CONTROL DATA

60000348

CDCNET

Installation and Troubleshooting

Maintenance

CDCNET

Hardware Installation and Troubleshooting

Maintenance

This product is intended for use only as described in this document. Control Data cannot be responsible for the proper functioning of undescribed features and parameters.

Publication Number 60000348

Manual History

Revision	System Version/ PSR Level	Date
A	1.4/716	December 1988
B	1.5.1/739	December 1989

Covers CDCNET version 1.5.1 at PSR level 739, for operation on NOS level 2.7.1 and NOS/VE level 1.5.1. Major changes documented in this revision include:

- Added AC117-A MPB board (MPB-II) information.
- Added BS236-A SMM board (SMM4) information.
- Added Network Path Verification Test.
- Added Intelligent Modem Test to CML/VE.
- Added High Speed HDLC testing information to LIM, Port, and URI online test procedures.
- Revised chapters 4 through 8 to include CMSI and CML/VE information.
- Added Class 2 and Class 2 Plenum LIM cable part numbers to appendix B.
- Added CDC 587 printer settings to appendix C.
- Added appendix F, which explains how to interpret HPA detailed status bytes.
- Moved explanations of commands to appendix G.

Contents

Figures

Tables

About This Manual

This manual contains installation procedures and troubleshooting guidelines for the CONTROL DATA® Distributed Communications Network (CDCNET) products and associated I/O cables.

Audience

This manual is intended for individuals who install and check out CDCNET products, operate them, add options to them, and maintain them. In some cases, these individuals are CDCNET customers. In other cases, Control Data customer engineers or other maintenance personnel may perform these tasks.

It is assumed that some installers will have minimal technical training and experience in network products. Therefore, we have minimized technical descriptions and terms that are not necessary to perform installation tasks.

At some sites, the installation function may be performed by people who have other network responsibilities, such as the network troubleshooter, network installer, or network operator. These tasks require additional information contained in other CDCNET manuals. References to these related manuals are included in this manual.

Organization

The information in this manual is organized under the following major chapters and appendices:

- Chapter 1 - Planning the Installation
- Chapter 2 - Installing the Segment Cable and Components
- Chapter 3 - Installing the Device Interface (DI)
- Chapter 4 - Introduction to Troubleshooting
- Chapter 5 - Overall Network Troubleshooting
- Chapter 6 - How to Run Online and Inline Tests
- Chapter 7 - How to Run Onboard Tests
- Chapter 8 - How to Use the Network Performance Analyzer
- Chapter 9 - Removing and Replacing Parts
- Chapter 10 - Replacement Parts Information
- Appendix A - Glossary
- Appendix B - Segment, Transceiver, and LIM Cable Information
- Appendix C - Setting Printer Switches
- Appendix D - IEEE 802.3 and Ethernet V 1.0 and V 2.0 Specifications Comparisons
- Appendix E - Converting a 255x Cabling Scheme to a CDCNET TDI/NDI Cabling Scheme
- Appendix F - Interpreting General and Detailed Status from HPA Reports
- Appendix G - Commands

NOTE

Within some of the CDCNET manuals there may be a limited number of references to certain features or capabilities that are not available in this release of the product.

Wherever there is such a reference or description, a colored divider page precedes the affected chapter of the manual and identifies the feature, option, or procedure that is not currently available to the user.

Conventions

The following conventions are used in this manual:

- The terms logic board, module, board, and card may be used interchangeably in this manual or other CDCNET manuals. These terms refer to printed circuit board assemblies, such as the main processor board, memory boards, line interface modules, and so on. The main backpanel and LIM backpanel are also printed circuit boards; however, they are referred to as backpanels rather than boards.

- The terms Ethernet, IEEE 802.3 (Institute of Electrical and Electronic Engineers), and ISO/DIS 8802/3 ISO (International Standards Organization/Draft International Standards) are used interchangeably in this and other CDCNET manuals. Ethernet refers to network components that are compatible with the network standard developed by XEROX, INTEL, and DEC. IEEE 802.3 and ISO/DIS 8802.3 are the ANSI/IEEE (American National Standards Institute) and ISO/DIS adaptation of that standard. The term IEEE 802.3 is more precise; the term Ethernet is more commonly used in the industry. CDCNET components covered by these standards are compatible with both IEEE 802.3 and Ethernet V.2.

- The term device interface or DI refers to both 120 V ac and 240 V ac models. If it is necessary to distinguish between the two models, the product number will be given.

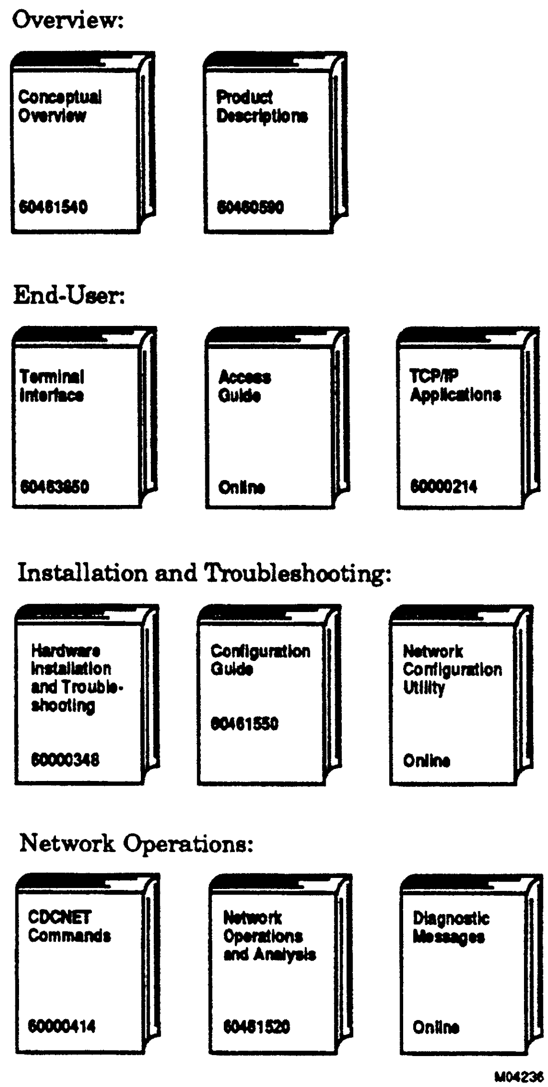
- All numbers are in decimal notation unless otherwise specified.

- All part numbers are Control Data, unless otherwise specified.

- The term ICA refers to all models of integrated communications adapters. The term ICA-II refers only to model 2629-2 ICAs.

- Unless otherwise specified, when you are instructed to enter a command, you are expected to signal the end of the command with a carriage return. A carriage return may have different names or labels on different terminals; for example, NEXT, CR, RETURN, and NEW LINE.

Related CDCNET Manuals



Manual Abstracts

Following is a brief description of each CDCNET manual.

Overview:

Conceptual Overview	Discusses CDCNET in conceptual terms. It provides a broad view of CDCNET that explains the theoretical nature of this product. It does not attempt to define which particular product capabilities and features are currently available and which ones will follow in subsequent releases.
Product Descriptions	Provides reference, planning, and training information for customers who own or are interested in owning CDCNET products, and for Control Data personnel who use or work on CDCNET. The manual describes hardware products and software features, provides information on how to select and use various types of network cables, and provides network configuration examples.

End-User:

Terminal Interface	This is the primary manual for end-users who use interactive terminals to access computer services connected to CDCNET. The manual explains general terminal interface concepts, terminal commands and attributes, and connection attributes. For the advanced user, site administrator, and network analysts it also covers more advanced topics such as virtual and transparent modes, resolving communications problems, and the various terminal protocols supported by CDCNET.
Access Guide	This online manual guides the novice user through the process of accessing and using computer services through CDCNET. It includes procedures for connecting, disconnecting, and managing connections; displaying and changing terminal attributes; and terminal user exception processing. The more experienced user can find additional related information in the CDCNET Terminal Interface manual.
TCP/IP Applications	Describes how to access the utilities that implement the TCP/IP protocols through CDCNET. The manual assumes the user is familiar with CDCNET terminal and connection attributes; knows the service title to access; and has some working knowledge and understanding of TCP/IP protocols.
Batch Device User Guide	Describes how to operate batch devices connected to CDCNET. It assumes the user is familiar with NOS and/or NOS/VE operating systems and with CDCNET access to these operating systems. The manual defines the concepts of I/O stations and provides the procedures for defining and controlling these stations. The online manual is available with NOS/VE and NOS operating systems.

Installation and Troubleshooting:

Hardware Installation and Troubleshooting	Contains hardware installation procedures and troubleshooting guidelines for CDCNET hardware products and associated I/O cables. The manual is intended for individuals who install and check out CDCNET hardware products, operate them, add options to them, and maintain them.
Configuration Guide	Documents how to configure CDCNET software after it is installed on an operating system, and describes the responsibilities of the CDCNET network administrator. This manual also documents the Manage CDCNET Configuration Utility (MANCC), a utility for creating and editing files defining a CDCNET network.
Network Configuration Utility (NETCU)	Describes how to access and use NETCU. In addition to NETCU usage information, the manual includes sections on configuration strategy and planning, and CDCNET configuration concepts. The help feature of NETCU allows a NOS/VE user to access an appropriate page of the NETCU manual from any NETCU screen. Available with NOS/VE only.
NETCU Summary Card	Contains access information, function key and main menu descriptions, and instructions for installing configurations generated by NETCU.
DI Dump Analyzer	This manual is an online version of the DI Dump Analyzer section of the CDCNET Network Operations and Analysis manual. The manual is for CDCNET analysts who are familiar with Control Data host computer operating system concepts and operations. The manual describes how to use information from the Analyze CDCNET Dump (ANACD) utility to help troubleshoot network problems. Available with NOS/VE only.

Network Operations:

Network Operations and Analysis	This manual documents how to monitor, control, and reconfigure CDCNET using the CDCNET Network Operator Utility (NETOU). The Network Operations section walks an operator through operations concepts, basic and advanced operations activities, and elementary troubleshooting decisions. The Network Analysis section describes the tools and methods used to analyze CDCNET performance including: instructions for using the CDCNET DI Dump Analyzer, a list of DI reset codes, a map of fixed address memory, and definitions of important system data structures. The NPA section of the manual provides information on how to generate various types of NPA reports and provides examples and descriptions of all NPA reports.

Diagnostic Messages

This manual is for network operators, network analysts, and programmers. The manual provides sorted lists of diagnostic messages and command responses issued by the CDCNET software. The primary sorted list of diagnostic messages describes the event causing each message and the appropriate user action. The primary sorted list of command responses describes the event causing the command response. Secondary sorted lists of diagnostic messages and command responses provide a cross reference of diagnostic message number and command response number to the CDCNET software products that issue the messages or command responses.

The printed version of this manual is no longer available. However, a copy can be printed on site; refer to the 1.5.1 SRB for further information. Available with both NOS/VE and NOS operating systems.

CDCNET Commands

This new manual contains all of the CDCNET Operator/Analyst commands formerly included in the Network Operations, Configuration and Site Administration, NPA, and Network Analysis manuals. This manual also replaces the CDCNET Commands Quick Reference manual (60000020) and is intended for operators, systems analysts, support engineers, and other experienced users.

Manual History

Not all sites find it convenient or expedient to install each new version and PSR level of CDCNET software. This presents a problem in maintaining sets of manuals that reflect installed software when later versions of CDCNET software are available but not installed. The following CDCNET Manual History table helps users to assemble and maintain the appropriate documentation by indicating which manual revisions support each release of CDCNET.

Manual/Audience Matrix

The CDCNET Manual/Audience matrix helps site planners, administrators, and users to determine their CDCNET documentation needs. The matrix categorizes each manual according to its type: overview, reference, tutorial, and so on. It then defines the audience of each manual in general terms: customer, end-user, LAN installer, and so on. Sites may have different audience designations for their audience, or may combine user functions.

CDCNET MANUAL HISTORY
RELEASE 1.2 - 1.5.1

CDCNET MANUALS	CDCNET RELEASE DATE/VERSION/PSR LEVEL					
	APR. '87 R1.2 L678	SEPT. '87 R1.2.5 L688	APR. '88 R1.3 L700	DEC. '88 R1.4 L716	JUN. '89 R1.4.2 L727	DEC. '89 R1.5.1 L739
	MANUAL REVISION					
CONCEPTUAL OVERVIEW 60461540	B	-	-	-	-	-
PRODUCT DESCRIPTIONS 60460590		B ——	1.3 ——▶	C	-	D
TERMINAL INTERFACE 60463850	B	C	D	E	-	F
ACCESS GUIDE (ONLINE NOS) L60463340	B	C	D	E	-	F
ACCESS GUIDE (ONLINE NOS/VE) L60000143	A	B	C	D	-	E
TCP/IP USAGE 60000214		A	B	C	D	E
BATCH DEVICE USER GUIDE 60463863	B	C	D	E	-	F
BATCH DEVICE USER GUIDE (ONLINE NOS/VE) L60000142	B	C	D	E	-	F
BATCH DEVICE USER GUIDE (ONLINE NOS) L60463890	B	C	D	E	-	F
HARDWARE INSTALLATION AND TROUBLESHOOTING 60000348	*	*	*	A	-	B
CONFIGURATION GUIDE 60461550	C	D	E	F	-	G
NETWORK CONFIGURATION UTILITY (NETCU) (ONLINE NOS/VE) L60000268			A	B	C	D
NETCU SUMMARY CARD 60000269			A	B	-	-
DI DUMP ANALYZER (ONLINE NOS/VE) L60000401				A	-	B
NETWORK OPERATIONS AND ANALYSIS 60461520	C	D	E	F	-	G
DIAGNOSTICS MESSAGES (ONLINE NOS-NOS/VE) L60461600	C	D	E	F	G	H
CDCNET COMMANDS 60000414						A

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NOTES:

——▶ INDICATES MANUAL UPDATED TO THAT RELEASE.

\- MANUAL NOT AFFECTED BY THE RELEASE.

* RELEASES SUPPORTED BY LAN INSTALLATION MANUAL, DI INSTALLATION AND CHECKOUT MANUAL, AND TROUBLESHOOTING GUIDE.

[shaded box] SHADED BOXES INDICATE THE LATEST REVISION LEVEL FOR THE MANUAL.

