match the terminal baud rate, enter
     ED-PRMTR-LINK::j::PTCOL-{S|T},BAUD-bb
     [,ALM-k][,BS-e][:INIT];
     and you have completed this procedure. (Refer to Section 6.8 for the procedure to establish the link.)

```
/*Protocol*/
"{S/X}"
/*Baud:Backspace:Alarm:Enq/Ack.Xon/Xoff:Mode,Software,Hardware status*/
"bb:e:k:q:x:m,p,hh"
```

Protocol = S for Snider (Async) or X for X.25 (Synchronous)

bb = <baud> = 03,06,12,24,48,96

e = <backspace> = 0 for true backspace, 1 for underscore backspace, or dash (—) for synchronous link.

k = <alarm> = 1 (link alarm defined as minor) or 2 (defined as major)

q = ENQ/ACK protocol 0 disabled, 1 enabled (default)

x = Xon/Xoff protocol 0 disabled (default), 1 enabled.

m = <mode> = 0 (idle), 1 (input message), or 2 (output message)

p = <software> = 0 (protocol exchanges in-service) or 1 (protocol exchanges out-of-service, which slows down DACS II response time)

hh = <hardware> = 03 (hardware in-service) or 04 (hardware out-of-service)

ADDITIONAL LINES FOR X.25:

```
/*Data Link Layer parameters:  Frame address*/
"K-b,T1-eee,T3-ggg,N2-aa:{A/B}"
/*Packet Layer parameters*/
"W-c,P-ddd,T20-iii,T22-jjj,T23-kkk,T25-lll,T26-mmm,R20-nn,R22-p,R23-q,R25-r"
/*PVC and SVC range:  PVC and SVC group number*/
"ppss:gghh"
```

Figure 6-1. Link Status Register

6. Enter **DGN-EQPT::LINK-j;** (where **j** is the original link that failed).
   - If DGN LINK ...STF message is received, refer to *Manual Diagnostic Failures* to clear link diagnostic failure.
7. If other links are working, try removing the inoperative link and restoring it to service again as follows:
   RMV-EQPT::LINK-j; and **RST-EQPT::LINK-j;**
8. On suspect link, try entering **RTRV-HDR-NE;** to see if DACS II can now execute commands.
   - If DACS II can execute commands, this procedure is completed.
9. If the inoperative link uses data sets, check data sets by connecting to a different link (if one is available and correctly provisioned in the data base). Alternatively, you can try replacing the data set. Data set specifications are found in the information notes of SD-96699-01.
10. At back of the frame, disconnect the administrative link cables (except link 1) from the main controller and tag them for correct installation after the trouble is cleared.
11. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button. Watch for messages to see if the reset completes.
    - If the link is now operative, this procedure is completed.
12. Proceed as follows:
    - If DACS II is responding with **RL**, go to Section 6.7.
    - If DACS II is not responding at all (no character echo), replace the CI, ECI, or HECI pack in the MC.
    - If trouble persists, replace each of the following plug-ins one at a time and check if the link is operative after the reset completes.
      — For MP, replace CPU (TM657B) in main controller.
      — For SSC, replace SSC (TM659C).
      — For EBX, replace EBX (UM71) or BX2 (UM72).
      — For EMTC or MTC, replace EMTC (UM75) or MTC plug-in.
    - If trouble persists, contact technical consultant for assistance.

6.7 Clear Repeated RL Command Response

1. If **RL** appears on the command line after the command is entered, reenter the command. If RL is received again, enter `RTRV-HDR-NE;` to see if trouble persists with different command.
   - If RL persists, continue with Step **2**.
   - If the trouble goes away, you have completed this procedure.
2. Check processor FAILURE LEDs status.
   - If MJ and processor FAILURE LEDs are lighted on the DACS II status panel, refer to Section 6.1.
3. Check printout for OVERLOAD message.
   - If OVERLOAD message is present on the printout, refer to Section 6.5.
4. On DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - After the reset completes, if DACS II can execute commands, this procedure is completed.
   - After the reset completes, if DACS II cannot execute commands, contact technical consultant for assistance.

6.8 Establish Administrative Link at DACS II

Overview: This procedure is used to prepare DACS II links for connections. There are six links available for connection of terminal equipment and operations systems. With the ECI (TM736C), links 5 and 6 are synchronous links using X.25 protocol (through level 3) at rates up to 9.6 kb/s. The HECI (high-speed, TM762) extends the rate up to 56 kb/s. Up to 16 virtual circuits can be established on each synchronous link. The characteristics of each link can be changed from the defaults provided by DACS II using the ED PRMTR LINK commands herein. The ECI or HECI is required for TABS (telemetry asynchronous block serial) links.

1. If data sets (such as 202T) are required for remote connections or for equipment more than 50 feet (RS-232C specification) or 2000 feet (RS-449 specification, 1200 baud) away, verify that data sets have been installed. Data set specifications are given with the information notes in SD-96662-01.
2. Connect data link cable (for example, M25B) to the TTY connector for the link (behind DACS II main controller). No adapter is required for RS-449 format, but ED-2C646-30 adapters are required for RS-232C format as follows:
   - — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).
   - — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).
   - — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).
   - — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

NOTE:
The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

3. What type of link is being established?
   - If **ASYNCHRONOUS**, continue with Step **4.**
   - If **TABS**, proceed to Step **5.**
   - If **SYNCHRONOUS**, proceed to Step **6.**

4. Enter the appropriate command to initialize the link or make changes:
   ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-S[,BAUD-bb]
   [,ALM-k][,BS-e][,ENQ-q][,XON-x][:INIT]; or
   ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-M[,ALM-k][:INIT];

   Where:

   j = Physical link number (1 through 6)

   SIM = Asynchronous Snider (S) protocol or Modified (M) Snider for *SLC* Series 5 carrier system; only one of the 6 links can be set for modified Snider.

   bb = Baud rate; 03, 06, 12, 24, 48, or 96 for rate of 300, 600, 1200, 2400, 4800, or 9600; default is 1200

   k = Alarm class; k = 2 for major alarm for link hardware failure, or k = 1 for minor alarm (default)

   e = Backspace; e = 1 for backspace indicated by underscore or e = 0 to actually move cursor backward for backspace (default)

   ENQ-q = To enable/disable ENQ/ACK acknowledgement protocol to match terminal requirement; q = 0 to disable or x = 1 enable (default).

   XON-x = To allow use of CTRL S and CTRL Q commands to temporarily stop and start long output messages; x = 0 to disable (default) or x = 1 to enable.

   INIT = Optional, to initialize all parameters to default values except for those parameters entered in the command.

   Proceed to Step **10.**

5. Enter the following commands to make required settings:

   ED-PRMTR-LINK::j::PTCOL-T,BAUD-bb;

   ED-PRMTR-LINK:[<xy>]:j:[ww]:APPL-{ASCS|ASCD|PM}
   [,L2AD-aa][,POLL-ttt];

   Where:

   j = Physical link number (3 or 4)
   T = TABS protocol
   bb = Baud rate (24 for 2400)
   ASCS, ASCD, or PM = Selects application as follows: alarm surveillance and control summary or detailed, or performance monitoring.
   ttt = Optional, to specify polling time as follows: 001 through 255 for ASCS or ASCD applications.
   aa = Optional, to specify Layer 2 address (00 through 31).

   Proceed to Step **10**.

6. To initialize the link or change alarm class, enter
   ED-PRMTR-LINK:[xy]:j:[ww]:PTCOL-X[,ALM-k][:INIT];

   Where:

   j = Physical link number (5 or 6)
   PTCOL X = X.25 synchronous link protocol
   k = Alarm class; 2 for major alarm for link hardware failure or 1 for minor alarm (default)
   INIT = Optional, to initialize all parameters to default values except for those parameters entered in the command.

7. Enter **RTRV-PRMTR-LINK:[xy]:j[mm]:[ww];** to see the existing (or default) link parameter values (see Table 6-3). The link must be removed from service to change parameters. See Figure 6-2.

8. To enter different **data layer** values, list the subject parameter followed by the value (for example, K-5). Enter the command as follows:
   ED-PRMTR-LINK:[xy]:j:[ww]:[K-b][,T1-eee][,T3-ggg]
   [,N2-aa][,FRMAD-{A|B}];

   Where:

   j = Physical link number (5 or 6)
   FRMAD {AIB} = Frame address in X.25 layer; default is A.

9. To enter different **packet layer** values, list the subject parameter followed by the value (for example, R20-nn) and use commas to separate parameter entries. Enter the command as follows:
   ED-PRMTR-LINK:[xy]:j[mm]:[ww]:[<param>-<value>, ... <param>-<value>][,VC-ppss&-gghh];

   Where:

   j = Physical link number (5 or 6)

   mm = Permanent virtual circuit (01 through 16) on same link

   <param> = One of the **packet layer** parameters of Table 6-3 for which different values are to be specified; identified by designation (for example, T20)

   <value> = Value of named parameter

   ppss = Virtual circuit ranges (00 through 16) for permanent (pp) and switched (ss) VCs; defaults are pp = 08 and ss = 08

   gghh = Virtual circuit groups (00 through 15) for above ranges; defaults are gg = 00 and hh = 00.

10. If DENY message with explanation that link is out-of-service is received, enter **RST-EQPT::LINK-1;** and reenter ED LINK command. Conversely, for synchronous link, enter **RMV-EQPT::LINK-1;** if link is in-service.

11. Verify that any administrative terminal to be connected to the link is set to the following major characteristics: Full Duplex, 7/8-Bit ASCII, Even Parity, Answerback (if link is provisioned for ENQ/ACK) and same Baud Rate. Complete terminal specifications are found in the information notes of SD-96658-01.