CDCNET MANUAL/AUDIENCE MATRIX

CDCNET MANUALS	MANUAL TYPE	AUDIENCE: CUSTOMER	END-USER	LAN INSTALLER	CUSTOMER ENGINEER	NETWORK OPERATOR	CE SUPPORT ENGINEER	NETWORK ANALYST	SITE ADMINISTRATOR	PROGRAMMER
OVERVIEW										
CONCEPTUAL OVERVIEW	OVERVIEW	X			X		X	X	X	X
PRODUCT DESCRIPTIONS	REFERENCE	X			X		X	X	X	X
END-USER										
TERMINAL INTERFACE	USER GUIDE		X			X	X	X		X
ACCESS GUIDE	USER GUIDE		X				X	X		
TCP/IP APPLICATIONS	USER GUIDE		X				X	X		
BATCH DEVICE USER GUIDE	USER GUIDE		X				X	X		
INSTALLATION AND TROUBLESHOOTING										
HARDWARE INSTALLATION AND TROUBLESHOOTING	MAINTENANCE	X		X	X	X	X	X		
CONFIGURATION GUIDE	REF./TUTORIAL					X	X	X	X	
NETWORK CONFIGURATION UTILITY (NETCU)	REF./TUTORIAL					X	X	X	X	
NETCU SUMMARY CARD	SUMMARY					X	X	X	X	
DI DUMP ANALYZER	REF./TUTORIAL				X	X	X	X		
NETWORK OPERATIONS										
CDCNET COMMANDS	REFERENCE				X	X	X	X	X	X
NETWORK OPERATIONS AND ANALYSIS	REF./TUTORIAL					X	X	X	X	
DIAGNOSTICS MESSAGES	REFERENCE				X	X	X	X	X	X

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Additional Related Manuals

Other manuals that are necessary to maintain and understand CDCNET follow.

Manual	Publication Number
Control Data ACLA Hardware Maintenance manual	74700900
Control Data SCLA Hardware Maintenance manual	74700700
Synchronous Bit Protocol Communications Line Adapter Hardware Maintenance manual	60470710
HPA Reference (applies to NOS)	60459460
HPA/VE Reference	60461930
CML/VE Reference	60000019
CML Reference	60455980
NOS 2 Analysis Handbook	60459300
Control Data CYBER 930 Computer System Maintenance Guide	60469540

Additional Related Documents

The following documents provide additional information on local area networks:

- ANSI/IEEE Standard 802.3 and ISO/DIS Standard 8802/3 for Local Area Networks: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications. Available from ANSI, 1420 Broadway, New York, NY, 10018.
- CCITT V.35 Recommendations: An electrical standard established by the Consultative Committee of International Telephone and Telegraph (CCITT) for interconnection of equipment operating above 20 K bps. Available from National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA, 22161.
- CCITT V.24 Recommendations: A list of definitions for interchange circuits between data terminal and data circuit-terminating equipment. Available from National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA, 22161.
- EIA RS-232-C Standard: An electrical standard established by the Electrical and Electronic Industries Association (EIA) for the interconnection of equipment. Available from EIA, 2001 Eye Street NW, Washington, D.C., 20006.
- EIA RS-449 Standard: Defines general purpose 37-position and 9-position interfaces employing serial binary data interchange. Available from EIA, 2001 Eye Street NW, Washington, D.C., 20006.

Ordering Manuals

Control Data manuals are available through Control Data Sales Offices or Control Data, Literature and Distribution Services, 308 North Dale Street, St. Paul, Minnesota 55103.

Submitting Comments

Control Data welcomes your comments about this manual. Your comments may include your opinion of the usefulness of this manual, your suggestions for specific improvements, and the reporting of any errors you have found.

You can submit your comments on the comment sheet on the last page of this manual. If the comment sheet has already been used, you can mail your comments on another sheet of paper to:

Control Data
Technical Publications, ARH219
4201 North Lexington Avenue
St. Paul, Minnesota 55126-6198

You can also submit your comments through SOLVER, an online facility for reporting problems. To submit a documentation comment through SOLVER, do the following:

1. Report a new problem or change in existing PSR from the main SOLVER menu.
2. Respond to the prompts for site-specific information.
3. Write a comment about a manual from the new menu.
4. Respond to the prompts.

Please indicate whether you would like a written response.

Disclaimer

This equipment will work properly only if installed and used according to the information given in this manual, and other referenced manuals and documents. Control Data cannot be responsible for problems that result from improper installation or use.

If any information in this manual conflicts with local building, electrical, or fire codes or ordinances, the customer must consult with the proper local authorities to determine the proper course of action. It is the customer's responsibility to ensure that applicable codes and ordinances are followed.

Warning of Possible Radio Frequency Interference

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A peripheral computing device pursuant to Subpart J of Part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Canadian Compliance Notice

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Important Safety Information

You must use proper safety and repair techniques to ensure safe and reliable operation of CDCNET equipment. We recommend the procedures in this manual as effective, when performed by qualified persons.

It is especially important to observe the warnings and cautions that appear in this manual and on equipment labels. Warnings point out conditions or practices that may endanger you or others. Cautions point out conditions or practices that may damage the equipment, possibly making it unsafe for use.

The following is a list of general warnings and precautions that you must observe when using or maintaining CDCNET equipment.

- Use caution when troubleshooting equipment that has voltages present. Remove power from unit before servicing or replacing parts.
- Do not disconnect or otherwise disable safety grounding systems, even if the equipment is powered off.
- Use the special tools called out in the procedures.
- Wear safety glasses when performing any activities that may endanger your eyes.
- Wear safety shoes if you must remove or replace heavy parts.
- Replace all covers, groundstraps, and panels when maintenance is complete.
- Use only Control Data approved replacement parts. Other parts could adversely affect safety.
- In case of fire or other emergency, isolate equipment from main power by removing the power plug from the ac outlet. Where removing the plug is not possible or practical, use the system main power disconnect to isolate equipment from main power.
- When installing equipment, ensure that the temperature at that location will not exceed the limits defined for the equipment. Pay special attention to temperature when mounting equipment in a rack or cabinet.
- Follow all applicable building, electrical, and fire codes. Consult with the proper authorities if there appears to be a conflict between those codes and the information in this manual.
- In general, use sound safety practices when operating and maintaining the equipment.

Planning the Installation 1

Planning the Installation 1

System Installation Overview

CDCNET (Control Data Distributed Communications Network) is a high-speed communication network for data exchange between computers, data terminals, and other digital devices. The network is usually located within a single building or group of buildings that are fairly close together.

Figure 1-1 is a schematic of a typical network. As shown on that figure, all components connect to a main cable called a segment or trunk cable. To ensure an easy installation, the cable routing and location of all components must be carefully planned.

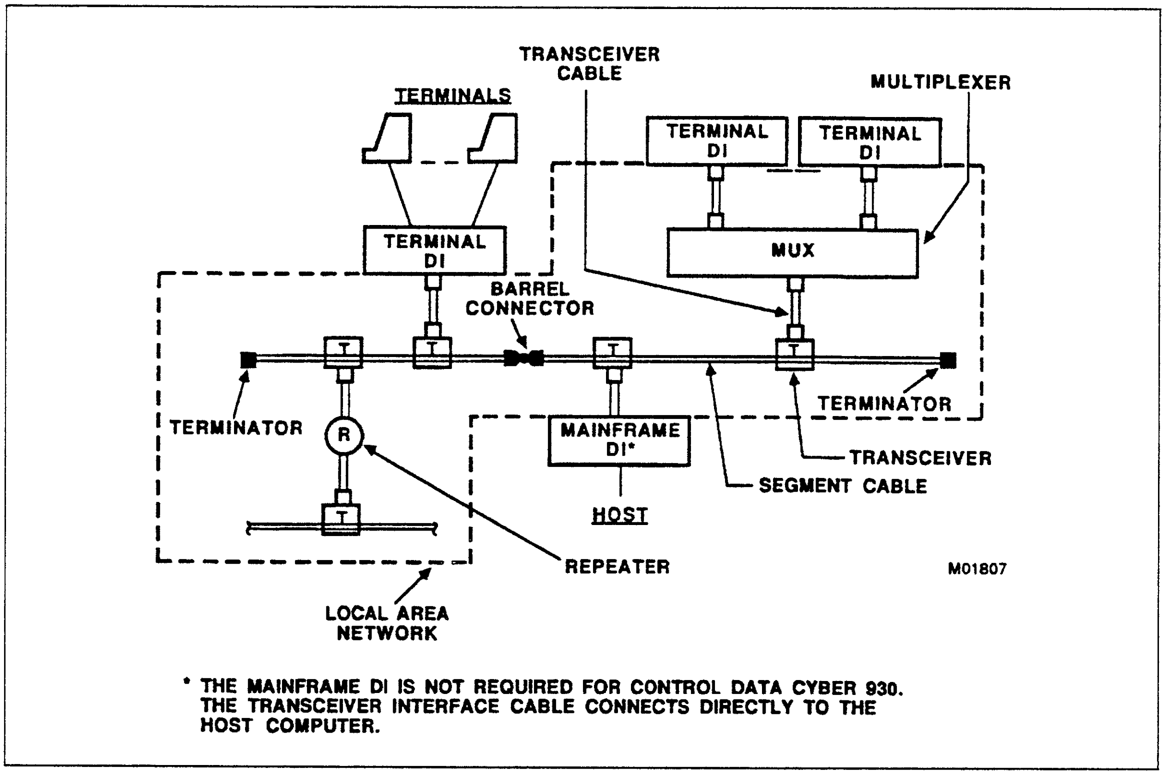

Figure 1-1. Basic LAN Configuration

The first stage of the planning is to determine what equipment will connect to the network. This is normally done by the sales representative working with the customer. Assuming that the initial planning is done and you know what will be in the network, the remaining tasks are as follows:

1. Planning the cable route according to where device interface (DI) cabinets will be located.

2. Installing the segment cable and related components.

3. Installing the device interfaces and verifying that they are operating properly.

Steps 2 and 3 above are covered in chapters 2 and 3 of this manual. This chapter concentrates on the first step, planning the cable route and location of components. Topics discussed are:

- Specifications of network components - Lists temperature, space, and other specifications for network components.

- Types of components used in the network - Brief descriptions of the various network components.

- Evaluating the building - Factors that can affect how you route the cabling (for example, the type of construction).

- Providing power for the network - Factors to consider when planning network power requirements.

- Guidelines for routing cables - Routing methods, and problems to avoid when routing the cables.

- Creating the floor plan layout - Procedure for creating a floor plan that shows where components will be installed.

- Creating the network schematic - Guidelines for creating a schematic diagram of the network.

Specifications of Network Components

Tables 1-1 through 1-3 list the environmental and electrical specifications for the device interface, transceivers, repeaters, and multiplexers. Figure 1-2 shows the dimensions of these components.

Table 1-1. Device Interface Specifications

Specification	Value
Temperature	
- Operating	10 to 40° C (50 to 104° F)
- Non-operating	-40 to 60° C (-40 to 140° F)
- Change per hour	10° C (18° F)
Humidity	
- Operating	20 to 80%
- Non-operating	5 to 95%
- Change per hour	10%
Max Dew Point Temperature	26.1° C (79° F)
Input Power	
- Voltage Range	104 to 128 V at 59 to 60.6 Hz or 191 to 256 V at 49 to 50.5 Hz
- Phases	1
- Circuit Protection	Use separate 1 phase, 15-A circuit for each DI (also see Providing Power for the Network, later in this chapter)

Table 1-2. Transceiver Specifications

Specification	Value
Temperature Range	
- Operating	5 to 55° C (41 to 131° F)
- Non-operating	-20 to 90° C (-4 to 194° F)
Humidity	5 to 95% (no condensation)
Power	10 to 15 V dc (500 mA Maximum)

Table 1-3. Repeater and Multiplexer Specifications

Specification	Value
Temperature	0 to 40° C (32 to 104° F)
Humidity	10 to 95% (no condensation)
Input Voltage Range	98 to 132 V ac or 198 to 264 V ac (50 or 60 Hz)
Max Power Consumption	50 VA

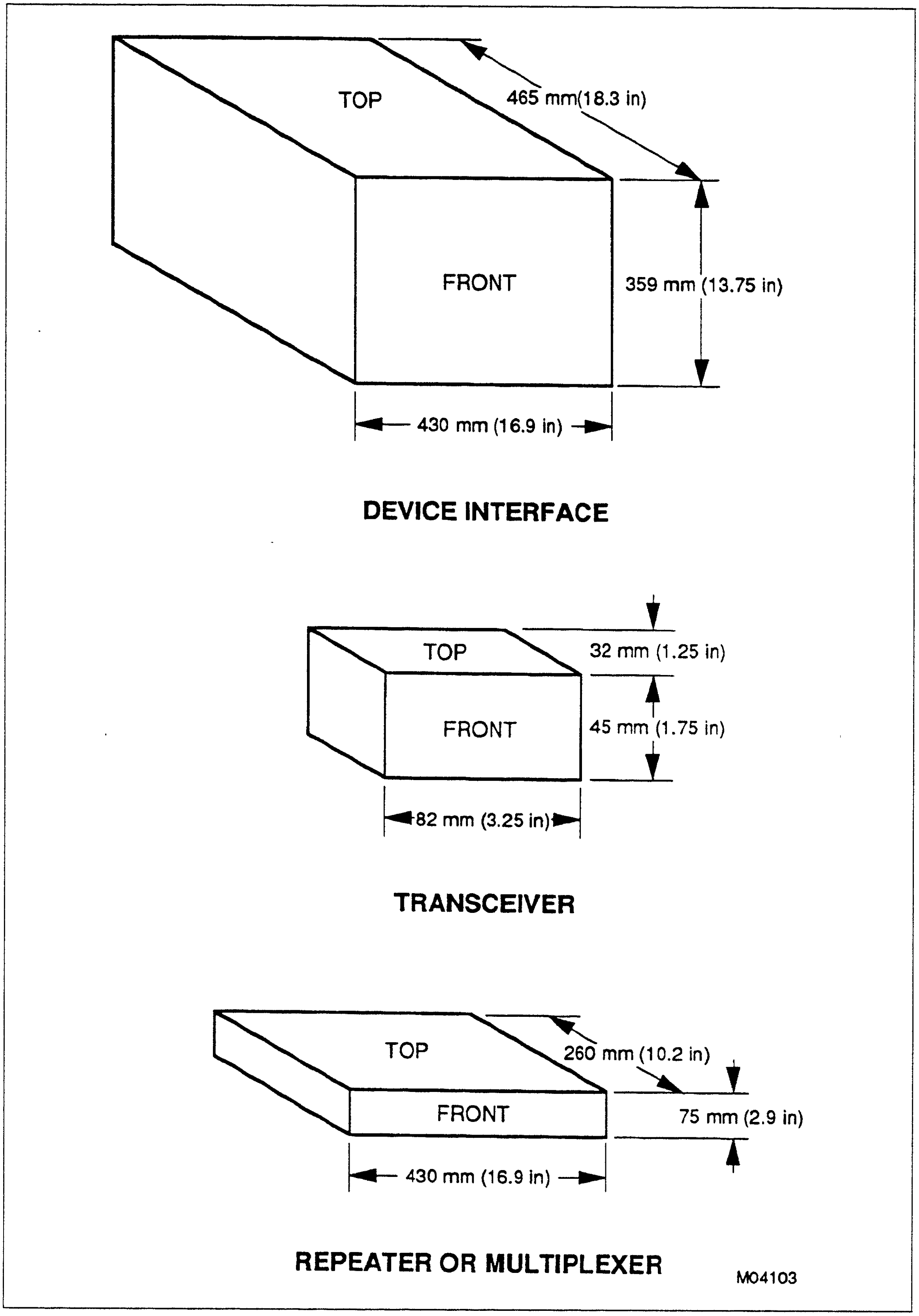

Figure 1-2. Dimensions of Components

Types of Components Used In the Network

You must also be familiar with network components to properly plan the physical layout. The following paragraphs provide brief descriptions of various components used in the network.