12. If you are adding the link to service, enter **RST-EQPT::LINK-j[mm];** to complete this procedure. Procedures to change the link language, NPC addressing, and output message screening are contained in *Provisioning*, Volume I.

```
/*Protocol*/
"{S/X}"
/*Baud:Backspace:Alarm:Enq/Ack:Xon/Xoff:Mode,Software,Hardware status*/
"bb:e:k:q:x:m,p,hh"
```

Protocol = S for Snider (Async) or X for X.25 (Synchronous)

bb = <baud> = 03,06,12,24,48,96

e = <backspace> = 0 for true backspace, 1 for underscore backspace, or dash (—) for synchronous link.

k = <alarm> = 1 (link alarm defined as minor) or 2 (defined as major)

q = ENQ/ACK protocol 0 disabled, 1 enabled (default)

x = Xon/Xoff protocol 0 disabled (default), 1 enabled.

m = <mode> = 0 (idle), 1 (input message), or 2 (output message)

p = <software> = 0 (protocol exchanges in-service) or 1 (protocol exchanges out-of-service, which slows down DACS II response time)

hh = <hardware> = 03 (hardware in-service) or 04 (hardware out-of-service)

```
ADDITIONAL LINES FOR X.25:
/*Data Link Layer parameters:  Frame address*/
"K-b,T1-eee,T3-ggg,N2-aa:{A/B}"
/*Packet Layer parameters*/
"W-c,P-ddd,T20-iii,T22-jjj,T23-kkk,T25-lll,T26-mmm,R20-nn,R22-p,R23-q,R25-r"
/*PVC and SVC range:  PVC and SVC group number*/
"ppss:gghh"
```

Figure 6-2. Link Status Register

Table 6-3. Synchronous Link Level Parameters

Parameter Designation	Meaning	Value Range	Default
Data Layer Values			
N2	Frame Transmission Attempts	2 through 16	7
K	Window Size	1 through 7	7
T1	Acknowledgment Timer	2 through 20 seconds	3
T3	Idle Channel Timer	4 through 120 seconds	26
Packet Layer Values			
W	Window Size	1 through 7	2
P	Packet Size	128 through 512 octets	128
R20	Restart Retries	1 through 10	1
R22	Reset Retries	1 through 3	1
R23	Clear Retries	1 through 10	1
R25	Data Retransmissions	0 through 3	0
T20	Restart Timer	10 through 180 seconds	180
T22	Reset Timer	10 through 180 seconds	180
T23	Clear Timer	10 through 180 seconds	180
T25	Data Acknowledgment Timer	10 through 200 seconds	200
T26	Interrupt Confirmation Timer	10 through 180 seconds	180

Note: The following timers are not supported by DACS II:

T2 - Built-in to the XPC-MC 68605 chip of the ECI, time is 0.3 seconds and cannot be changed with the software.

T4 - Inactive link timer.

T21 - Call request response timer for SVCs.

Data Base Troubles

7

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Data Base Troubles

7

This chapter deals with two major troubles: clearing the denial of the backup memory transfers and clearing the conditional (with errors) completion of the main controller reset or the utility boot command.

NOTE:
If you already have isolated the alarm to one of the data base troubles in this chapter, you can proceed directly to the procedure for that trouble; otherwise, you should go to *Trouble Identification* to first isolate the trouble.

The following items, on the maintenance considerations, are presented here as trouble-clearing tips:

- Data base troubles are often traced to the tape or disk. If both are implicated, the tape should be the first line of trouble clearing. Common problems are that the disk or tape information cannot be accessed during a boot or transfer operation or data errors are detected.
- Before MC or EFC plug-ins are replaced, the MC must be removed from service. For the hard disk and tape, this step powers down the drive so that it can be replaced without the possibility of equipment damage. If the MC cannot be removed from service, the SSC plug-in can be disconnected to power down the disk or tape drive.
- It may take up to 4 minutes for the remove tape command to execute because the tape is rewound during the operation.

- Tape aging is aggravated by heat buildup during repeated tape operations so the tape should be removed from service and pulled out to cool after repeated long use, like for backup transfers.
- Some problems will cause the MC or EFC to go to the MCOND (maintenance condition) autonomously. While in the MCOND, the MC will be in the required state to process main controller maintenance commands. Commands directed to the peripheral units will be denied. After the trouble is cleared (or the particular backup transfer is completed), the restore MC command or hard reset is used to exit the MCOND.

7.1 Clear CPY MEM DENY Trouble

Supplementary Information — Tape Cartridge Replacement

If you do not know how to replace the tape cartridge, familiarize yourself with the following procedure.

- If the tape is not already out-of-service, enter `RMV-EQPT::TAPE;` to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).
- Remove tape cartridge from the drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.
  - — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.
- Insert tape cartridge into the tape drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

    NOTE:
    Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
    Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

  - — **Tape Drive With the Drawer.** Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

    NOTE:
    Metallic side of the cartridge faces down and the door faces to the right.

- Enter **RST-EQPT::TAPE;** to power up the tape drive and retension the tape.
  - — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.
  - — If other denial message is received, the reason for denial will be in the output message.

Trouble Clearing Procedure

1. To transfer executable programs (PROG) or to transfer to disk (PRI), the frame must be in the maintenance condition (MCOND) and you must have restricted maintenance (RMON) privileges. If necessary, enter `RST-EQPT::MC::MCOND;` to go to MCOND and log on as user DAX or user with RMON enabled.

   CAUTION:
   Repeated use of the tape can cause heating and accelerated tape aging. To avoid damaging the tape by repeated operations, remove the drive from service, disconnect the tape, and allow it to cool for about 30 minutes; return it to service.

2. See Caution. Reenter the CPY MEM command that was denied.
3. If CPY ...DENY message is received again, proceed to Step **4.**
   - If denial message is not received, then take no further action; trouble or DACS II condition that prevented first transfer attempt is not present at this time.
4. Locate the denial error explanation in the output message.

   NOTE:
   Anytime the CPY MEM command is reentered and a different denial is received in the procedure, return here to clear the new denial.

5. Which denial explanation appears in the CPY output message?
   - If **frame not in-service**, continue with Step **6.**
   - If **MP or units RAM error**, proceed to Step **8.**
   - If **unit out-of-service and journal files exist**, proceed to Step **8.**
   - If **problem occurred while accessing disk**, then proceed to Step **14.**
   - If **source does not contain requested information**, then proceed to Step **14.**
   - If **DB disk error OP-CL-RD-WR-SK**, proceed to Step **14.**
   - If **DB can't send or receive mail**, proceed to Step **23.**
   - If **can't lock or unlock RAM data base**, proceed to Step **23.**
   - If **DB can't get slave mailbox**, proceed to Step **23.**
   - If **invalid option, mailbox, or flag**, then proceed to Step **23.**
   - If **problem occurred while accessing tape**, then proceed to Step **28.**

- If **tape unit is not restored**, proceed to Step **28.**
- If **entity can't be addressed in this configuration**, then proceed to Step **33.**
- If **software identification block not readable**, then proceed to Step **36.**
- If **software identification block failed comparison**, then proceed to Step **36.**
- If **checksums verification failed**, proceed to Step **36.**
- If **tape contains previous software journal files**, proceed to Step **40.**
- If **FPI on tape does not match one on disk**, proceed to Step **40.**
- If **can't mount/unmount disk**, proceed to Step **43.**
- If **disk not restored**, proceed to Step **43.**

6. Enter `RST-EQPT::MC;` to correct data base problem.
7. Reenter the CPY command.
   - If the command is completed, this procedure is completed. If executable programs were transferred (PROG in command), enter `RST-EQPT::MC;` to exit the maintenance condition.
   - If the same denial is received, contact technical consultant.

For RAM Error or Unit Out-of-Service, Continue

8. Attempt to locate failed pack or out-of-service unit using the following commands:

   `DGN-EQPT::MP;`
   `DGN-EQPT::UNIT-[q]q::UC;` (where [q]q = unit number 1 through 16)
   - If commands are denied because MC is out-of-service, enter `RST-EQPT::MC;`.

9. Enter `RTRV-STATE-EQPT:::ALL;` and check for failed and out-of-service MC packs and UCs.

   NOTE:
   The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

10. If you are clearing "unit out-of-service ..." and have units out-of-service, enter command(s) to restore service as follows:
    `RST-EQPT::UNIT-[q]q::UC;`.

11. If you received DGN ...STF message for MP or UNIT UC, refer to *Manual Diagnostic Failures* to clear the particular failed diagnostic.

12. If the MC is in-service, enter **`STA-LOCL-RST::PRI;`**. If the MC is out-of-service, operate the reset on the status panel as follows: hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    ⇒ NOTE:
    The boot updates all the frame memories from the disk; this operation can take as long as 30 minutes to complete.

13. If reset was just performed, log in again and reenter the CPY command that was denied.

    - If the command completes, this procedure is completed. If executable programs were transferred (PROG in command), enter **`RST-EQPT::MC;`** to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For Problem-Accessing Disk, Source Does Not Contain, or DB Disk Error, Continue

14. Enter **`RST-EQPT::DISK;`** to ensure the disk is powered.

    - If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.

15. Reenter the CPY command that was originally denied.

    - If "problem-accessing disk" or "disk error" is received again, proceed to Step **17**.
    - If "source does not contain ..." is received again, continue with Step **16**.
    - If denial message is not received, enter **`RST-EQPT::MC;`** to exit the maintenance condition. This procedure is completed.

16. If your CPY command directs a transfer to tape (SEC), continue with Step **17**.

    - If your command does not direct a transfer to tape, replace tape cartridge. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure.) If trouble persists, contact technical consultant.

17. Replace the disk drive and ensure that the tape is used as the source for a boot if the SSC is disconnected to power down the disk.

    Replacing Disk Drive:

NOTE:
Use a 40MB disk drive (ED-2C876-30 G2) for non-cef systems. For CEF systems, use a 40MB disk drive (ED-9C015-30 G1).

a. On the main controller shelf, locate the disk drive plug-in to be replaced.
   - If the DACS II is executing commands (not disabled by trouble), place the main controller in the maintenance condition by entering `RST-EQPT::MC::MCOND;`. Then remove the disk from service by entering `RMV-EQPT::DISK;`.
   - If the DACS II is not executing commands, then disconnect SSC plug-in from MC to remove power from disk. The disk will stop spinning in about 30 seconds.

b. See Caution. Disconnect the disk plug-in from the shelf slot and place it out of the way to prevent accidental damage to it.

CAUTION:
Do not allow the mounting assembly or drive unit to drop. The drive unit is sensitive to shock damage and can be damaged by a 1-inch fall.

c. Insert a tape cartridge into tape drive containing the current executables. If the SCC was disconnected, insert the SSC plug-in that was previously disconnected.

d. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

NOTE:
Without the disk in the frame, the reset will cause a boot from tape. The reset may take up to 30 minutes.

   - If `COMPLD` **...with error explanation**, message is received, go to Section 7.2.
   - If the reset stops, go to Section 6.2.

e. Verify that the edge protector is removed from the disk plug-in connector. Install the disk drive as follows:

CEF Configuration:

Align the new disk plug-in with the guides on the right side of the slot and insert the new disk plug-in into the slot. Be sure the plug-in is securely seated.

Non-CEF Configuration:

Insert the new drive into the slot and screw in the thumb-screw to take up the slack. Push in again to be sure it is seated. Finally, hand tighten the screw to secure.

18. Log in again and enter `RST-EQPT::DISK::CLR;` to power up, format, and initialize the new disk. Answer YES when prompted to answer if you want to enter the command to clear the disk.

    NOTE:
    The YES/NO answer will not be received from an operations system and as a result the command will time out.

    NOTE:
    This command may take up to 30 minutes to complete.

    - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

19. Enter the following command to copy the software onto the disk: `CPY-MEM:[xy]::[ww]:SEC,PRI:PROG;` Answer YES when prompted. Wait for the command to complete before continuing.

    NOTE:
    Formatted tapes (without executables) can be ordered for use as backup tapes. One of the generic tapes (or backup tape with executables) is required as source for executables (PROG)

    - If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

20. Verify that the most current back-up tape is in the tape drive. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure).

21. Enter the following command to copy the data base information onto the disk: `CPY-MEM:[xy]::[ww]:SEC,PRI;` Answer YES when prompted. Wait for the command to complete before continuing.

- If the command is denied, find the reason for the denial in the output message and perform corrective action to obtain command completion.

22. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    NOTE:
    Reset may take up to 30 minutes.

    - If the system returns `COMPLD` **...with error explanation**, refer to Section 7.2.
    - If the reset stops, refer to Section 6.2.

For DB Can't Send ..., Can't Lock/Unlock DB, DB Can't Get Mailbox, or Invalid Mailbox ..., Continue

23. Check printout for ERR SOFTWARE messages that name the tape or disk.
24. Enter `DGN-EQPT::MC;`.
25. If you have any failed diagnostics, go to *Manual Diagnostic Failures* to clear the particular failed diagnostic.
26. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET COMPLD (with no error explanation) is received, continue with Step **27**.
    - If RESET COMPLD (with error explanation) is received, go to Section 7.2.
27. Log in again and reenter the CPY command that was denied.
    - If the command completes, this procedure is completed. If executable programs were transferred (PROG in command), enter `RST-EQPT::MC;` to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For Problem -While Accessing Tape or -Tape Not Restored, Continue

28. Perform the following to ensure that the tape is installed and powered up:
    - Verify that the tape is installed. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure.)
    - Enter `RST-EQPT::TAPE;` to power up and retension the tape and place it in-service.

29. Enter `DGN-EQPT::TAPE;` and `DGN-EQPT::TAPE::DBASE;`.
    - If DGN ...STF message is received for either diagnostic, go to *Manual Diagnostic Failures* to clear the failed tape diagnostic.

30. Reenter the original CPY command that was denied.
    - If the command is denied again, continue with Step **31**.
    - If CPY ...DENY message is not received when original CPY command is reentered, this procedure is completed.

31. Replace tape cartridge and restore the tape (see *Supplementary Information — Tape Replacement* at the beginning of this procedure).

32. Reenter the CPY command that was denied.
    - If the command is completed, this procedure is completed. If executable programs were transferred (PROG in command), enter `RST-EQPT::MC;` to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For Entity Can't Be Addressed, Continue

33. The configuration information on the tape does not match the frame configuration. Enter `RTRV-PRMTR-NE;` and check the software serial number in the configuration file. This is the number in the SS column of the output message.

    NOTE:
    The software serial number in the configuration information designates the data bases on tape for use in a particular frame. A tape from storage may have the default (arbitrary) serial number.

34. If the correct tape cartridge is not installed, install it. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure).

35. Reenter the CPY command that was denied.
    - If the command completes, this procedure is completed. If executable programs were transferred (PROG in command), enter `RST-EQPT::MC;` to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For Software - Not Readable, Software - Failed Comparison, or Checksums Verification Failed, Continue:

36. Remove the tape cartridge (See *Supplementary Information — Tape Replacement* at the beginning of this procedure) and check the SAFE tab setting on the cartridge.
    - If CPY PRI,SEC failed, verify that the screw-tab on the tape is NOT set to the SAFE position (that is; slot open). Set screw-tab correctly if necessary. Reinstall the tape cartridge.
    - If SAFE tab setting is correct, replace the tape cartridge.
37. Reenter the CPY command that was denied.
    - If the same denial is received, continue with Step **38**.
    - If the denial message is not received, this procedure is completed.
38. If the tape has not already been replaced, replace the tape cartridge. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure).
39. Reenter original backup command that was denied.
    - If the same denial is received, contact technical consultant.
    - If the denial message is not received, this procedure is completed.

For Tape Contains Previous Software or FPI On Tape Does Not Match, Continue:

40. The wrong tape is installed. The "tape contains previous software" explanation indicates that it is an old tape that contains previous software information, and "FPI on tape does not match" explanation indicates that the tape contains a different feature package.
41. Install the correct tape cartridge in the tape drive. (See *Supplementary Information — Tape Replacement* at the beginning of this procedure).

42. Reenter the CPY command that was denied.
    - If the command completes, this procedure is completed. If executable programs were transferred (PROG in command), enter `RST-EQPT::MC;` to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For Can't Mount/Unmount Disk or Disk Not Restored, Continue:

43. Enter command to restore hard disk to service, `RST-EQPT::DISK;`.
    - If RST ...DENY message is received, find the reason for the denial in the output message and perform corrective action to obtain command completion.

44. Reenter CPY command that was denied.
    - If the same denial is received, contact technical consultant.
    - If the denial message is not received, this procedure is completed.

7.2 Clear Reset, Boot, RST MC Conditional Completion

Overview: This procedure is used to respond to a conditional (with errors) completion of a frame reset, STA-LOCL-RST command (boot), or the RST MC command. Frequently, the conditional completion will put the MC in MCOND for entry of maintenance commands only; full command capability is returned when the trouble is cleared and the RST MC completes. During a reset, the controller packs (CI, MP, and SSC) and the frame unit UCs are initialized, internal communications are established, the disk and tape drives are powered up, and programs are transferred from the disk or tape to respective packs. The RST MC command performs the same operations as the reset except that the main controller plug-ins are not initialized.

Supplementary Information — Tape Cartridge Replacement

If you do not know how to replace the tape cartridge, familiarize yourself with the following procedure.

- If the tape is not already out-of-service, enter **`RMV-EQPT::TAPE;`** to power down the drive and enable restore of new tape. In progress messages will be received every 20 seconds; wait for RMV ...COMPLD (2- to 5-minute completion).
- Remove tape cartridge from the drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Push the tape in against the spring pressure to release the latch and remove the tape cartridge from the drive.
  - — **Tape Drive With the Drawer.** Turn the front latch clockwise (out of the way). Slide the drawer that holds the tape to the open position. Remove the tape from the drawer.
- Insert tape cartridge into the tape drive as follows:
  - — **Tape Drive Without the Drawer** (tape drive mounted either vertically or horizontally). Insert and push the cartridge into the drive to allow the cartridge to return to latched position (latch comes up over bottom of cartridge).

    NOTE:
    Vertically Mounted Drive. Metallic side of the cartridge faces to the right and the door faces down.
    Horizontally Mounted Drive. Metallic side of the cartridge faces down and the door faces to the left.

— **Tape Drive With the Drawer.** Install the cartridge in the drawer. Return the drawer and latch to the in-service position.

NOTE:
Metallic side of the cartridge faces down and the door faces to the right.

- Enter `RST-EQPT::TAPE;` to power up the tape drive and retension the tape.
  - — If "Boot Failed" denial is received, there is a mechanical problem with the cartridge (tape may be despooled) or tape drive. Examine tape slot and contact technical consultant if drive is damaging tapes.
  - — If other denial message is received, the reason for denial will be in the output message.

Supplementary Information — Hard Disk Replacement

Overview: The hard disk drive is a plug-in unit mounted on the main controller shelf. Relays in the drive unit remove power from the drive when the command to remove the disk from service is executed. When the disk is powered, a characteristic operating sound and vibration are detectable.

NOTE:
Use a 40MB disk drive (ED-2C876-30 G2) for non-CEF systems. For CEF systems, use a 40MB disk drive (ED-9C015-30 G1).

NOTE:
You must have restricted maintenance privilege or be logged on as the frame administrator to make transfers from tape to disk in this procedure.

1. On the main controller shelf, locate the disk drive plug-in to be replaced.
   - If the DACS II is executing commands (not disabled by trouble), place the main controller in the maintenance condition by entering `RST-EQPT::MC::MCOND;`. Then remove the disk from service by entering `RMV-EQPT::DISK;`.
   - If the DACS II is not executing commands, then disconnect SSC plug-in from MC to remove power from disk. The disk will stop spinning in about 30 seconds.
2. See Caution. Disconnect the disk plug-in from the shelf slot and place it out of the way to prevent accidental damage to it.

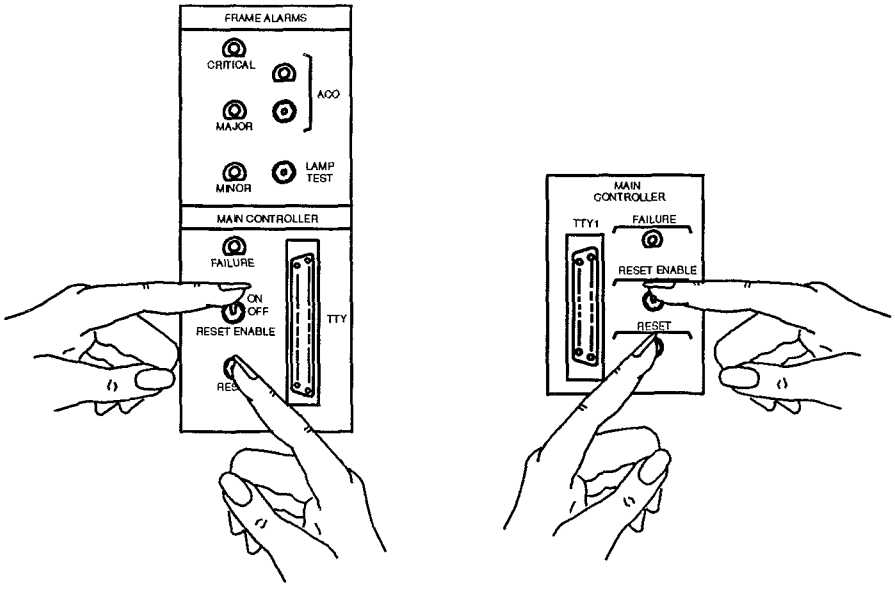
   CAUTION:
   Do not allow the mounting assembly or drive unit to drop. The drive unit is sensitive to shock damage and can be damaged by a 1-inch fall.

3. Insert a tape cartridge into tape drive containing the current executables. If the SCC was disconnected, insert the SSC plug-in that was previously disconnected.

4. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button (Figure 7-1).

NOTE:
Without the disk in the frame, the reset will cause a boot from tape. The reset may take up to 30 minutes.

- If `COMPLD` **...with error explanation**, message is received, refer to the Trouble Procedure that follows this supplemental procedure.
- If the reset stops, refer to Section 6.2.



A. CEF Status Panel **B. Non-CEF Status Panel**

Figure 7-1. Performing a Reset

5. Verify that the edge protector is removed from the disk plug-in connector. Install the disk drive as follows:

   CEF Configuration:

   Align the new disk plug-in with the guides on the right side of the slot and insert the new disk plug-in into the slot. Be sure the plug-in is securely seated.

   Non-CEF Configuration:

   Insert the new drive into the slot and screw in the thumb-screw to take up the slack. Push in again to be sure it is seated. Finally, hand tighten the screw to secure.