For more detailed information on components supplied by Control Data, refer to the CDCNET Product Descriptions manual (see Related CDCNET Manuals). You can also refer to IEEE standard 802.3 or one of the other references listed under Other Related Documents.

Chapter 10, Replacement Parts Information, gives part numbers for components available from Control Data, as well as a list of other vendors that provide network components. Chapter 10 also has a product-to-equipment number cross-reference table.

The components covered in this chapter are:

- Segment Cable
- Transceivers
- Transceiver Interface Cables
- Device Interfaces (DIs)
- Repeaters
- Multiplexers
- Cable Connectors and Terminators
- Special Tools and Kits
- Fiber-Optic Components

Segment Cable

The segment cable (also called Ethernet cable) is a constant impedance coaxial transmission line that connects the network devices. The recommended cable is a Teflon[1] coated coaxial cable having a characteristic impedance of 50 ±2 ohms. This impedance value and tolerance are critical to the proper operation of the network. The maximum length for the segment cable is 500 m (1640 ft). You must install terminators at each end of the cable. Control Data coaxial cables come with N-connectors and terminators installed.

If possible, make each segment cable from one homogeneous cable. If you must build a cable segment by joining smaller sections, use sections that have the same manufacturer and lot number. If you must mix manufacturers or lot numbers, choose a length such that reflections do not have a high probability of adding in phase. Therefore, cable lengths that are odd integral multiples of half-wave lengths at 5 MHz are recommended.

Control Data segment cabling is available in four standard lengths. Lengths are determined using the following ISO/DIS relationship:

$$\text{Segment length} = \frac{\text{Cable propagation delay}}{\text{Data bit rate}} \; N$$

Where: N = odd integer (1, 3, 5, 7 . . . 21)
Tolerance = $\pm$ 0.5 m

$$\text{Example: } \frac{(0.78)3 \times 10^{8}}{(2)5 \times 10^{6}} \; 3 = 70.2 \text{ m}$$

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Appendix B gives Control Data part numbers for the various lengths of Teflon and PVC segment cables (where n = 1, 3, 5, and 21). Use any combination of the cables as long as total length does not exceed 500 m (1640 ft).

Transceivers

Transceivers provide both the electronics and the required electrical isolation to send and receive the encoded signals on the segment cable. They connect directly to the segment cable (via tap blocks). When installed on the segment cable, each transceiver must be at least 2.5 ± 0.05 m (8.25 ± 0.165 ft) apart. The segment cable is marked at those intervals (8.25 ft) to simplify installation.

A transceiver receives 10 to 15 V dc power from the attached data terminating equipment (DTE) through the transceiver interface cable. The DIs and multiplexers are examples of data terminating equipments.

Figure 1-3 shows a TN111A and its associated tap block (YA300A). The TN111A is no longer available from Control Data but you may encounter it in older installations.

Figure 1-4 shows a TN111B transceiver and its YA331A tap block. The TN111B is an 802.3 compatible device and includes a signal quality error (SQE) test that can be enabled or disabled. You must disable the SQE test (also called heartbeat test) when connecting the transceiver to a 802.3 repeater (such as the TN112C).

1. Teflon is a trademark of the Dupont Corporation.

Five LEDs (light emitting diodes) on the front of the TN111B indicate power (PWR), signal quality error test (SQE), transmit (XMT), receive (RCV), and collision presence (CP). These LEDs help the network troubleshooter to monitor network events.

Transceiver Interface Cables

Use a transceiver interface cable to connect a transceiver to a device interface (DI), Integrated Communications Adapter (ICA), repeater, or multiplexer. This allows those devices to access the network.

The maximum allowable total length of a transceiver cable is 50 ± 0.05 m (164 ft). You should use a single continuous length of cable to connect a user device to a transceiver. Theoretically, multiple lengths of interface cable can be connected together (chained) like extension cords, but each additional connector degrades reliability and performance. If chaining is deemed necessary to meet an unusual layout requirement, you may chain up to two lengths of cable. Chaining of more than two lengths is not recommended. Also, for each additional length used, the total allowable length is reduced by 8 m (26.4 ft). Refer to appendix B for the part and equipment numbers of the cables.

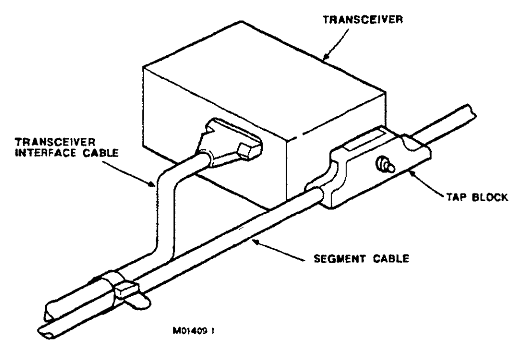


Figure 1-3. TN111A Transceiver and YA300A Tap Block

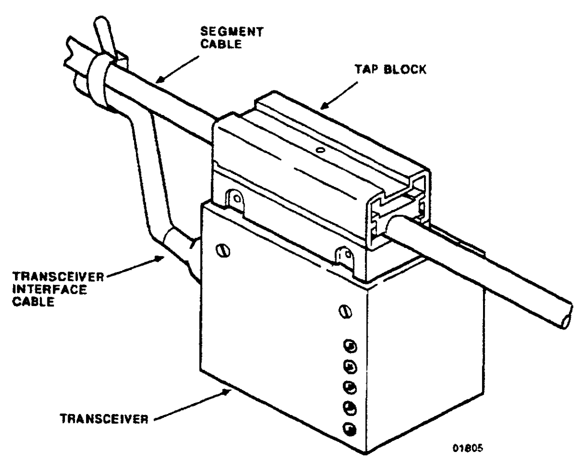


Figure 1-4. TN111B Transceiver and YA331A Tap Block

Device Interfaces

Figure 1-5 shows a device interface (DI). Several types of DIs can be configured. The purpose of each type is a function of both the physical configuration and the loaded software. Every DI has three basic components.

1. Basic DI - Includes power supply and enclosure, a main processor board, and a bus structure for up to eight large and eight small PC boards.

2. Memory - Available in 1024 or 4096 K byte versions.

3. I/O Interface - At least two I/O interfaces per DI.

The following types of DIs perform commonly required network functions.

- Mainframe DI (MDI) - The MDI enables data to be transmitted between a 12-bit CYBER host channel and the network. An MDI is not required by the CYBER 930 computer system, because an Integrated Communications Adapter (ICA), which is resident in the host computer, performs the functions of an MDI.

- Terminal DI (TDI) - The TDI enables you to connect terminal devices to the network.

- Mainframe/Terminal Device Interface (MTI) - The MTI is a combination MDI and TDI that enables you to connect terminal devices directly to a CYBER host without using a local area network. Essentially, the MTI is an entry-level unit. As your site adds hardware and expands into a local area network, you can reconfigure the MTI into an MDI and TDI by using an MTI conversion kit.

- Network DI (NDI) - The NDI provides access from CDCNET to other networks by using two types of connections. In one, it connects a remote CDCNET to a local CDCNET using medium-speed links such as High-Level Data Link Control (HDLC). In this case, the NDI acts as a relay unit in an essentially unified network.

  Alternatively, the NDI software may contain a special gateway to connect CDCNET to an outside network based on other architectures.

- Remote Terminal DI (RTI) - The RTI functions as a remote line concentrator for RS-232 lines. At least one line must connect to a dedicated HDLC link (4800 to 64000 bps). The HDLC link may be an RS-232, RS-449, or V.35 line.

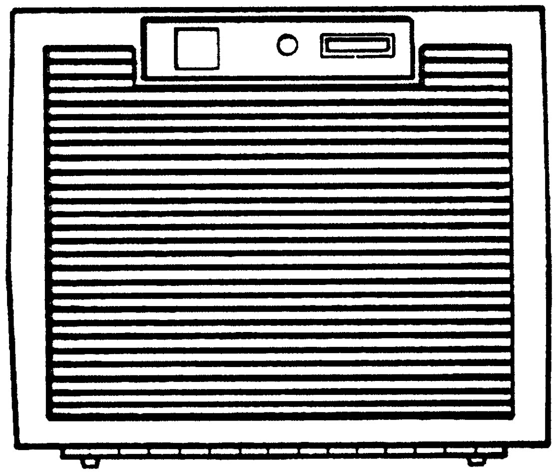


Figure 1-5. Device Interface

Repeaters

The TN112C repeater (figure 1-6), allows you to connect two segments of a local baseband 10 M bps CSMA/CD network in compliance with IEEE 802.3 standards. It thereby extends the network beyond one 500-m (1640-ft) length of coaxial cable. This repeater meets ISO DIS 8802/3 and IEEE 802.3 standards.

You connect the repeater to a segment cable by connecting a transceiver interface cable between it and a transceiver. To comply with IEEE 802.3 standards, use either a transceiver without an SQE (signal quality error) test, or disable the test.

The repeater is fully enclosed with sheet metal for wall or 48.2 cm (19 in) shelf mounting, or for free-standing use. Front panel lamps indicate internal power, packet activity, and partitioning of port 1 and port 2.

To install a repeater, first attach a transceiver to each of the two segment cables being connected by the repeater. Attach the transceivers at any of the placement marks on the segment cables, then connect interface cables from each transceiver to the repeater.

The maximum number of repeaters between any two communicating transceivers on the network is two. This restricts the maximum separation of any two DIs to 1800 m (5940 ft), which is equivalent to three 500-m (1650-ft) segment cables plus six 50-m (165-ft) transceiver interface cables. However, many repeaters can be used to create branches, as required. An exception to the 1800-m (5940-ft) limitation is when a fiber-optic link is used to connect two coaxial cable segments. The fiber-optic link provides an additional separation of up to 1000 m (3300 ft), or a maximum separation of 2800 m (9240 ft) between any two DIs in the network. For examples of repeater usage, refer to the typical network configuration diagrams at the end of this chapter.

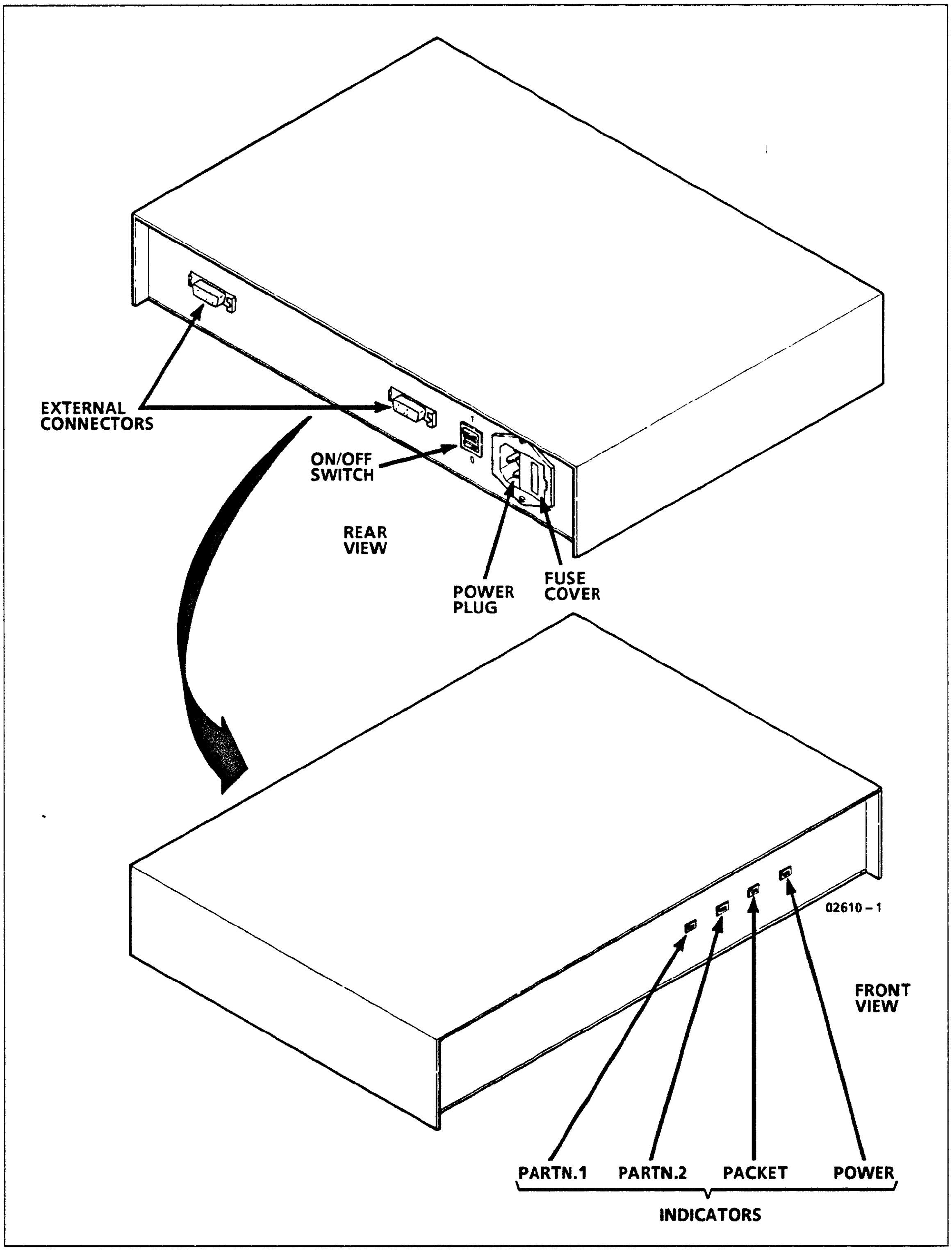


Figure 1-6. TN112C Repeater

Multiplexers

The TN114B multiplexer (figure 1-7) allows up to eight devices to access the network through one transceiver connection. As shown on figure 1-7, the multiplexer provides eight ports for connection of external data processing equipment and one port for connection to a transceiver. This multiplexer meets ISO DIS 8802/3 and IEEE 802.3 standards. Figures 1-8 and 1-8 show how a single multiplexer can be configured into networks with and without a segment cable. Connect the multiplexer to the network with the transceiver interface cables described earlier in this chapter.