Trouble Clearing Procedure

1. Locate the error explanation in the RESET, STA-LOCL-RST, or RST MC message.

   NOTE:
   The message shows one trouble at a time (the first one found). If other troubles exist, a different condition code will occur after the reset or restore is repeated. **If a different code occurs, go to Step 2 to clear that code.**

2. Which error explanation is given in the RESET, RST MC, or BOOT message?

   - If **Software ID or Comparison Failed**, proceed to Step **33**.
   - If **Generic, Point Issue, or Release Mismatch**, proceed to Step **36**.
   - If **Failed to Boot CONF file**, contact technical consultant. This condition code can be caused by the interaction of trouble-clearing operations with the existing trouble conditions; the technical consultant will need to reconstruct the sequence that led to the trouble.
   - If **Failed to Boot DB**, proceed with Step **4**.
   - If **Failed to Boot Journal**, continue with Step **3**.
   - If **Failed to Boot Unit**, proceed to Step **15**.
   - If **Tape Failed, Disk Used**, proceed to Step **17**.
   - If **Tape Error, Boot from Disk**, proceed to Step **17**.
   - If **Disk Failed, Tape Used**, proceed to Step **19**.

- If **Disk Error, Boot from Tape**, proceed to Step **19**.
- If **Failed to boot CI**, proceed to Step **28**.
- If **Mount Tape/Unmount Tape**, proceed to Step **30**.

3. If conditional completion was received as part of doing INIT SYS FRAME or using the DLT FPKG command, there is a discrepancy between the journal files in the working RAM and the hard disk.
   - Enter `RST-EQPT::MC::NOJRNL;` to clear the problem.
4. Install the most current backup tape in the tape drive (using remove and restore tape commands to power down and power up the tape). (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).
5. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI;` to copy the data base information onto the disk.
   - If CPY ...DENY message is received from the transfer, go to Section 7.1.
6. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
   - If RESET ...COMPLD (with error explanation) message is received, continue with Step **7**.
7. Replace the DACS II hard disk drive. (See *Supplementary Information — Hard Disk Replacement* in the beginning of this procedure).
8. Verify that a backup tape (containing executables) is installed in the tape drive. The CPY command with the PROG keyword is used to recover the software from tape.

   NOTE:
   Formatted backup tapes (without executables) can be ordered for use as backup tapes. One software tape (or backup tape with executables) is required as source for executables.

9. To log in as frame administrator, enter `LGN-USER:::DAX;`.
10. Enter `RST-EQPT::DISK::CLR;` to initialize the disk. To complete this command, you will have to answer YES when prompted.

NOTE:
The YES/NO answer will not be received from an operations system and as a result the command will time out.

11. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI:PROG;` to copy the software onto the initialized disk.
12. If the software tape used above does not contain the most up-to-date provisioning and cross-connections, install the most current backup tape (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).
13. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI;` to copy the data base information onto the initialized disk.
    - If CPY ...DENY message is received, go to Section 7.1.
14. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with same error explanation) message is received, contact technical consultant.

For Failed Boot Unit, Continue

15. Enter `RTRV-STATE-EQPT::[UNIT-[q]q]::ALL;` to find the unit UC which is out-of-service. The subject unit may have been removed by error recovery.
16. Enter `RST-EQPT::UNIT-[q]q::UC;` to restore the same unit.
    - If DGN ...STF message is received, go to Section 5.9 to clear failed unit UC diagnostic.
    - If the command is completed, this procedure is completed.

For Tape Failed-Disk Source Used for Boot, Continue

17. The condition code shows that the boot from the tape failed and that the disk was used as the source for the boot. Replace tape cartridge with other generic tape. (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).

18. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with error explanation) message is received, contact technical consultant.

For Disk Failed-Tape Used for Boot, Continue

19. The error condition indicates that the boot from the disk failed and that the tape was used as the source for the boot.
20. Replace the DACS II hard disk drive. (See *Supplementary Information — Hard Disk Replacement* in the beginning of this procedure).
21. Verify that a backup tape (containing executables) is installed in tape drive. The CPY command with the PROG keyword is used to recover the software from tape.

    NOTE:
    Formatted backup tapes (without executables) can be ordered for use as backup tapes. One software tape (or backup tape with executables) is required as source for executables.

22. To log in as frame administrator, enter `LGN-USER:::DAX;`.
23. Enter `RST-EQPT::DISK::CLR;` to initialize the disk. To complete this command, you will have to answer YES when prompted.

    NOTE:
    The YES/NO answer will not be received from an operations system and as a result the command will time out.

24. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI:PROG;` to copy the software onto the initialized disk.
25. If the software tape used above does not contain the most up-to-date provisioning and cross-connections, install the most current backup tape. (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).
26. Enter `CPY-MEM:[xy]::[ww]:SEC,PRI;` to copy the data base information onto the initialized disk.
    - If CPY ...DENY message is received for either transfer, go to Section 7.1.

27. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with error explanation) message is received, contact technical consultant.

For Failed to boot CI, Continue

28. Replace the CI, ECI, HECI plug-in whichever is installed in the main controller.
29. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with error explanation) message is received, contact technical consultant.

For Mount Tape/Tape Power, Continue

30. Perform the following to ensure that the tape is installed and powered up:
    - Verify that the tape is installed. (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).
    - Enter `RST-EQPT::TAPE;` to power up and retension the tape and place it in service.
31. Repeat the command or reset operation that originally failed.
32. If no trouble is found and you get the same condition again when you repeat the operation that brought you here, contact technical consultant.

For Software ID or Comparison Failed, Continue

33. If the reset booted from the tape (check printout), continue with Step **34**.
    - If the reset booted from the disk, contact technical consultant.
34. Replace the tape cartridge (replacement tape must contain executables). (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).

35. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with same error explanation) message is received, contact technical consultant.

For Generic/Point Issue/Release Mismatch, Continue

36. The wrong tape is installed. The condition code indicates that the tape contains an older version of the software (COND 22), Point Issue (COND 23), or Release (COND 24).
37. Install the correct tape cartridge in the tape drive. (See *Supplementary Information — Tape Replacement* in the beginning of this procedure).
38. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPLD (with no error explanation) message is received, this procedure is completed.
    - If RESET ...COMPLD (with error explanation) message is received, contact technical consultant.

Frame Audits

8

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Frame Audits

8

8.1 Clear DGNDET Message 82002

Overview: This procedure deals with frame comparison type frame audit messages. These messages result when there is a difference in the data contained in the UC or pack memory and the MP memory. The DGNDET test number identifies what data is in question, and the message data bytes give which pack and what values are in the data bases. The boot operation (the entire frame, the unit UC restore, or pack restore) is used to bring the UC or pack memory into agreement with the hard disk. When doing corrective action, remember that booting the frame can take as long as 30 minutes to complete, and removing an NPC causes all of its channels to be taken out of service.

NOTE:
Although you will want to take notice of all DGNDET messages, you generally do not need to perform corrective action unless the same message recurs. **Provisioning commands that are not followed by a boot can cause DGNDET messages with test numbers in the 220 to 237 range.**

1. Locate the following in the trouble message: the test number which appears after the DGNDET keyword and the data bytes after the test number. These data bytes are referred to as dn through d0 in left-to-right order.

   The following lists the frame audits in numerical ascending order along with the table number the associated corrective action appears in:

Frame Audit	Table #
002	8-1
003	8-1
004	8-1
005	8-1
006	8-1
007	8-1
008	8-1
009	8-4
00A	8-4
00B	8-4
00C	8-4
011	8-1
012	8-1
013	8-1
014	8-1
015	8-1
016	8-1
017	8-1
018	8-1
019	8-2
01A	8-2
01B	8-2
01C	8-2
01D	8-2
021	8-1
022	8-1
023	8-1
024	8-1
025	8-1
026	8-1
027	8-1
028	8-1
029	8-1
033	8-3
034	8-3
035	8-3
036	8-3
037	8-3
038	8-3
039	8-3
03B	8-4

Frame Audit	Table #
03C	8-4
03D	8-4
03E	8-4
03F	8-4
040	8-3
041	8-3
042	8-3
043	8-4
044	8-4
045	8-4
046	8-4
047	8-4
048	8-4
049	8-4
04A	8-4
04B	8-4
04C	8-4
04D	8-4
050	8-3
052	8-3
055	8-3
056	8-3
057	8-3
058	8-3
059	8-3
05A	8-3
05B	8-3
05C	8-3
060	8-3
061	8-3
062	8-3
063	8-3
064	8-3
065	8-3
066	8-3
069	8-3
06A	8-3
06B	8-3
06C	8-3
06D	8-3
06E	8-3
06F	8-3

Frame Audit	Table #
070	8-3
071	8-3
072	8-3
073	8-3
074	8-3
076	8-3
077	8-3
078	8-3
079	8-3
07A	8-3
07B	8-3
07C	8-3
07D	8-3
07E	8-3
07F	8-3
080	8-3
081	8-3
084	8-3
102	8-1
103	8-1
104	8-1
105	8-1
106	8-1
112	8-1
113	8-1
114	8-1
115	8-1
116	8-1
121	8-1
122	8-1
123	8-1
125	8-1
126	8-1
127	8-1
128	8-1
131	8-1
132	8-1
133	8-1
135	8-1
136	8-1
150	8-1
151	8-1
152	8-1
154	8-1
155	8-1
156	8-1

Frame Audit	Table #
157	8-1
160	8-1
161	8-1
162	8-1
163	8-1
164	8-1
165	8-1
166	8-1
167	8-1
168	8-1
171	8-2
172	8-2
173	8-2
174	8-2
205	8-1
207	8-1
208	8-1
209	8-1
210	8-1
211	8-1
215	8-1
216	8-1
217	8-1
218	8-1
220	8-2
221	8-2
222	8-2
223	8-2
224	8-2
225	8-2
226	8-2
227	8-2
228	8-2
229	8-2
230	8-2
231	8-2
232	8-2
233	8-2
234	8-2
235	8-2
236	8-2
237	8-2
238	8-2
239	8-2
240	8-3

Frame Audit	Table #
241	8-3
242	8-3
253	8-4
254	8-4
255	8-4
256	8-4
257	8-4
258	8-4
259	8-4
25A	8-4
25B	8-4
25C	8-4
25D	8-4
25E	8-4
25F	8-4
260	8-4
261	8-4
262	8-4
263	8-4
264	8-4
265	8-4
270	8-5
271	8-5
272	8-5
273	8-5
274	8-5
275	8-5
276	8-5
277	8-5
278	8-5
279	8-5
27A	8-5
27B	8-5
27C	8-5
27D	8-5
27E	8-5
27F	8-5
280	8-5
281	8-5
282	8-5
283	8-5
284	8-5
285	8-5
286	8-5
287	8-5
288	8-5