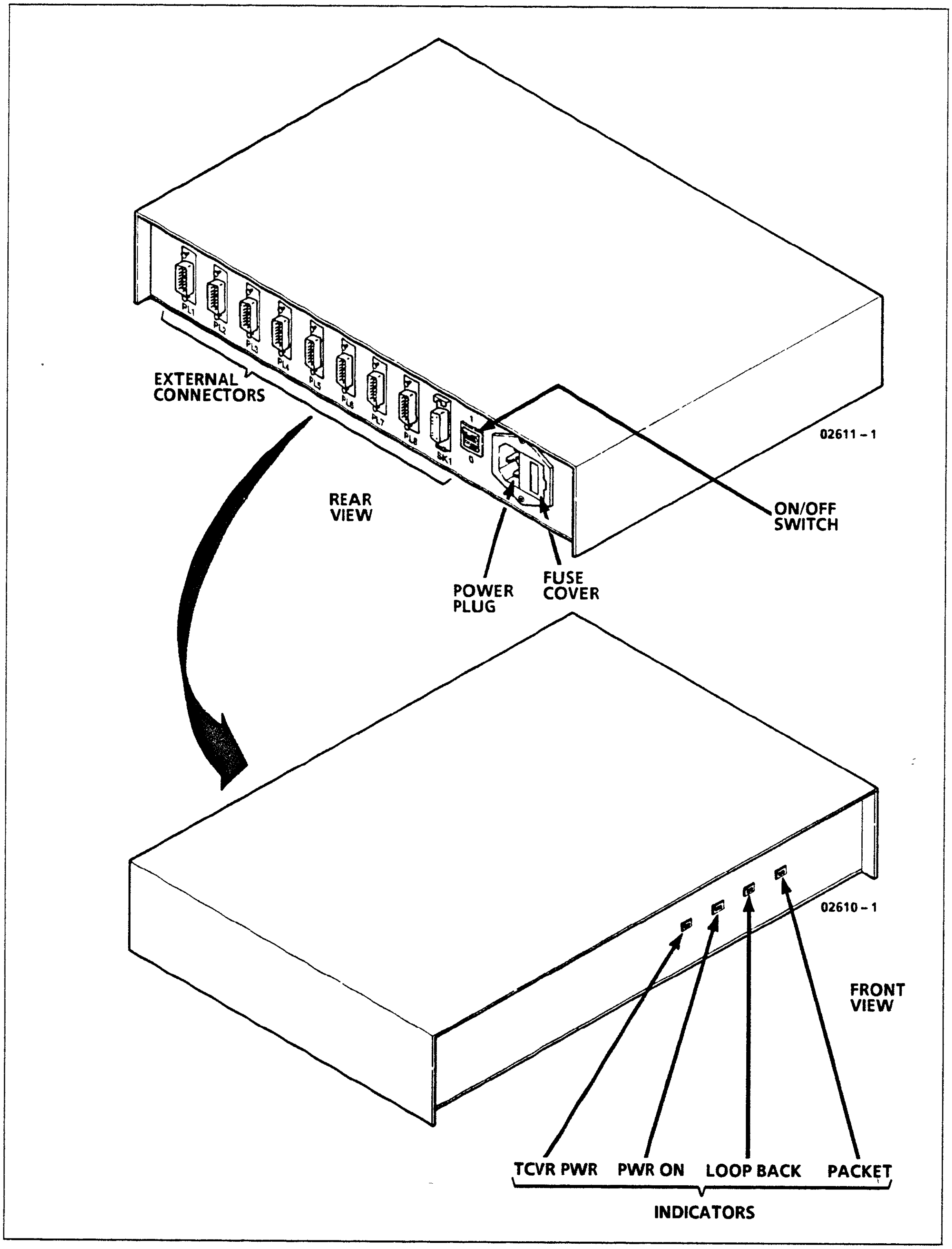


Figure 1-7. TN114B Multiplexer

When the multiplexer connects to a segment cable (figure 1-8), the connection is made through an 802.3 transceiver (such as the TN111B). The maximum distance between a DI and the transceiver is 40 m (131.2 ft).

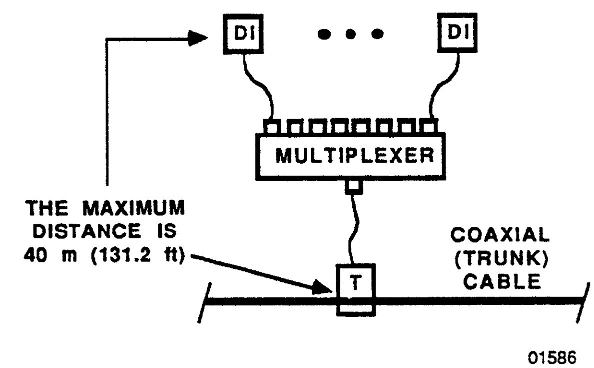


Figure 1-8. Cable Network Using a Single Multiplexer

If the transceiver is not present (figure 1-9), the unit automatically self-configures to operate without the segment cable (standalone or loopback mode). The maximum distance between a DI and the multiplexer is 50 m (164 ft). Using a single multiplexer, you can configure cableless networks of up to 100 m (328 ft) in diameter. When used in this way, the multiplexer simulates the functions of a transceiver except for jabber control, and its operation is transparent to the connected equipment. In a cableless or standalone network using a single multiplexer, the maximum length of any transceiver interface cable is 50 m (164 ft).

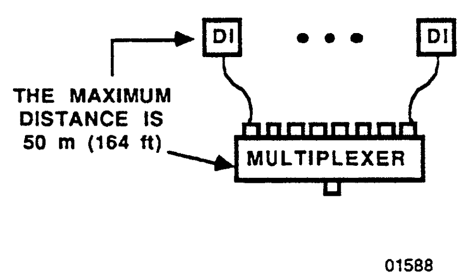


Figure 1-9. Cableless Network Using a Single Multiplexer

You may connect multiplexers in series (cascaded) if more than eight ports are required. Figures 1-10 and 1-11 show how multiplexers can be cascaded when used in networks with and without a coaxial segment cable, respectively. When cascading multiplexers in a cable network, reduce the maximum distance (50 m or 164 ft) between a DI and the transceiver by 10 m (32.8 ft) for each multiplexer used. When you cascade multiplexers in a cableless network, reduce the maximum distance (1000 m or 3280 ft) by 10 m (32.8 ft) for each multiplexer used.

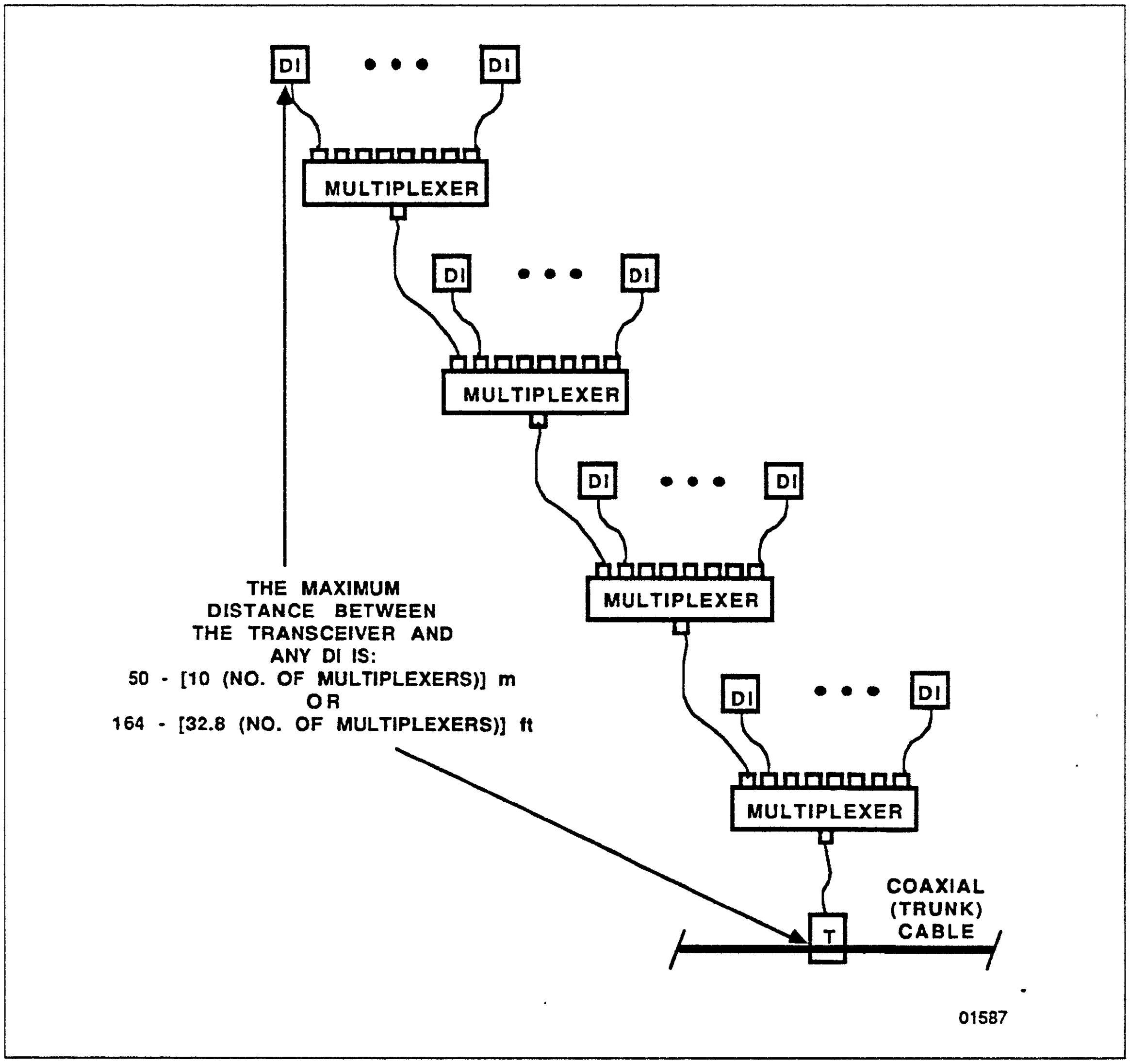


Figure 1-10. Cable Network Using Cascaded Multiplexers

Stated in mathematical terms, the maximum permissible length of cable between a DI and the transceiver in a cable network, or between two DIs in a cableless network is:

Maximum (meters) = 10 x (no. of multiplexers) + sum of transceiver cable lengths

Maximum length for a cable network = 50 m
Maximum length for a cableless network = 1000 m

Maximum (feet) = 32.8 x (no. of multiplexers) + sum of transceiver cable lengths

Maximum length for a cable network = 164 ft
Maximum length for a cableless network = 3280 ft

The multiplexer is fully enclosed with sheet metal for wall-mounting or 19-in shelf mounting, or for free-standing use. Front panel lamps indicate internal and transceiver power, packet activity, and loopback status.

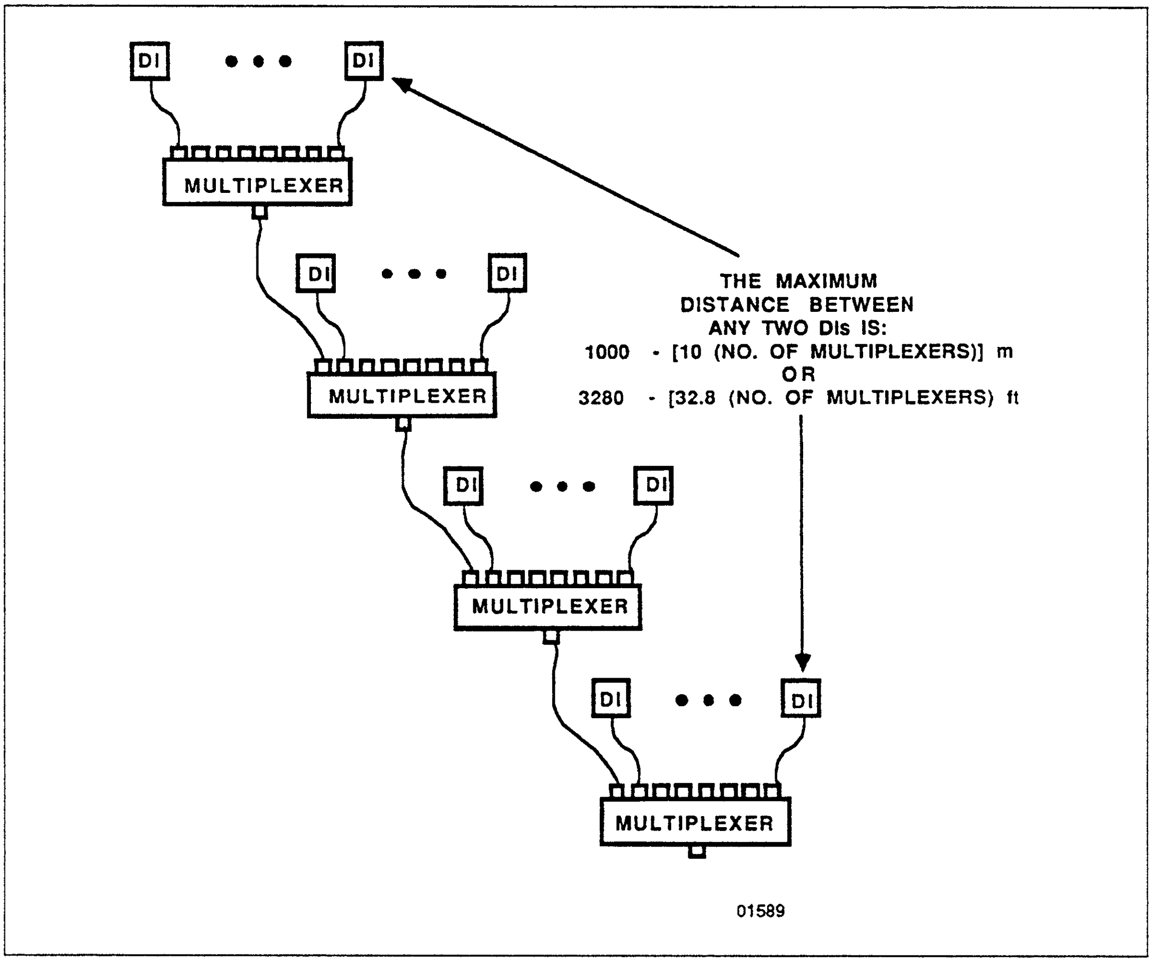


Figure 1-11. Cableless Network Using Cascaded Multiplexers

Cable Connectors and Terminators

Figure 1-12 shows the connectors used to join lengths of segment cable. The figure also shows the type of terminator to install at each end of the segment cable. The network will not operate correctly if the terminators are not installed.