Frame Audit	Table #
289	8-5
28A	8-5
28B	8-5
28C	8-5
28D	8-5
28E	8-5
28F	8-5
290	8-5
291	8-5
292	8-5
293	8-5
294	8-5
295	8-5
296	8-5
297	8-5
298	8-5
299	8-5
29A	8-5
29B	8-5
29C	8-5
29D	8-5
29E	8-5
29F	8-5
2A0	8-5
2A1	8-5
2A2	8-5
2A3	8-5
2A4	8-5
2A5	8-5
2A6	8-5
2A7	8-5
2A8	8-5
2A9	8-5
2AA	8-5
2AB	8-5
301	8-1
302	8-1
303	8-1
305	8-1
306	8-1
307	8-1
308	8-1
310	8-1
311	8-1
312	8-1
313	8-1

Frame Audit	Table #
314	8-1
315	8-1
316	8-1
317	8-1
320	8-4
321	8-4
322	8-4
323	8-4
324	8-4
325	8-4
326	8-4
327	8-4
328	8-4
329	8-4
32A	8-4
32B	8-4
32C	8-4
32D	8-4
32E	8-4
32F	8-4
330	8-4
331	8-4
332	8-4
333	8-4
334	8-4
335	8-4
336	8-4

2. Refer to Table 8-1, 8-2, 8-3, 8-4, or 8-5 to perform corrective action and consider the following:
   - — If a facility NPC must be removed from service, all channels on that NPC will be out-of-service until the NPC is restored to service (restore operation completes).
   - — For a DGNDET on an NPC or facility, the NPC number is determined by converting the HEX pack value to decimal. See Figure 8-1 for an example and Table 8-6 for hexadecimal numbers from 1 to 160. To get the NPC number in other units, add 160 for each proceeding unit.
3. If the DGNDET recurs and the unit controller has not already been removed and restored, enter `RMV-EQPT::UNIT-[q]q::UC;` and `RST-EQPT::UNIT-[q]q::UC;`.
4. If the DGNDET message recurs and the frame has not already been booted, enter `STA-LOCL-RST::PRI;`.

5. If any DGNDET number recurs, contact technical consultant for assistance.

Table 8-1. Equipage/Provisioning

ttt =	Pack	Data Bytes*	Corrective Action
002 003 007 032	FTMI FC UNIT DSPI	d5=unit No. d4=pack No. (NPCs - HEX No.)†	Enter RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT-[q]q::UC;
008	ECCN	d4=ECCN side (0, 1)	Enter RMV-EQPT::CCI-s; and RST-EQPT::CCI-s;
011	NPC	d5=unit No. d4=NPC No. (HEX No.)†	Enter RMV-EQPT::NPC-<npc No.>; and RST-EQPT::NPC-<npc No.>;
021 022 023 024	CCN CCNI CCB TSI	d5=side (00 or 01) d4=pack No. TSI=d5,d4,d3	(1) Remove and restore any Pack on subject side (2) Enter STA-LOCL-RST::PRI;
025	CCN	d5=side (00 or 1)	Enter STA-LOCL-RST::PRI;
205 207 208 209	FTMI FC NPC NPC	d5=unit No. d4=pack No. (01-04) (NPCs=HEX No.)†	(1) Enter RMV-EQPT and RST-EQPT commands for subject pack (2) Look for DGN-STF (3) If recurs, enter RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT-[q]q::UC;
210	FC	d3=side, d4=FTMI d5=unit No.	Enter RMV-EQPT::UNIT-[q]q::FC-sf; and RST-EQPT::UNIT-[q]q::FC-sf;
301	CCN Group	d5=side	Remove and restore any pack on side. If side is active, go to other side first (SW-DX-EQPT::XC-a;)
302 303	TSI CCB	TSI=d5,d4,d3 d5=side, d4=CCB No.	Enter commands to RMV-EQPT and RST-EQPT subject pack
308	LINK	d5=link No. (01-06)	Enter commands to remove and restore link

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

† To obtain NPC number, convert HEX digits to decimal.

Continued on next page

Table 8-1. *Continued*

ttt=	Data Bytes*	Corrective Action
004,005,006	d5=Unit No.	(1) Enter `RMV-EQPT::UNIT-[q]q::UC;` and `RST-EQPT::UNIT-[q]q::UC;` (2) If recurs, enter `STA-LOCL-RST::PRI;`
012,013,014, 015,016,017 018	d5=Unit No. d4=NPC No. (HEX 01-A0)†	(1) Enter `RMV-EQPT::UNIT-[q]q::UC;` and `RST-EQPT::UNIT-[q]q::UC;` (2) Enter `RMV-EQPT::NPC-<npc No.>;` and `RST-EQPT::NPC-<npc No.>;`
026-029	d5=ECCN side (0,1)	Enter `RMV-EQPT::ETSI-sqq;` and `RST-EQPT::ETSI-sqq;`
211,215, 216,217, 218	d5=Unit No. d4=NPC No.	(1) Enter `RMV-EQPT::NPC-<npc No.>;` and `RST-EQPT::NPC-<npc No.>;` (2) If recurs, remove 2 NPCs reseat pack, and restore
102,103,104, 105,106,112, 113,114,115, 116,125,126, 127,128,135, 136,154,155 156,157		Enter `STA-LOCL-RST::PRI;`
121,122,123, 131,132,133, 150,151,152, 160,161,162, 163,164,165, 166,167,168	d5=Unit No. d4=NPC No.	Enter `RMV-EQPT::UNIT-[q]q::UC;` and `RST-EQPT::UNIT-[q]q::UC;`
266,267,268, 269,26A,26B, 26C,26D,26E, 26F	d2=Expected value d3=Actual value read back from hardware d4=NPC number d5=Unit number	Enter `RMV::NPC <npc No.>!` and `RST::NPC <npc No.>!`
305,306,307, 310,311,312, 313,314,315	d5=SYNC side (0,1) d4=TLI No. (01-04) (except for ttt=305 312, 313, 314)	(1) If TLI is named, remove and restore SYNC TLI (2) Enter `RTRV-STATE-EQPT::SYNC:;` look for SOURCE TLI,MATE (3) Enter `RMV-EQPT::SYNC-a;` and `RST-EQPT::SYNC-a;` (byte d5=sync side)
316,317	d5=ECCN side (0,1)	Enter `RMV-EQPT::CCI-s;`

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

† To obtain NPC number, convert HEX digits to decimal.

Table 8-2. Facility Error Thresholds

ttt =	Data Bytes*	Corrective Action
171,172,173 174	d5=Unit No. d4=NPC No.	RMV-EQPT::NPC-<npc No.>; and RST-EQPT::NPC-<npc No.>;
019,01A,01B 01C,01D	d5=Unit No. d4=NPC No.†	RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT-[q]q::UC;
220,221,222,223,224, 225,226,227,228,229, 230,231,232,233,234, 235,236,237,238,239	d5=Unit No. d4=NPC No.†	RMV-EQPT::NPC-<npc No.>; and RST-EQPT::NPC-<npc No.>;

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

† To obtain NPC number, convert HEX digits to decimal.

Table 8-3. Subscriber Carrier and Subrate Data

ttt =	Data Bytes*	Corrective Action
033,034,035,036, 037,038,039,042, 050,052,250,251,	d5=Unit No. d4=NPC (for 251)	RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT-[q]q::UC;
055,056,057,058, 059,060,061,062 063,064,065,066, 086,089-091,093, 095	d5=Unit No. d4=RT/DL (coded - internal number)	RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT-[q]q::UC;
05A	d0=Unit No.	RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT-[q]q::UC;
05B	d0=1(frame), 2(unit), 3(channel) or 4(time slot) d3=NPC No. (if applicable) d4=Unit No. (if applicable)	RMV-EQPT::UNIT-[q]q::UC; and RST-EQPT::UNIT[q]q::UC;
05C	d0-d5=not used	STA-LOC-RST::PRI;
069-074,076-081, 084	d4=MJU/SRM/chan. No. d1=NPC No.	RMV-EQPT::NPC-<npc No.>::SIDE-s; and RST-EQPT::NPC-<npc No.>::SIDE-s;
240,241,242	d4=Unit No. d5=NPC No.	RMV-EQPT::NPC-<npc No.>; and RST-EQPT::NPC-<npc No.>;

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

Table 8-4. DS3 Feature

ttt =	Data Bytes*	Corrective Action
009,00A, 00B,00C	d4=Entity No. d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`
03B,03C,03D, 03E,03F	d4=Entity No. d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`
040,041,042, 043,044,045 046,047	d4=Entity No. d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`
253,254,255, 256,257,258, 259,25A,25B, 25C,25D,25E, 25F	d4=Entity No. d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`
048,049,04A, 04B,04C,04D 260,261,262 263,264,265	d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`
323,324,325, 326,327,328, 329,32A	d4=MXR No. d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`
320,321,322 32B,32C,32D, 32E,32F,330, 331,332,333, 334,335,336	d4=NPC No. d5=Unit No.	`RMV-EQPT::UNIT-[q]q::UC;` `RST-EQPT::UNIT-[q]q::UC;`

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

Table 8-5. Performance Monitoring

ttt=	Data Bytes*	Corrective Action
270,271,272,273, 274,275,276,277, 278,279,27A,27B, 27C,27D,27E,27F, 280,281,282,283, 284,285,286,287, 288,289,28A,28B, 28C,28D,28E,28F, 290	d0 Long ANSI threshold value in hardware d1 Long ANSI threshold value in hardware d2 Long ANSI threshold value in hardware d3 Long ANSI threshold value in hardware d4 Long ANSI threshold value in database d5 Long ANSI threshold value in database d6 Long ANSI threshold value in database d7 Long ANSI threshold value in database d8 NPC number d9 UNIT number	(1) Verify the threshold value in the database is correct. (2) Enter **STA-LOCL-RST::PRI**
291,292,293,294, 295,296,297,298, 299,29A,29B,29C, 29D,29E,29F,2A0, 2A1,2A2,2A3,2A4, 2A5,2A6,2A7,2A8, 2A9,2AA,2AB	d0 Long 30-channel threshold value d1 Long 30-channel threshold value d2 Long 30-channel threshold value d3 Long 30-channel threshold value d4 Long 30-channel threshold value d5 Long 30-channel threshold value d6 Long 30-channel threshold value d7 Long 30-channel threshold value d8 NPC number d9 UNIT number	(1) Verify the threshold value in the database is correct. (2) Enter **STA-LOCL-RST::PRI**

Powers of 16 = 16^3 16^2 16^1 16^0

Example: Hex = 005A
Decimal Number = (0×16^3)
$+ (0 \times 16^2)$
$+ (5 \times 16^1)$
$+ (A \times 16^0)$, where $16^0 = 1$

0s = $(0 \times 0) = 0$
5 = $(5 \times 16) = 80$
A = $+ (A \times 1) = 10$, where A = 10
Decimal Number = 90
(NPC Number = 90 + 1 because internal count started with 0)