- Cable connector; type N male plug connector, Control Data part number 15386115
- Cable connector; type N female barrel connector Control Data part number 15386110
- Cable connector; type N 50-ohm terminator Control Data part number 15386105

Grounding Clamp

You must ground the braid shield of each segment cable. For proper operation, the cable can be grounded only once per segment.

To ground the cable, attach a clamp (figure 1-12) to a barrel connector or terminator and run a 16-gauge bare copper wire to the nearest incoming mains feeder. Attaching the grounding clamp to a terminator connector is recommended. The Control Data part number for the grounding clamp is 94275202.

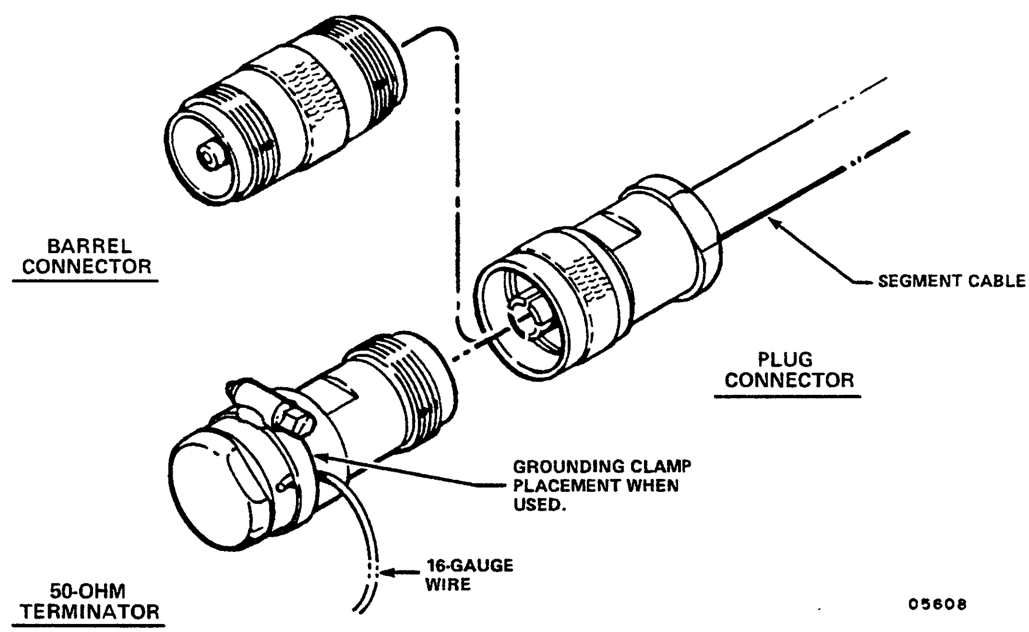


Figure 1-12. Coaxial-Cable Connectors and Grounding Clamp

Special Tools and Kits

The following kits are available to aid in the installation and repair of the network components.

Cable-Tap Tool Kits

Figure 1-13 shows the tool kit (Control Data part number 53585366) for installing the YA300A tap block (used with TN111A transceiver). The kit includes three separate hand tools for drilling holes into the segment cable:

- Coring tool (Control Data part number 12263657)
- Shield removal tool (Control Data part number 12263663)
- Insulation-piercing tool (Control Data part number 12263665)

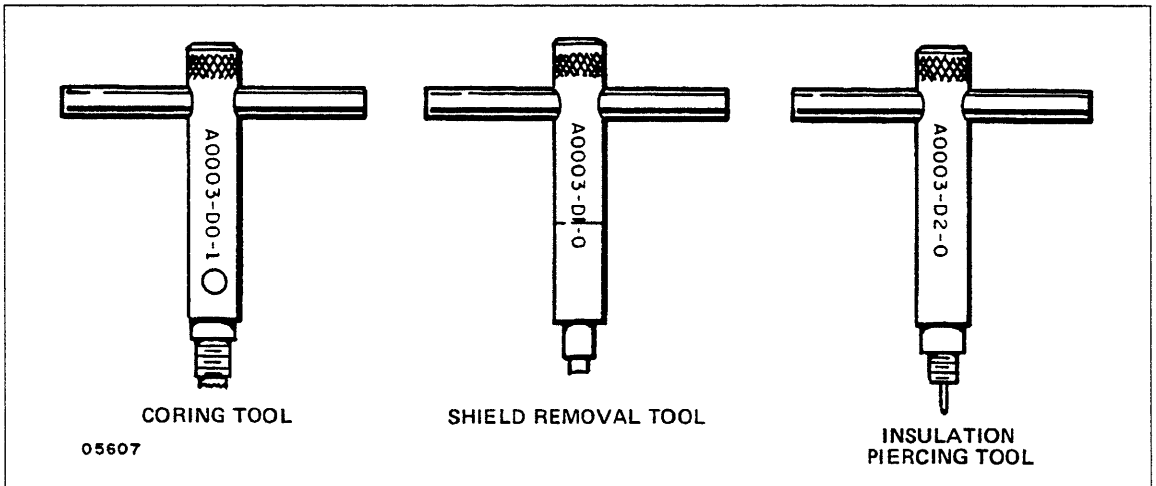


Figure 1-13. Cable-Tap Tool Kit for YA300A Tap Block

Figure 1-14 shows the tool kit for installing the YA331A tap block (used with the TN111B transceiver). The kit includes a 1/8-in hex wrench and a hand tool. The hand tool has a drill bit at one end for drilling holes in the segment cable and a socket wrench at the other end for tightening the center probe of the tap. The Control Data part number of this kit is 22137341.

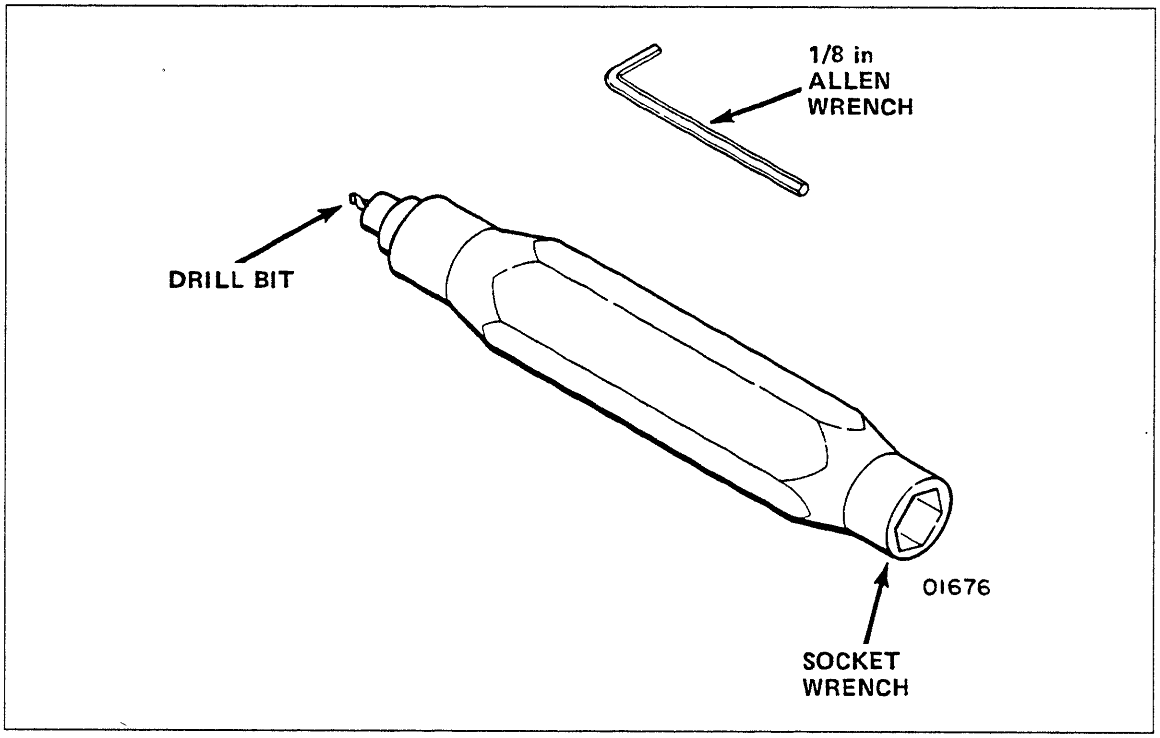


Figure 1-14. Cable-Tap Tool Kit for YA331A Tap Block

Splice Kit

The YA302A splice kit (Control Data part number 53585364) is used to repair faulty coaxial cables and to add additional lengths of cable. The kit consists of:

- Two type N male plug cable connectors
- One type N female barrel connector
- 30.48 cm (12 in) of 2.54-cm (1-in) diameter insulation sleeving

Terminator Kit

The YA301A terminator kit (Control Data part number 53585365) contains terminators and related hardware needed to terminate each end of the coaxial segment cable with a characteristic impedance load of 50 ohms. It also contains grounding clamps and wire for grounding the segment cable. The kit consists of:

- Two type N 50-ohm terminators
- Two type N male plug cable connectors
- 60.96 cm (24 in) of 2.54-cm (1-in) diameter insulation sleeving
- 91.44 cm (36 in) of 16-gauge solid copper wire
- Two grounding clamps

Fiber-Optic Components

Some installations may require fiber-optic links. For example, if the network passes through areas where it is exposed to lightning, electrical noise, or extreme temperatures. Fiber-optics are also recommended if the data requires maximum security. Control Data does not provide fiber-optic products, however chapter 10 has information on suppliers and manufacturers.

Evaluating the Building

The first step in laying out the physical network is to become familiar with the building. Office buildings warehouses, and manufacturing premises vary considerably in construction. Survey the site thoroughly with assistance from the site service manager or others responsible for, and familiar with, the premises.

When doing the survey, use the form shown on figure 1-15. This form will help both with evaluating the building and routing the cables, which is covered in the next topic.

Three important things to consider when evaluating the building are:

- Is it a new or an existing building?
- Who owns the building?
- How is the building constructed?

These items are discussed in the following paragraphs:

Is It a New or an Existing Building?

Existing Building

A major consideration in an existing building is how much of it to cable. Even when the network occupies only part of a building, it may be best to cable the entire building. The building owner and any other occupants should be contacted for their approval. Cooperation between the parties could be beneficial to all. The building owner would be able to regard the facility as a future asset by enhancing its market value. It would also provide the other occupants with networking capabilities at a significantly reduced installation cost.

New Buildings

New buildings provide a unique opportunity for installing network systems. Provisions can be made by the architect for concealed ducting to accommodate the segment and drop cables. Data ports can be provided as required in each office. Central points could be allocated for shared services such as printing, where extra cabling and outlets are needed.

Who Owns the Building?

Is the building owned or leased by the customer? Outright ownership of the building should present the fewest restrictions. A lease can be restrictive. For example, a lease could prohibit installation of segment cables or restrict how they are installed. A lease could also permit only the owner to install the cable. Or, it may require the tenant to submit plans for approval prior to installation.

1. Is building owned or leased? ____________________

2. Name and telephone number of lease holder _______________________

3. Do any ceilings have removable panels or access doors? ________________

4. Are any of the false ceilings used as an air (plenum) return? ____________

5. Will any of the cabling be run in the walls? _________________

6. Are the walls:
   a. Cement block? __________
   b. Plaster? _______________
   c. Standard wall board easily penetrable? ________________
   d. Tile? ______________
   e. Other? _____________

7. If cable is to be run in a false ceiling:
   a. Is there sufficient room for a 250-mm radius bend where needed? _______
   b. Is there room for mounting a tap block and transceiver? ____________
   c. Will there be firewalls to penetrate? ____________

8. If cable is to be routed between floors:
   a. Is there access from the false ceiling into (or out of) the telephone closet? __
   b. Is there access from one telephone closet to the one above (or below)? ____
   c. Is there an air shaft or pipe chase that can be used between floors? _____

9. If cable is to be routed under a false floor:
   a. Is the area deep enough to accommodate the cable? ____________
   b. Is there a path that can be used to avoid pipes, congested areas, electrical wires, and conduit? ____________
   c. Is the floor itself earth-grounded? _____________

10. If cable is to be routed between buildings:
    a. Is connective conduit available? ____________
    b. Is the conduit large enough to accommodate the cable and 250-mm (10-in) radius bends? ____________
    c. How many access manholes are there? ____________
    d. How far apart are the manholes? ____________
    e. Will it be necessary to route cable on telephone poles? ____________
    f. Will a fiber-optic link be used? ____________

11. Your remarks: (Name and telephone number of building maintenance engineer that can be contacted for difficult routing areas, and other problems).

Figure 1-15. Survey Form

How is the Building Constructed?

CAUTION

The building must have sufficient lightning protection to safeguard the network. Tall wooden structures are particularly vulnerable to penetration. For protection, contact a local electrical contractor who specializes in lightning conductors.

Building structure is the largest factor affecting the cost of cable installation. The following are important considerations related to structure.

- Ceilings - T-bar suspended ceilings are best for routing the segment cable. It is also easier to route between floors if the building has usable risers. If the building has those characteristics, few structural modifications will be required. However, concealed spline ceilings are common in modern high-rise buildings and can cause an access problem.

- How many floors will the network occupy? If the network equipment is to be located on more than one floor, you need a suitable method of routing the cable between floors. It will be easiest if there are risers that have room for the cable. In a crowded riser, fiber-optics can be used. If no risers are available, you must find other other ways. Concrete core drilling, wireways, conduits, and air ducts are among the things to consider. The facilities manager or a local contractor may provide advice on this issue.

WARNING

The device interface (DI) has a switching type power supply. If power comes from a 3-phase, 4-wire, wye branch or feeder circuit, ensure that the circuit meets the latest requirements of the United States National Electrical Code and/or other local or country regulations. Failure to meet these requirements may cause hazardous conditions due to high currents and heating in the neutral conductors and transformers supplying the unit (see text below).

Providing Power for the Network

A very important consideration is providing power for the device interfaces and other components. During the planning you must determine how much power is needed and whether the existing circuits can provide it. This is particularly important in a large network where many devices will require power. Also ensure that outlets are available where you need them. The CDCNET Product Description manual gives the power requirements for each device (also see Specifications of Network Components, earlier in this chapter).

Take special precautions when planning DI power requirements (see warning above). Notify facility electricians that the DIs use switching power supplies. A characteristic of this type of supply is that the neutral current in the facility 3-phase line feeding the wall box may be as high as 1.73 times the line current. The facility 3-phase neutral line must be large enough to handle this current. When measuring the current on the 3-phase lines, a true RMS (Root Means Square) meter must be used because of the distorted current waveform.