Hex Characters: = A = 10, B =11, C = 12, D = 13, E = 14, F = 15

Figure 8-1. Hexadecimal-to-Decimal Conversion Example

Table 8-6. Hexadecimal Numbers

(1) 01	(21) 15	(41) 29	(61) 3D	(81) 51	(101) 65	(121) 79	(141) 8D
02	16	2A	3E	52	66	7A	8E
03	17	2B	3F	53	67	7B	8F
04	18	2C	40	54	68	7C	90
05	19	2D	41	55	69	7D	91
06	1A	2E	42	56	6A	7E	92
07	1B	2F	43	57	6B	7F	93
08	1C	30	44	58	6C	80	94
09	1D	31	45	59	6D	81	95
(10) 0A	(30) 1E	(50) 32	(70) 46	(90) 5A	(110) 6E	(130) 82	(150) 96
0B	1F	33	47	5B	6F	83	97
0C	20	34	48	5C	70	84	98
0D	21	35	49	5D	71	85	99
0E	22	36	4A	5E	72	86	9A
0F	23	37	4B	5F	73	87	9B
10	24	38	4C	60	74	88	9C
11	25	39	4D	61	75	89	9D
12	26	3A	4E	62	76	8A	9E
13	27	3B	4F	63	77	8B	9F
(20) 14	(40) 28	(60) 3C	(80) 50	(100)64	(120) 78	(140) 8C	(160) A0

8.2 Clear DGNDET Message 82001 or AUD 82004

1. Are you clearing message 82004?
   - If MC keyword is in the message, continue with Step **2**.
   - If not, from Table 8-7 determine which circuit failed the DGNDET diagnostic using the circuit abbreviation and data in the output message.
2. Enter the diagnostic command from Table 8-8 for the circuit named in the DGNDET message. The abbreviations for the circuits in the table match the message keywords.
3. If DGN-EQPT ...STF message is received, refer to the procedure in *Manual Diagnostic Failures* to clear the trouble.
   - If the message is not received, there is no hardware trouble at this time; the autonomous diagnostic may have resulted from an error situation that cleared up.

Table 8-7. Circuit Pack Identification

Circuit	3-Digit Field (eee)	Data Byte (d0)
ETSI	eee = side (000.001)	d0 = left,right=from,to
SYN (SYNC)	= side	= 00
UFC (FC)	= unit (001-016)	= 00
FTM (FTMI)	= unit	= FTMI No. (01-04)
ECCN (CCI)	= CCI (000/001)	= 00
NPC	= NPC (001-640)	= 00
LNK (LINK)	= link (001-006)	= 00
TLI	= sync side (00/001)	= TLI No. (01-04)
CRO	= sync side	= TLI No. (03)
UNI (UNIT)	= unit (001-016)	= 00
DSP (DSPI)	= DSPU	= not used
FMT 0qs	= unit (q) and side (s)	= not used
CCB	= side	= CCB No. (01-06)
CCN(CCNI)	= CCNI (000/001)	= 00
FLI 0qk	= unit (q) and side (k)	= not used
MXR 0qc	= unit (q) and MXR (c)	= not used
MIU 0qc	= unit (q) and MIU (c)	= not used

Table 8-8. Diagnostic Commands

Circuit (Abbrev.)	Command
EBX	DGN-EQPT::MC;
MTC (MT)	DGN-EQPT::MC,
CI	DGN-EQPT::CI;
DISK	DGN-EQPT::DISK;
SSC	DGN-EQPT::SCC;
SYNC	DGN-EQPT::SYNC-a;
CRO	DGN-EQPT::SYNC::TLI-3:CRO;
TLI	DGN-EQPT::SYNC-a::TLI-n;
UC	DGN-EQPT::UNIT-[q]q::UC;
FTMI	DGN-EQPT::UNIT-[q]q::FTMI-d;
DSPI	DGN-EQPT::UNIT-[q]q::DSPI;
FC	DGN-EQPT::UNIT-[q]q::FC-sb;
CCI	DGN-EQPT::CCI-s;
ETSI	DGN-EQPT::ETSI-sqq;
CCNI	DGN-EQPT::CCNI-s;
CCB	DGN-EQPT::CCB;
TSI	DGN-EQPT::TSI-sft;
NPC	DGN-EQPT::NPC-<npc No.>::[SIDE-s][:INCL];
TAPE	DGN-EQPT::TAPE;
LINK	DGN-EQPT::LINK-j;
FMT	DGN-EQPT::UNIT-[q]q::FMT-s;
FLI	DGN-EQPT::UNIT-[q]q::FLI-{SIP};
MXR	DGN-EQPT::UNIT-[q]q::MXR-c
MIU	DGN-EQPT::UNIT-[q]q::MIU-c;

8.3 Clear DGNDET Message 82003

Overview: LOOK AT STEPS 1 AND 2 BEFORE READING THIS OVERVIEW. This procedure deals with the frame audit which results because there is a difference between the MP memory data base and the disk data base. If the message data bytes show that the RAM is not corrupted, the discrepancy will be cleared with the next automatic transfer from RAM to DISK. However, if the RAM data is invalid, either an immediate BOOT is needed or, if an automatic transfer has already placed the data onto the disk, the corrupted disk trouble will have to be cleared.

1. Look at the value of data bytes d5 through d1 which are the five bytes just after the test number on the last line of the DGNDET message.
2. If these bytes equal FF, immediately enter **`STA-LOCL-RST::PRI;`**.

   NOTE:
   The FF bytes indicate that the RAM data is invalid. Entering the BOOT will update the RAM data base from the disk and will resolve the problem provided the automatic transfer from RAM to disk has not already occurred. This automatic transfer occurs approximately every 15 minutes, and if it occurred, the disk has been corrupted which will result in another trouble message and error recovery (ERR message).

   - If these bytes do not equal FF, the discrepancy may be temporary until the next automatic transfer (unless it can be done manually by a command). If the message recurs, there may be a problem; contact technical consultant for assistance.

Software Error

9

Contents

9.1 Clear REPT ERR SOFTWARE Message 9-1

Software Error

9

9.1 Clear REPT ERR SOFTWARE Message

Overview: This procedure checks the results of the software error recovery action and gives the meanings of the error types. Unless the message indicates that it is only a REPORT, the recovery action will occur autonomously and will correct the problem via a command abort, a boot, a processor removal, the MC going to MCOND, or the processor being "parked" in the inoperative state. The only manual operations required are to: respond to MP, CI, or UC removals/parking, reset/boot failures, and reenter commands that were aborted. If error recurs, the DACS II may escalate the recovery operation. For example, if entry of a command reveals the error and brings a boot, the next occurrence may bring a circuit removal.

1. In the message lines of the REPT EVT ...ERR SOFTWARE message, note the ACTION that was autonomously initiated. The PROC (process) named in the message is the one that found the error. Table 9-1 gives the meaning of the ERROR TYPE that is named in the message.
2. Check the output message to see which autonomous recovery action is reported.
   - If **PARK MC/CI** or **PARK UC**, continue with Step **3.**
   - If **CDBOOT**, proceed to Step **4.**
   - If **MCOND**, proceed to Step **5.**
   - If some **other action**, proceed to Step **6.**

3. For PARK MC/CI, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button on the DACS II status panel. For PARK UC, enter `RST-EQPT::UNIT-[q]q::UC;` for the unit number (1 through 16).
4. If MC RESET COMPLD message (with no error explanations) or RST-COMPLD message is received, proceed to Step **11**.
   - If MC RESET COMPL message (with COND code) is received, refer to *Data Base Troubles* to clear the trouble.
   - If MC RESET stopped is received, refer to *Controller and Link Troubles* to clear the trouble.
   - If DGN ...STF message is received for restore UC, refer to *Manual Diagnostic Failures* to clear the diagnostic trouble.
   - If other denial message is received for restore UC, find the reason for denial in the output message and perform corrective action to obtain command completion.
5. Enter `DGN-EQPT::MC;` or separately diagnose the MP.

   NOTE:
   The MC MCOND message in the printout shows that the MC is in the maintenance condition. Commands that were aborted when the software error was detected must be reentered after the trouble is cleared.

   - If DGN ...STF message is received, refer to *Manual Diagnostic Failures* to clear the failed diagnostic.
   - If DGN ...STF message is not received, proceed to Step **12.**
6. Check associated messages in printout to determine whether initial autonomous action was completed or denied. If denied, check if some other action resulted.
   - If MP was removed (RCY REMOVE MP) or parked, continue with Step **7.**
   - If not, proceed to Step **8.**

7. If MC was removed, enter **RST-EQPT::MC;**. If MC was parked, reset frame using the **RESET ENABLE** switch and the **RESET** button on DACS II status panel. Then proceed as follows:
   - If **RST MC error explanation occurs**, refer to *Data Base Troubles* to clear the trouble.
   - If **reset startup diagnostic or boot fails**, refer to *Controller and Link Troubles* to clear the trouble.
   - If **other response**, proceed to Step **10.**
8. Check for DGN ...STF messages in the recovery sequence, enter **RTRV-STATE-COM:::ALL;**, and check the output for failed plug-ins (indicated by 1s in the failed position of the out-of-service, failed, pested groupings for the plug-ins).
9. If the recovery ACTION from the ERR SOFTWARE message is listed below, perform the corrective action:
   - REMOVE - Replace failed plug-in and enter command to restore plug-in to service per Figure 9-1.
   - WMBOOT - If the action was denied, enter **STA-LOCL-RST::PRI;**.
   - HWBOOT - If the action was denied, enter the command to restore the plug-in to service per Figure 9-1.
   - REPORT - Respond to the COND completion or denial of the command that brought the ERR SOFTWARE message.

verb:[xy]:<CP identification>:[ww]{;} or {:<additional info.>;}

{RMV-EQPT::	SYNC-a;	a = 0 or 1
/RST-EQPT::	SYNC-a:[ww]:TLI-n[:SSP-b];	n = 1-4; b = sync port (0 or 1)
/DISC-EQPT::	SYNC:[ww]:TB	
/DGN-EQPT::	CCI-s;	s = side 0 or 1
	CCNI-s;	s = side 0 or 1
	ETSI-sqq;	qq = unit 01-16
	TSI-sft;	f = unit (receiving from) (1-6)
	CCB-sf;	t = unit (transmitting to) (1-6)
	ETSIS,ECCN-s;	
	UNIT-[q]q:[ww]:UC;	[q]q = unit 01-16
	UNIT-[q]q:[ww]:{FTMI-dIDSPI};	d = module interface 1-4
	UNIT-[q]q:[ww]:FC-sd;	sd = FC side (0,1) and FC No. (1-4)
	UNIT-[q]q:[ww]:FLI-k;	k = service (S) or protection (P)
	UNIT-[q]q:[ww]:FMT-s;	s = side (0,1)
	UNIT-[q]q:[ww]:MMFG-c:	c = DS3 group (1-6, P)
	[FRC][,INCL};	FRC = forces RMV with no prot. switch
		INCL = removes/restores MXR NPCs
	UNIT-[q]q:[ww]:MIU-c;	c = DS3 group (1-6, P)
	NPC-<npc No.>:[ww]:[SIDE-s];	<npc No.> = NPC No.
		s = SIDE for DSPU
	LINK-j;	j = link 1-6
DGN-EQPT::	UNIT-[q]q:[ww]:MXR-c;	c = DS3 group (1-6, P)

Figure 9-1. Commands to Restore Plug-Ins

10. If the corrective action is completed, proceed to Step **13.**
    - If not, continue with Step **11.**

11. If the ERROR TYPE is listed below, perform the additional corrective action (if not already done autonomously) as follows:
    - JOURNAL/DISK/TAPE - Enter **DGN-EQPT::SSC;** and look for failures.
    - CHECKSUM/DBCHECKSUM - Repeated errors on same processor indicate a failure or DISK corruption.
    - HARDWARE - Look for ERR HARDWARE messages or other pack failure messages.
    - EXCESSIVE INT - If trouble recurs (processor parked), notify technical consultant.
    - RAMTEST - If trouble recurs (processor removed), replace the associated pack (MP, EBX, BX, CI, or UC) and enter command to restore MC or UC processor.