Planning the Cable Route

Before starting to install the network, carefully plan the route and location of all components. Some factors to consider are: local codes, aesthetic values, security, cost, environment, and maintainance. As mentioned earlier, make a detailed inspection first, to ensure that the best route is chosen. The following describes precautions and guidelines along with suggested methods for routing the cables.

Cable Routing Precautions and Guidelines

- Do not expose the cables to the possibility of being struck by lightning.

- Avoid areas where electrical noise is present. High-power electrical plants may produce switching transients and radio frequency emissions that will induce interference in the segment cable. The construction of the cable and error detection features of the network normally prevent any data errors that are perceptible to the user. Avoid possible problems by keeping network cables at least 10 m (33 ft) from any source of high-energy emissions (such as elevator contactors, arc lighting or uncompensated fluorescent lighting, electrical welders, ac substations, generators, and commutators). It is also a good practice to avoid running signal lines parallel to and within 7.62 cm (3 in) of power wiring for distances of more than 30 cm (1 ft).

- Avoid areas where mechanical damage is likely. If that is not possible, provide adequate protection. This is an obvious precaution but still must be highlighted because prolonged downtime on data networks cannot be tolerated.

- Choose a route that will make it easy to access the cables. Easy access will simplify any future network extensions, rerouting, or repair.

- Install the segment cable in sections to allow break points for system troubleshooting and testing. This also facilitates network expansion and enhancement.

- Choose the route least likely to be disturbed. The separate sections are joined using standard N-series coaxial connectors, and these connections should be disturbed as little as possible.

- Choose the shortest route. A shorter route has less chance of being damaged and also costs less to install.

- Label the segment cables. Segment must always be labeled to allow easy identification. The recommended method is to apply at least one label per each visible cable section, and at least one label per every 8 m (26.4 ft) of cable installed in one area.

Methods for Routing the Segment Cable

There are several possibilities for routing the segment cable. It can be routed above a suspended ceiling, under the floor, in floor conduits, in the wall, or on the wall. The best way is to route the cable above the ceiling, out of the way. The building construction will probably determine the method. Several possibilities are described in the following list.

NOTE

The segment cable can only be grounded at one point on the cable. Therefore, insulate transceivers and metal connectors to prevent their contact with ground. Avoid bolting transceivers to I-beams or other grounded supports.

- Suspended ceilings - Segment cable can easily be installed in the suspended ceiling in areas where the ceiling tiles can be removed for access. If you must penetrate the firewall, note it on the installation floor plan (ensure that local fire regulations are obeyed). Using tie-wraps, secure the cable to the ceiling hangers every 2 to 3 m (6.6 to 9.9 ft).
- Floor conduits - Many concrete floor structures have wireways running in the floor. These wireways can be used to route sections of segment cable that do not have transceiver taps connected. When routing through a conduit, be careful not to crush or crimp the cable, or bend it to less than a 250-mm (10-in) bend radius.
- Raised floors: The segment cable can be laid under the floor in the normal manner. Again, be careful not to crush or crimp the cable or bend it to less than a 250-mm (10-in) bend radius.
- Return air plenums - Many new structures use the suspended ceiling space for return air plenums. Local fire regulations restrict PVC-type cable, so caution must be used if specifying PVC segment cable. Teflon cable is rated for this type of environment and is recommended for use by Control Data. Do not use standard PVC cable in air plenums.
- Between buildings/hazardous environments: See the following caution.

CAUTION

The segment cable may pass outside buildings only if it is fully protected from being struck by lightning. An optical fiber-based inter-repeater link should be used to connect the network through areas where it may be exposed to lightning, electrical noise, or extreme temperatures. Fiber-optics are also recommended if the data will require maximum security. Fiber-optic cable requires a special fiber-optic transceiver. Control Data does not provide fiber-optic components, but chapter 10 has information on suppliers and manufacturers.

Methods for Routing Transceiver Cables

Two methods are recommended for running the transceiver interface cable from the transceiver to the DI, multiplexer, repeater, or host computer. These are:

- Suspend the cable from the ceiling or wall and attach it to the equipment.
- Route the cable inside a wall, through an outlet (data port), and then attach it to the equipment by a separate cable. Ensure that there is electrical continuity between the transceiver cable and the equipment.

Creating the Floor Plan Layout

When you know where to route the cables (ceiling, floor, walls, or wherever), you are ready to lay out the network floor plan. This process is described in the following steps:

1. Carry out the survey and complete the network site requirements survey form. This form is to be submitted to the Control Data Computer Network Services representative (or other customer network services representative), together with the floor plan. Write in any pertinent information or comments you have concerning the facility.

2. Obtain floor plan: Obtain a floor plan from the facilities manager, architect, or other appropriate source. If a floor plan is not available, have one made or draw a sketch and note the relevant measurements. You will use the floor plan to show the path that the segment cable takes between devices and to compute its total length. This will help you determine the size and number of cable sections, and which other network components are required.

3. Show all network equipment locations on the floor plan. For cable layout planning purposes, you should also indicate where you may add things in the future. Figure 1-16 shows device symbols and abbreviations. Number each equipment label with its own unique identification number and show this number on the floor plan.

   NOTE

   The DI is classified as category 2 equipment as defined in the American National Standards (ANSI) S1.29. This standard specifies that category 2 equipment is intended for installation in large offices or retail stores. The noise level of this equipment may make it unsuitable for installation in private offices or other small areas.

4. Establish DI locations:

   - Locate the Device interface equipment (DI) so it is readily accessible to both users and support personnel. Also make sure that power is available.
   - Put the transceiver for a DI at any of the 2.5-m (8.25-ft) placement marks on the segment cable. The transceiver cable length determines the distance that the DI may be from the segment cable.
   - Remember to include the vertical rise when determining the distance from the equipment to the transceiver.

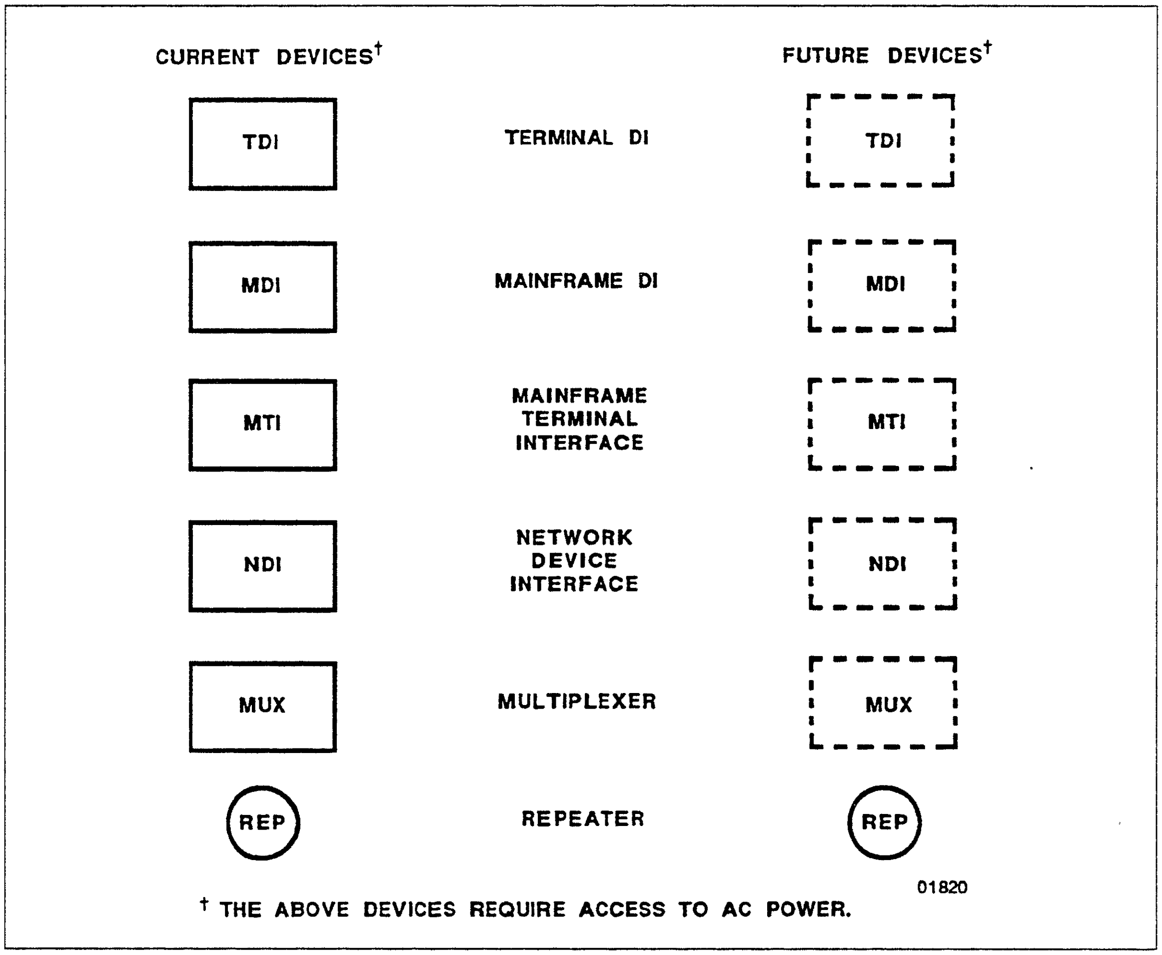


Figure 1-16. Device Symbols/Abbreviations

5. Determine the area to be served by the segment cable according to the following:

   - The total radius in which user devices (such as terminals) can be placed is determined by the length of transceiver cables minus the vertical rise and horizontal allowance for moving the equipment during service or repair.

   - The maximum length of transceiver interface cable for each transceiver should not exceed 50 m (165 ft), nor be in more than two pieces.

   - The early planning phase should allow an extra 4.5 m (14.85 ft) when the segment cable is installed in a suspended ceiling and 1.5 m (4.95 ft) when it is under a raised floor.

6. Identify the cable route on the floor plan. Factors affecting the segment cable route are:

   - Total length of a single network segment cable may not exceed 500 m (1640 ft).

   - The longest data path in the network may have a maximum of three 500 m (1640 ft) segment cables with a repeater between each segment (maximum of two repeaters in series). Note that one of these repeaters may be replaced by a fiber-optic link of up to 1000 m (3300 ft).

   - When covering larger floor areas, it may be more cost effective to use longer transceiver interface cables, rather than running extra segment cables. This saves both segment cable and repeaters. However, the segment cable must be within 50 m (165 ft) of the DI, repeater, or multiplexer.

   - The segment cable carries low-voltage, low-current signals. Best performance is achieved by keeping the cable at least 10 m (33 ft) from any source of high-energy emissions, such as elevator or lift contactors, electric-arc welders, or ac substations.

   - Route segment cable sections so that connectors are conveniently located for installation and maintenance. Also, assign each segment cable a unique identifier. This makes it easy to identify the cables when expanding or maintaining the system.

   - Mix segment cable lengths as necessary to conveniently locate connectors (available lengths are listed in the Segment Cable discussion earlier in this chapter).

   - Do not put connectors in risers or conduit. If connectors must be enclosed, install pull boxes in the conduit to house them. When connectors are placed in risers, a strain relief should be used to relieve them from stress due to the weight of the cable. Support a vertical cable every 3 or 4 m (9.9 or 13.2 ft), regardless of where it is installed.

   - If a length of segment cable exceeds 500 m (1650 ft), install a repeater to ensure reliable performance of the network.

7. Compute the length of the segment cable required to reach the equipment. Allow additional cable length in order to route around obstacles and for other contingencies. Remember the minimum 250-mm (10-in) bend radius when calculating the length of segment cable required.

8. Mark the floor plan to show the approximate location of terminators, repeaters, multiplexers, connectors, transceivers, and transceiver interface cables. Make sure power is available for these devices.

9. Attach a written list of all network equipments (such as workstations and repeaters) that are located on the floor plan.

10. Submit the floor plan and the network site requirements survey to the network installation engineer for editing, approval, and cost estimates of components and contractor services.

Creating the Schematic Layout

A schematic layout is a simplified diagram of the network configuration. While a schematic layout cannot show detailed placement of the network components (such as workstations, transceivers, and cables) as a floor plan can, it provides a good snapshot of the network design. You can quickly determine how many sections of what lengths make up a given segment of coaxial cable, if multiple segments exist, if repeaters exist, the number of barrel connectors used to connect the cable sections, and the number of different floors that the network services. The schematic layout is also useful in summarizing and cross-checking the network component order.

You create the schematic layout using information obtained from the floor plan. Refer to the following list of schematic layout symbols and example layouts when creating your schematic.

Schematic Layout Symbols

The following symbols represent the components that are used in a network. Each symbol is accompanied by a summary of the rules you should follow when using the components.

- Each cable segment is shown by drawing a straight line:

05595

- Terminators must be placed at each end of every cable segment. A segment can be up to 500-m (1650-ft) long. The symbol for a terminator is:

- Barrel connectors should be drawn on the cable segment to show how many sections of cable were used to form the segment. Write in the length of each section. Multiple sections can be connected using barrel connectors to make a segment of cable up to 500-m (1650-ft) long. The symbol for a connector is:

- Each coaxial cable segment must be grounded in one place only, either at a terminator or a barrel connector. Grounding at a terminator is recommended. All other exposed conductors or connectors must be isolated from ground. The symbol for grounding is:

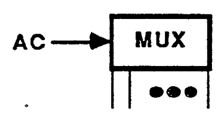
- Transceivers are attached to the segment cable near user device locations. Transceivers can be no closer together than 2.5 m (8.20 ft). The maximum is 100 transceivers-per-segment. The symbol for a transceiver is:

- Device interfaces (DIs) perform network functions according to the DI variant selected for use in the network. DIs require access to an ac power source. The symbol for a DI is:

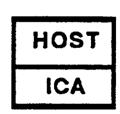
- Transceiver interface cables connect device interface (DI) cabinets, repeaters, multiplexers, and some host computers to the transceivers to allow access to the network. The symbol for a transceiver interface cable is:

- Multiple segment cables are joined by repeaters. Repeaters require access to an ac power source and must connect to a transceiver that has its signal quality error (SQE) test disabled. The symbol used for a repeater is:

- Multiplexers are used to connect up to eight Ethernet services to one transceiver for access to the network. Multiplexers require access to an ac power source. The symbol for a multiplexer is:



- Control Data CYBER 930 host computer systems contain one or more Integrated Communication Adapters (ICA) that allow the host to access the network directly without using an MDI. A transceiver and transceiver interface cable are used for the connection. The symbol for a host computer with ICAs is:



Schematic Layout Examples

The following schematics are examples of a few basic network layouts.