12. If the additional corrective action is completed, continue with Step **13.**
    - If not, refer trouble to technical consultant who will use the raw data bytes to further analyze the trouble.

13. Reenter the command that brought the ERR SOFTWARE message. This command will have either been aborted, denied, or have a conditional completion.

    NOTE:
    REPT DGNDET messages may also occur because of discrepancies that result if CPY MEM ...WKG,PRI (RAM to DISK) preceded a boot.

14. If the command is completed, you have completed this procedure.
    - If the command is not completed, refer trouble to technical consultant who will use the raw data bytes to further analyze the trouble.

Table 9-1. Software Error Explanation

Error Type	Explanation
JOURNAL	Failure to record command on disk journal.
DATABASE	Failure of software to access data base.
TAPE	Failure of software to access tape.
DISK	Failure of software to access disk.
COMMUNICATIONS	Process-to-process communications failure.
CPUDGN	Failure of CPU diagnostic.
MACHINE	Operating system error.
PROGRAM	Internal program failure or error.
CHECKSUM	Memory failure/corruption.
RECOVERY	Recovery-to-recovery problem.
REMOTE PROGRAM	Program error encountered on other processor local process report.
EXCESSIVE INT	Internal problem was causing repeated error handling; so, MC or UC was parked.
RAMTEST	Processor RAM failed test and was removed.
HARDWARE	Hardware write failed; possible hardware failure.
Action	**Explanation**
RSCOLDBT	Super cold boot.
REPORT	Report only; no action taken.
HWBOOT	Hardware boot from existing data base.
WMBOOT	Boot of data base from disk and boot hardware (warm boot).
CDBOOT	Boot entire processor data base and executables and boot processor hardware.
REMOVE	Remove named processor from service.
MCOND	Place MC in maintenance condition.
PARK	Park named processor in inoperative state.

Command Denials

10

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Command Denials

10

10.1 Clear Command Denials

1. If you have one of the following word strings in the denial message, read the associated information and perform corrective action to obtain command completion.

   - **INACT** - The INACT message indicates that the command is invalid with the feature package being used.
   - **BAD SYNTAX** - Determine the portion of the command that was in error from the designator (BAD VERB/FRM ERR/SEQ ERR) in the message and reenter the command with the correct information. If you do not understand how to correctly construct the command, you can get on-screen help using the help routine (initiated by entering a question mark, ?).

     NOTE:
     The DACS II indicates where the input error occurred, by placing = signs around the word or portion in the echoed command.

   - **ERR, ABT** - Reenter the command; a transient frame condition may have caused the command to be aborted. If the command is aborted again, check the printout to find associated trouble messages.
   - **MC OOS** - The MC (main controller) must be restored to service to execute the command.

- **MCOND** - The MC is in the maintenance condition, and only commands which are considered frame maintenance commands can be used.
- **MC INSERVICE** - The MC must be in the maintenance condition to execute certain disk and tape commands.
- **MPDBASE** - The main processor data base is not loaded.
- **RESTRICTED, STOPPED** - Only users who have been assigned the use of restricted maintenance commands can use the command. The use of this set of commands is enabled by the frame administrator who enters the SET-PRVG command with option RMON for the user.

2. Examine the DENY output message and notice the 4-digit error code which appears on a line by itself and the remaining lines which give the explanation of the error code.

   ⇒ NOTE:
   Error codes starting with the same letter are in the same general category; for example, I for input, E for equipage, S for service. The code is taken from letters of the key words that constitute the meaning of the code.

3. If you received a subrate data denial message string, check Table 10-1 for additional information.
4. Command denials can be categorized under common causes. Check the following descriptions and, if applicable, perform corrective action to obtain command completion.
   - **Input Error** - Check each field of the command entry on the screen or printout against the documented command to find the error.
   - **Not Equipped, Not In-Service, or Failed** - The named equipment is not grown (equipped) or in-service to support the execution of the command. The commands to create and restore the plug-in to service are covered in provisioning in Volume 1, and procedures to clear failed plug-in and trouble messages are in this trouble-clearing volume.
   - **Incorrect NPC/Channel Number** - Check each side of the cross-connect command to find incorrect numbers that are already assigned or assigned differently. There are retrieve commands in the cross-connect procedures to obtain information about existing connections on the frame.
   - **Invalid Parameters** - Check each field of the command entry against the documented command to determine which keyword is incorrectly used.

- **Boot Failed** - This is a specific restore command denial. Reenter the restore plug-in command and subsequent diagnose command in an effort to get a DGN ...STF message for which there is trouble clearing in the respective trouble-clearing chapter. If no DGN ...STF message is obtained but the denial persists, replace the plug-in to be restored.

Table 10-1. Subrate Denial Strings

Message String	Corrective Action
Exceeds Limit of 21	Only 21 MJUs can be disconnected at one time. Split the MJUs to be disconnected into smaller groups.
INCL Required for All Subrate Circuits	This is a precaution to ensure that data customers are informed of maintenance action. Verify that you are addressing the correct channel and notify customers if you are going to remove service.
OLD Channel Not Established to Subrate Feature	The addressed channel has not been established to subrate with CRTE-CRS-TS command.
OLD Channel Has Associated Parity Channel	The PCH [ppp] option must be used to indicate the next or particular parity channel.
New Channel Not Same As Old	The new channel was established to Subrate differently (DS0A or DS0B). Check channel entries.
Exceeds EC/SRM/MJU Capacity	For EC, use ECLOC query to find which is being used (SRM or MJU); enter command to change ECLOC. For SRM/MJU, the next plug-in is required for more capacity.
MPTM Keyword Disallowed	The MPTB keyword is only valid for multipoint junction unit circuit.
MA Field Does Not Exist	The MJU entered in the MA field does not exist.
ALL Keyword Is Not Specified	The ALL must be used when there are branches. Verify command entry.
Associated with RT Digroups	An NPC entered in the command is associated with *SLC*® Carrier System; channels for these are entered as virtual channels on the DGA NPC, which allows channels 1 through 96 to be addressed on one NPC.

Glossary

A

ABT
Abort

ACO
Alarm Cutoff

Active
The entity is in service, not protected. If it is a traffic-carrying entity, it is carrying traffic.

AIS
Alarm Indication Signal (also known as all 1s signal)

Alarm Delay
Specifies the alarm delay (in seconds) for software-detected alarm conditions. Initial value is 20 seconds.

Alarm Indication Signal (AIS)
A signal transmitted downstream if the incoming signal is defective.

All Ones Signal
Signal which is defined to contain all ones in the terminal-to-terminal mode.

ALM
Alarm

Alphanumeric Characters
Letters and digits.

Alternate Mark Inversion
A DS1 line code in which alternate one bits are positive and negative, but zero substitution is not used.

AMI
Alternate Mark Inversion

AS&C
Alarm Surveillance and Control

ASCII Characters
Letters, digits, and symbols used in the American Standard Code for Information Interchange.

ATAG
Autonomous Message Tag

ATP
All Tests Passed

Attribute
Alarm indication level: major, minor, or no alarm.

AUD
Audit

Autolock
When the system autolocks an entity, it switches to protection and forbids return to the working entity even if the trouble clears. This is usually caused by multiple protection switches on that entity in a short time period.

Autolock Number of Switches
This parameter is the number of times that the system restores an entity to service (after intermittent failures) in a given autolock switching interval before the entity is autolocked.

Autolock Release Time
The number of hours between times when the system automatically releases autolock.

Autolock Switching Interval
An interval in minutes (see autolock number of switches).

Autonomous
Done by the system without direction by you.

Autoprovisioned
Put into the provisioned state automatically by the system.

B

B3Zs
Bipolar with 3-zero substitution, a DS3 line code.

B8ZS
Bipolar with 8-zero substitution.

Baud Rate
Transmission rate (bits per second) on a link.

BBL
Backbone Leg

BC
Bus Controller

BCON
Broadcast Cross-Connect

BER
Bit Error Rate

BER Metric
Specifies the metric for calculating bit error rate at a DS3 interface port. Options are bipolar variations (BPV) or parity (PTY). (Initial value is BPV).

Bipolar Variation
A variation of the alternating +1, -1 pattern in a 3-level code.

Bit error Rate Threshold
3 stands for 0.001, 6 stands for 0.000001.

Blue Code
Same as AIS

BMTR
Back-up Memory Transfer

Boot
To transfer contents of backup memory into the system's working memory.

BOS
Bit Oriented Signaling

BPV
Bipolar Violation

BRD
Broadcast

Broadcast
Form a bridge connection.

BSRF
Basic Synchronization Reference Frequency

BT
Bus Terminator

BX
Bus Extender

Byte
Usually refers to a group of eight consecutive binary digits, but sometimes used for bit groups or other sizes.

C

CAS
Channel Associated Signaling

CATP
Condition All Tests Passed

CBIT
A DS3 line code in which parity checks on blocks of data are used to detect bits in error.

CCB
Cross-Connect Buffer

CCI
Clock and Control Interface

CCITT
International Telephone and Telegraph Consultative Committee

CCN
Cross-Connect Network

CCNI
Cross-Connect Network Interface

CEF
Capacity expansion Frame

CFA
Carrier Failure Alarm

CFR
Synchronizer Configuration

CGA
Carrier Group Alarm

CHG
Change

CI
Communications Interface

CIU
Craft Interface Unit

Clear (CL)
An alarm condition no longer exists.

CLF
Carrier Line Failure

CMAP
Channel Map

COFA
Chang-of-Frame-Alignment

Condition
The type of alarm indication.

CP
Circuit Pack

CPR
C-Bit Processor

CPU
Central Processing Unit

CRC
Cyclic Redundancy Check

CRO
Clock Reference Oscillator

Cross-Connect
A piece of hardware used to interconnect line-terminating equipment, multiplexers, and other equipment.

Crosstalk
A signal induced into one transmission line from another transmission line.

CRT
Cathode Ray Tube

CSS
Controlled Slip Seconds

CTAG
Correlation Tag

Current Value
In the dialog mode, it indicates that the current value of a parameter is used by the system unless you direct otherwise.

CV
Coding Violations

D

DACS
Digital Access and Cross-Connect System

DATS
Digital Access Test Set

Data Base
A record of cross-connections, status of entities and facilities, and other data.

DC
Digroup Circuit

DCC
Disconnect Code"

DCLU
Digital Carrier Line Unit

DDC
Dual Digroup Circuit

DDS
Digital Data system

Default
A value the system automatically uses for a parameter if you do not specify a value.

Delimiter
A punctuation mark (colon or comma) used to separate two parameters in an input message.

Demultiplexer
A device used with a multiplexed signal for recovering signals combined within it and restoring the distinct individual channels of these signals.

DFB
Dual Fuse Boards

Diagnose
Test an entity; also a trouble condition in which a diagnostic test is in progress.

DL
Data Link

DLC
Digital Loop Carrier

DM
Dual Multiplexer

DMA
Deferred Maintenance Alarm

DMAP
Digroup Map

DMB
Digital Multipoint Bridge

DMI
Digital Multiplex Interface

DMM
Digital Multimeter

DPC
Dual Primary Circuit

DPLL
Digital-Phase Locked Loop

Driven
A driven port is being monitored, and a good signal is expected.

DS0
Digital Signal Level 0 (64-kb/s)

DS1
Digital Signal Level 1 (1.544-Mb/s)

DS1 Port
A DS1 port in either a DS1 interface module or a DS3 interface module.

DS3
Digital Signal Level 3

DS3U
DS3 Unit

DSP
Digital Signal Processor

DSPC
Digital Signal Processor Circuit

DSPI
Digital Signal Processor Interface

DSPU
Digital Signal Processing Unit

DSU
Data Service Unit

DSX
Digital Signal Cross-Connect

Duplex Entity
A pair of entities in which one is active and the other is in hot standby (clock generators).

E

EBX
Expanded Bus Extender

ECCN
Expanded Cross-Connect Network

Echo
Display an input at a terminal (a user is echoed, but a password is not).

ECI
Enhanced Communications Interface

EFC
Expanded Frame Controller

EID
Entity Identification

EMIU
Expanded Multiple Interface Unit

EMTC
Expanded Maintenance Circuit

Enter
Provision an entity by a command, not automatically by the system.

Entity
A specific piece of hardware (such as circuit pack, memory device, or link) that has been assigned a name and recognized by the system.

Entity Identifier
The name used by the system to refer to an entity.

Equalizer
A circuit adjustment used to maintain signal strength between desired limits.

Equipped
The entity is in the system data base and physically in the frame, but is not yet provisioned.

ER
Error Rate

ERS
Errored Seconds

ES Errored Seconds

ESD
Electrostatic Discharge

ESF
Extended Superframe

ESR
Error Source Register

ESR1
Error Source Register 1

ESR2
Error Source Register 2

ETSI
Expanded Time-Slot Interchanger

F

FAL
Fuse Alarm Lamp

FC
Format Converter

FDL
Facility Data Link

Fe
Extended Superframe Format

FEBE
Far-End Block Error

FELP
Far-End Loopback

FES
Far-End Errored Seconds

FLI
Facility Line Interface

FMT
Formatter

FPB
Feature Package B

FPC
Feature Package C

Forced
A traffic-carrying entity (either service or protection) has been deliberately locked into a service-providing state by a manual command despite being bad.

FRADT
Frame Audit

FRER
Framing Bit Error

Fs
Fs Framing Format

FSES
Far-End Severely Errored Seconds

FTM
Facility Terminating Module

FTU
Facility Terminating Unit

FUAS
Far-End Unavailable Seconds

FW
Frame Word

G

Grooming
Rearrangement of DS1 signals in DS3 signals.

H

Header
The first line of a message.

Header Date
Specifies the current date as YYMMDD, where YY is the last two digits of the year, MM is the month, and DD is the day of the month.

Header Time
Specifies the current time of day as HHMMSS, where HH is the hour (00 to 23), MM is the minutes, and SS is the seconds.

HECI
High-Speed Enhanced Communications Interface

Hierarchy
An orderly ranking or sequence of elements, such as that of menus presented at a terminal.

Hit
A disruption of service that lasts for less than 1 second. See Outage.

Hot Standby
An entity ready for fast, automatic placement into operation to replace an active entity.

HUBID
Hub Identifier

I

IDLD
Idled

Idle
An output port is idle if it is not cross-connected to an input port.

IFTU
Integrated Facility Terminating Unit

In Service
The entity is performing normal service functions, either active or standby.

J

Jitter
Short term variations in the property of a digital signal.

K

Kbit
Kilobit

Kbit/s
Kilobits per second

L

LAN
Local Area Network

LBO
Line Build-Out

LBRV
Low Bit Rate Voice

LED
Light-Emitting Diode

LILB
Line Interface Loopback

Link ID
The location and type of a user interface link.

LLB
Line Loopback

LMA
Loss of Multiframe Alignment

Location
The specific entity involved.

Loopback
A circuit arrangement that causes a received signal to be returned to its source.

LOS
Loss of Signal

M

M13
A standard format used for DS3 signals.

Maintenance
The entity has been locked into a non-service providing state by a manual command.

Maintenance Condition
An entity state in which some normal service functions are suspended, either because of a problem or in order to perform special functions (copy memory) that cannot be performed while normal service is being provided.

Mapped
Cross-connected.

Mb
Megabit

Mb/s
Megabits per second

MBER
Minor Bit Error Rate

MC
Main Controller

MCP
Main Controller Power

Memory Location
Specifies the equipment, DS1 interace port, or DS3 MUX port location associated with a memory type.

MER
Multiframe Error

MI
Maintenance Information

MIU
Multiple Interface Unit

MJU
Multipoint Junction Unit

MMFG
Multiplexer-MIU Function Group

MML
Man-Machine Language

MP
Main Processor

MPDIS
Multipoint Disconnect

MPM
Multipoint Mode

MTC
Maintenance Circuit

MXR
Multiplexer

N

NA
No Acknowledgement

NDL
No Data Link

NEBS
Network Equipment Building Systems

Network Element
A DACS II frame is a network element.

NFW
Non-Framing Word

NG
No Good

NOBBL
No Backbone Leg

Notification Code
The notification code for alarm and status conditions, which include: MJ - major alarm; MN - minor alarm; NA - indicates no alarm (status only); or CL - cleared alarm.

NPC
Network Processing Circuit

NPCTG
NPC Test Group

NPCTP
NPC Test Port

NSA
Nonsignaling Associated

NZCS
No Zero code Suppression

O

OCNT
One-Way Cross-Connect, Terminated

OCON
One-Way Cross-Connect

ODIS
One-Way Disconnect

OFS
Out-of-Frame Seconds

OOS
Out-of-Service

OS
Operations Systems

Out-Of-Service (OOS)
The entity is not providing its normal service function (removed from service or protected) either because of a system problem or because it has been removed from service manually.

Outage
A disruption of service that lasts for more than one second. See Hit.

P

Parity Check
To determine whether a block of digital data has been corrupted in transmission, you can use an even-parity format in which an extra bit is added to the block at the transmitter if necessary so that the block always contain an even number of one bits. A parity-checking circuit at the receiving end can determine whether an error has occurred in transmission. An odd-parity format can also be used for the same purpose.

PBS
Primary Block Alarm

PBC
Primary Block Circuit

PBF
Primary Block Failure

PBX
Private Branch Exchange

PCM
Pulse Code Modulation

PDS
Program Documentation Standards (Language)

PF
Printout Follows

PFW
Pseudo-Frame Word

PMA
Prompt Maintenance Alarm

POTS
Plain Old Telephone Service

Primary Line
The second line in an output message.

Program
The software that directs the operation of the main controller and other frame elements.

Protocol
Detailed format and procedures used for transmitting digital data.

Protocol Type
Indicates the protocol supported on an interface link.

Provisioned
The entity is ready to perform its intended function.

Pulse Code Modulation (PCM)
The process by which analog signals are sampled, quantized, and coded into a digital bit stream.

R

R16
Remote Alarm Indication in TS16

RAI
Remote Alarm Indication

RAIS
Remote Alarm Indication Signal

RAM
Random-Access Memory

RBER
Remote Bit Error Rate

RDC
Red Circuit

REER
Remote Excessive Error Rate

Released
If an input port, it is not under test access; if an output port, it is not cross-connected to an input port under test access.

RL
Retry Later

RMS-D
Remote Measurement System, Digital

Rollover
Operation used when the transmission facility between the system and an upstream system is to be replaced.

RT
Remote Terminal

RTS
Remote Test System

RTS-5A
Remote Test System 5a

S

SARTS
Switched Access Remote Test System

SCC
Subrate Cross-Connect

SECH
Subrate Establish Command

SERS
Severely Errored Seconds

SES
Severely Errored Seconds

SID
Source Identifier

SNIDER
Protocol (message format) used on administrative links.

Software ID
Gives the software version information for the system: g - is a one-digit number giving the software release; i - is a two-digit number giving the issue; r - is a one-digit number giving the point release.

SPU
Synchronizer Power Unit

SRM
Subrate Multiplexer

SSC
Secondary Storage Controller

SSP
Select Synchronization Port

Standby
The entity is in service but is not providing service functions. It is ready to be used to replace a similar entity either by protection or by duplex switching.

State
The state of an entity indicates whether it is defective or normal, whether it is ready for normal use, etc.

Subrate
In the Digital Data System, a data bit rate that is either 2.4, 4.8, or 9.6 kb/s.

SYNC
Synchronizer

T

T1DM
T1 Data Multiplexer

TABS
Telemetry Asynchronous Block Serial

TAD
Test Access Digroup

TB
Time Base

TC
Trunk Conditioning

TCNT
Two-Way Cross-Connection, Terminated

TCON
Two-Way Cross-Connection

TD
Timing Distributor

TDIS
Two-Way Disconnection

Test Mode
Specifies the test access mode.

TG
Test Group

TID
Target Identifier

TLA
Terminate and Leave Active

TLI
Timing Link Interface

TLP
Transmission Level Point

TLR
Terminate and Leave Release

TP
Test Port

TPR
Test Port Release

TSI
Time Slot Interchange

TTY
Teletypewriter Terminal

U

UAC
Unassigned Channel Code

UAS
Unavailable Seconds

UATC
Unavailable Time Count

UBX
Unit Bus Extender

UC
Unit Controller

UMC
Unassigned Multiplexer Code

Z

ZBTSI
Zero Byte Time Slot Interchange

ZCS
Zero Code Suppression

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