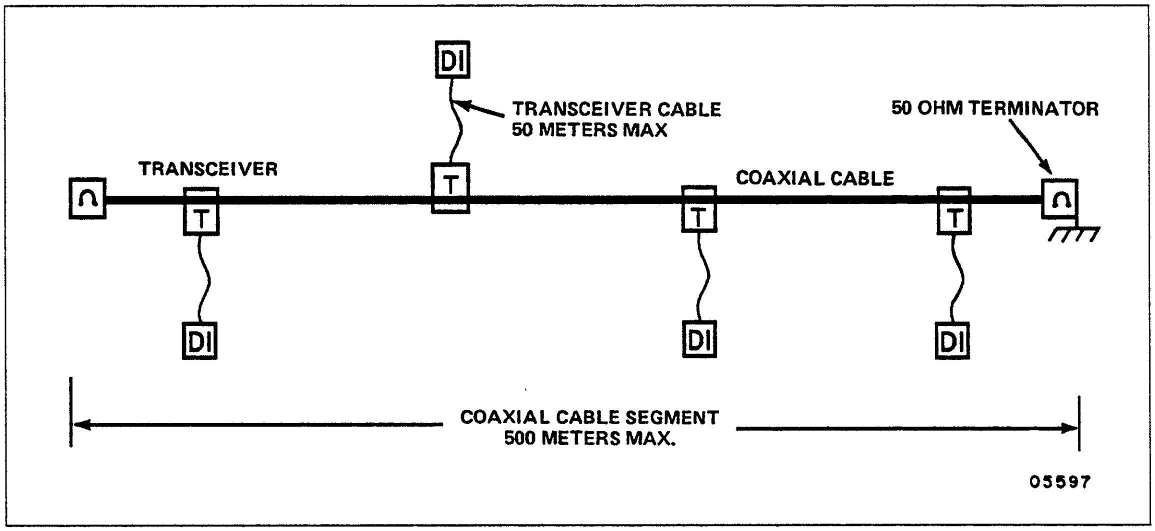


Figure 1-17. Single-Segment Network

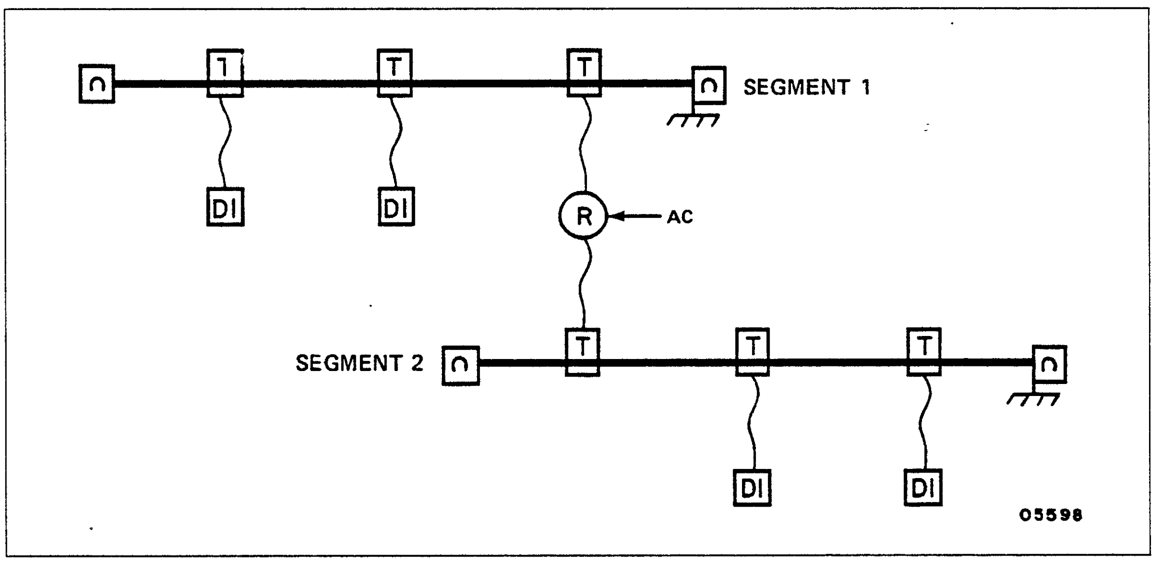


Figure 1-18. Two-Segment Network

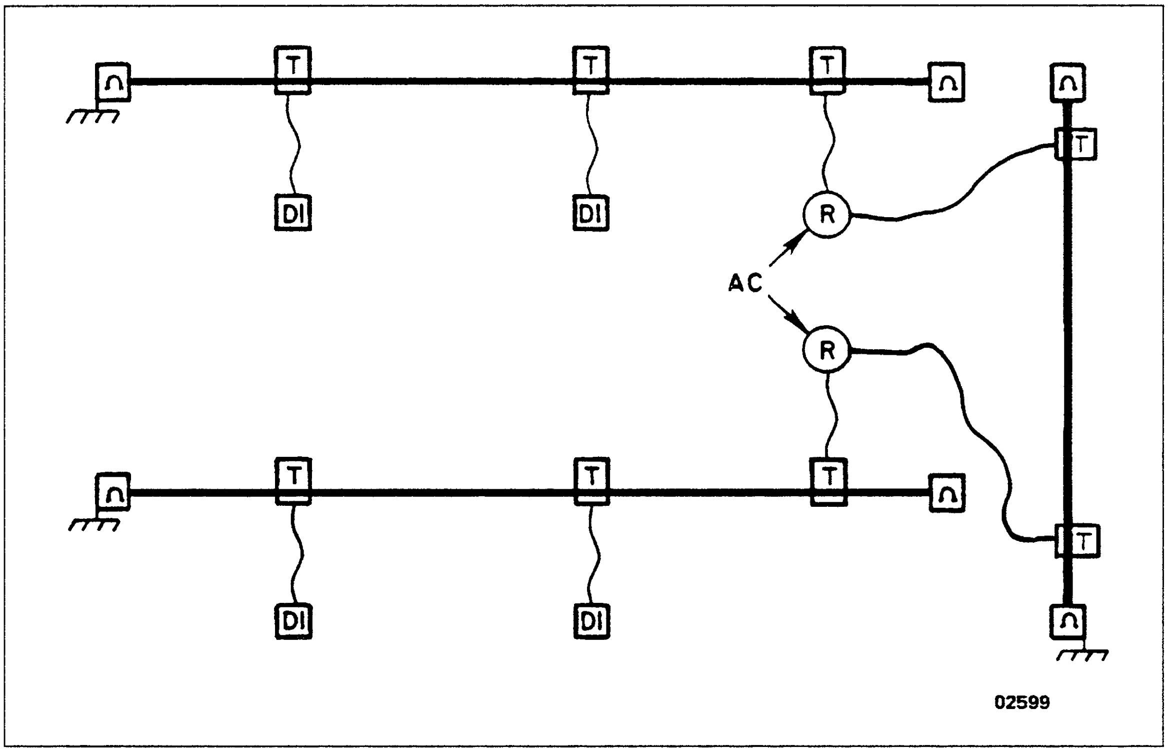


Figure 1-19. Three-Segment Network

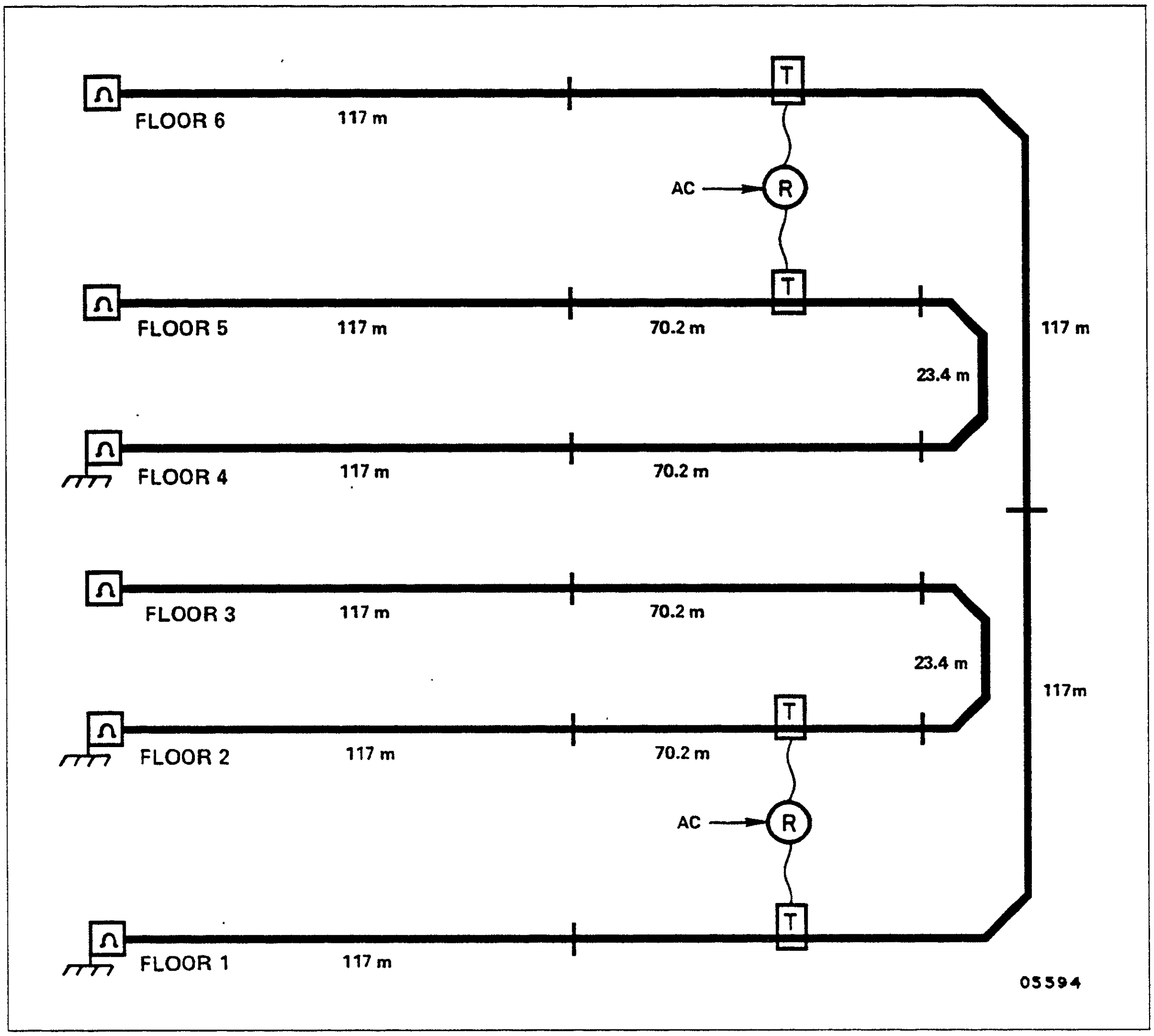


Figure 1-20. Multiple Floor Network Layout

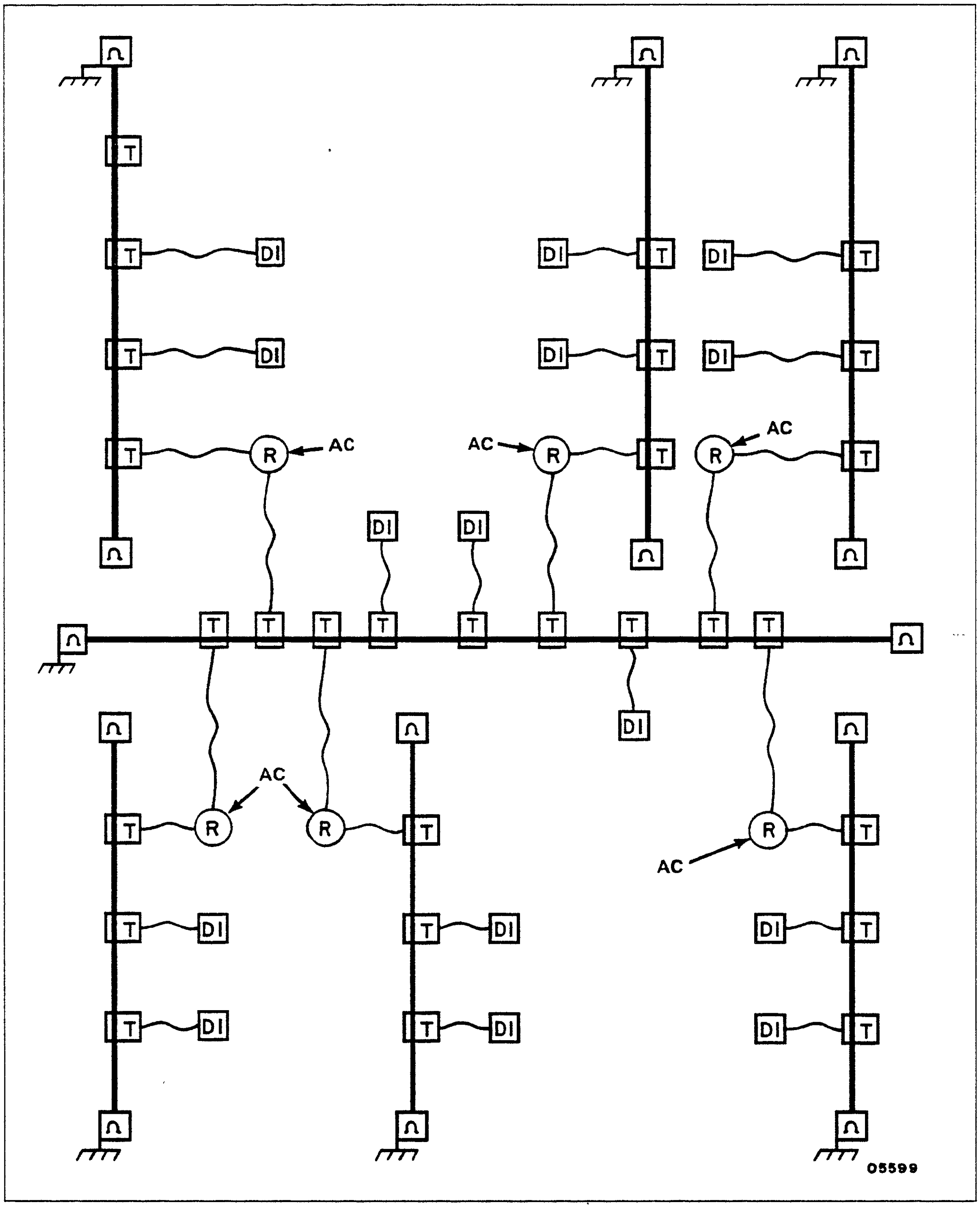


Figure 1-21. Complex Network Example Using Six Repeaters

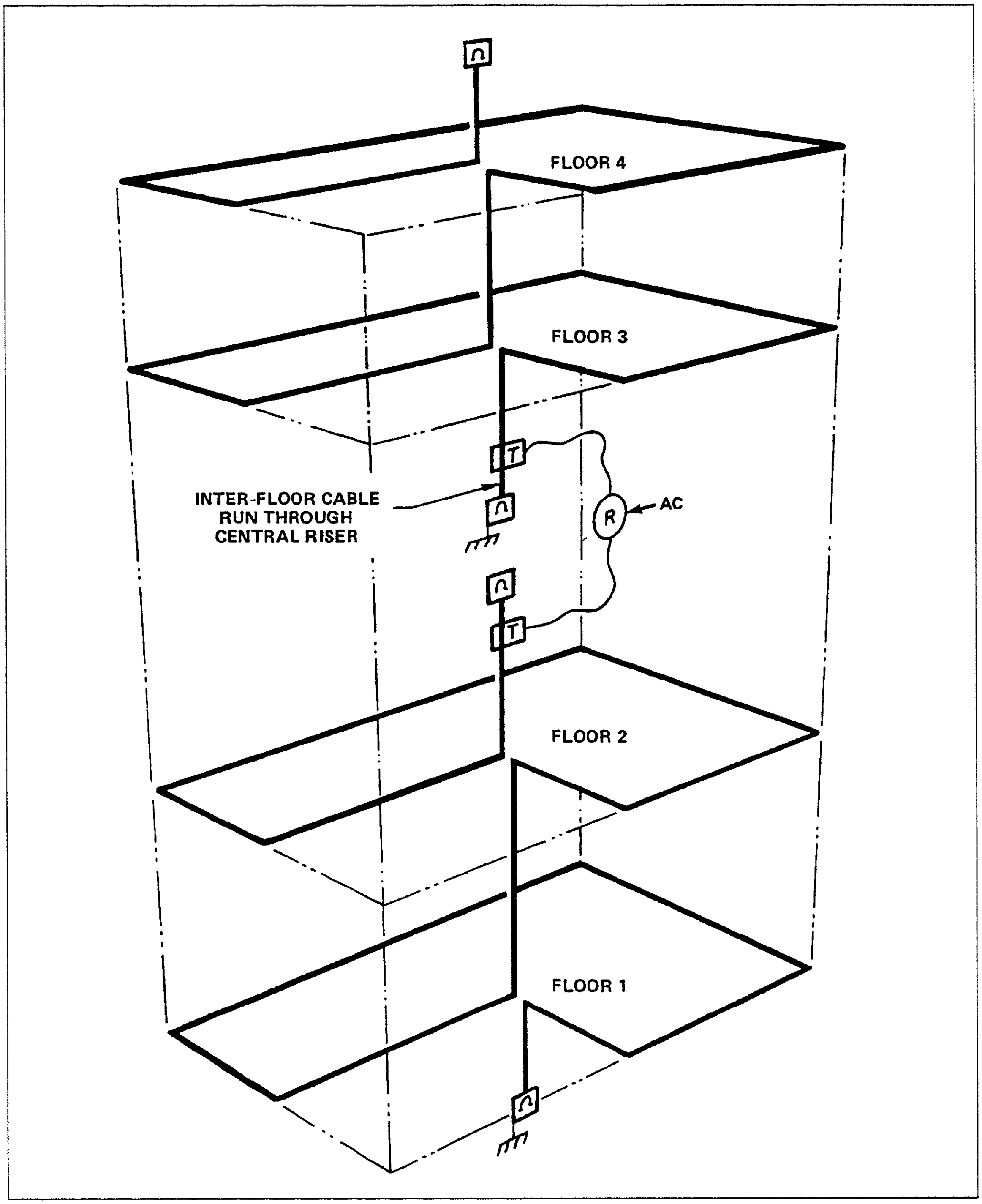


Figure 1-22. Four Floor, Two-Cable Network

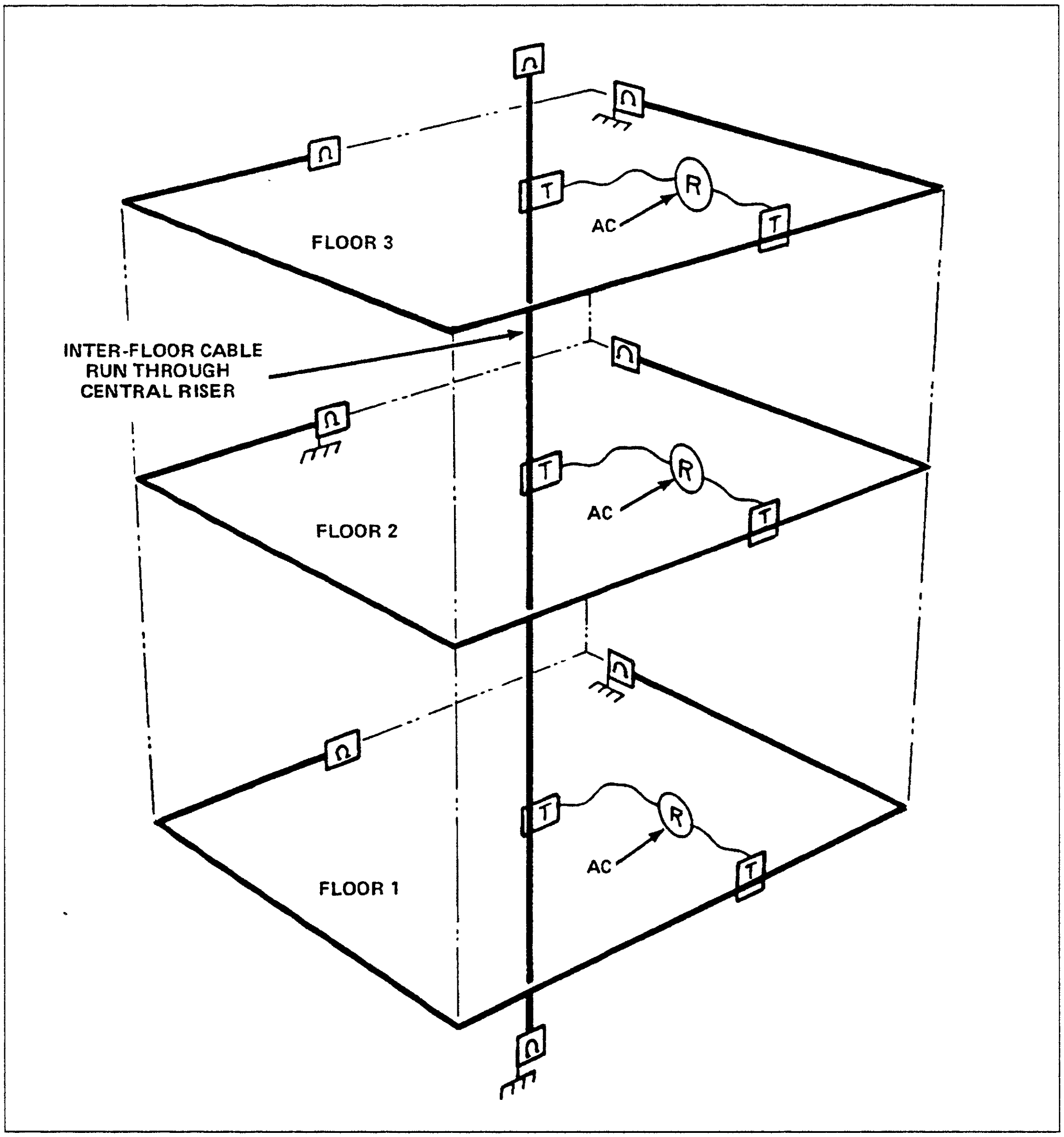


Figure 1-23. Three-Floor, Four-Cable Network

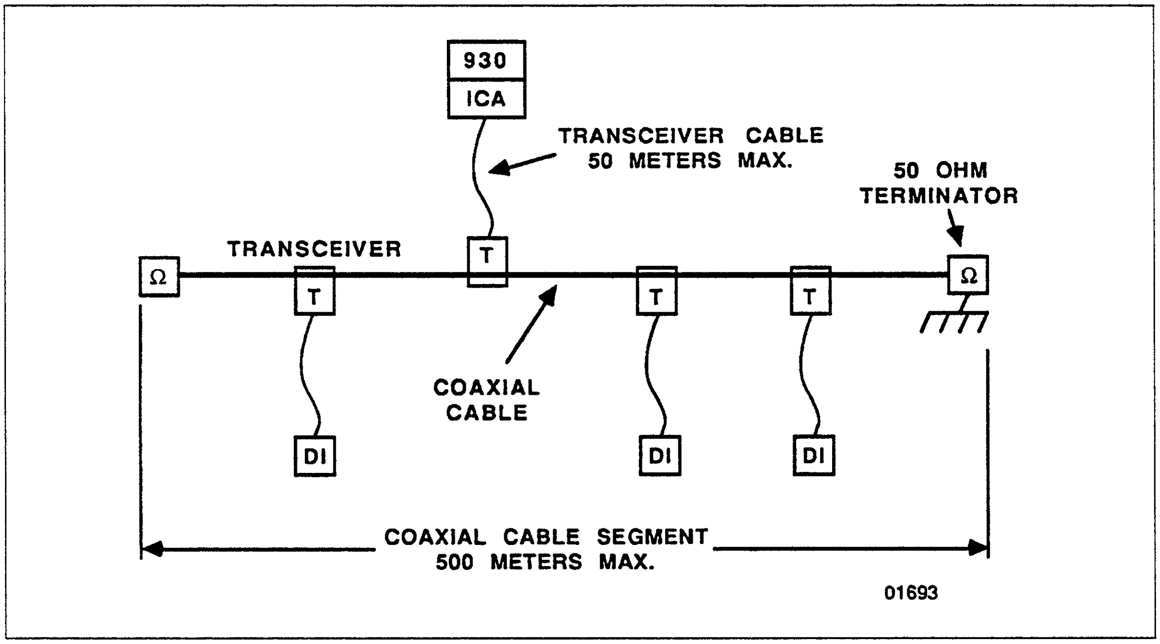


Figure 1-24. Network Accessed by Control Data CYBER 930 with ICA

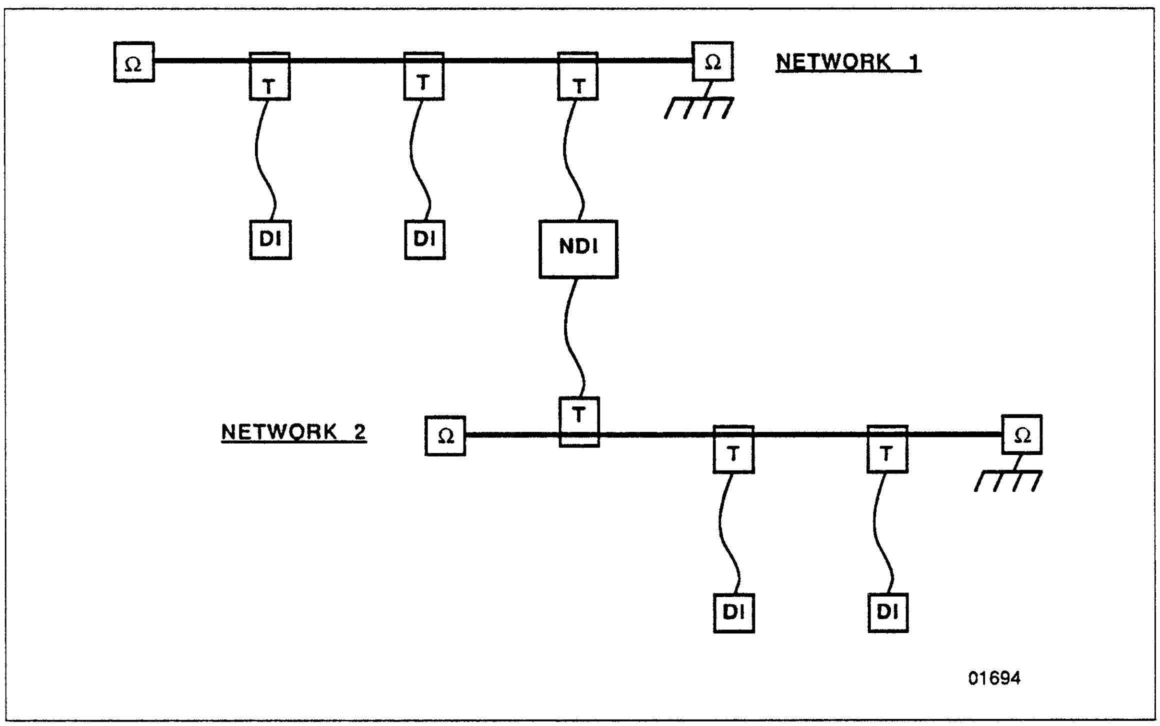


Figure 1-25. Two Networks Connected by NDI Used as a Relay Unit

Installing the Segment Cable and Components 2

Installing the Segment Cable and Components 2

Introduction

This chapter describes how to install the segment cable and its related components such as transceivers, repeaters, and multiplexers. The information here assumes that the cable route and location of all components has been determined and layed out on a floor plan of the facility. Chapter 1 describes how to plan the installation and includes processes for developing a floor plan and schematic.

Improper installation can seriously impair system performance and can also be difficult and expensive to correct. Only trained and experienced technicians should attempt to perform the procedures given here.

This chapter is divided into the following areas.

- Important precautions and guidelines
- Installing the cable and components
- Verifying cable and component installation
- Guidelines for expanding the network

Important Precautions and Guidelines

To ensure proper network operation, you must follow the precautions and guidelines listed below. This information is a summary of what is contained in ECMR 80, IEEE 802.3 or ISO/DIS 8802.3, and the technical report for LAN safety (ECMA TR-SS).

- Install the network according to the floor plan.
- Obtain approval from the network installation technician for any deviations to the network facility, as marked on the floor plan.
- Ensure that all cable segments are constructed as specified under the Segment Cable topic in chapter 1.

- During installation, do not bend or coil the segment cable to less than a 200-mm (7.87-in) radius. See figure 2-1 for a full-size template.
- Ensure that bends in installed segment cable have at least a 250-mm (9.84-in) radius. See figure 2-1 for a full size template.
- Ensure that bends in conduit used to house segment cable have at least a 250-mm (9.84-in) radius. See figure 2-1 for a full size template.
- Do not compress, crimp, crush, or stretch the segment cable.
- Do not cut or damage cable in any way that exposes the metal shield.
- Do not locate cable or components against sharp edges or where it could be damaged by any future work that might be done in the vicinity.
- Do not route the cable within 10.0 m (32.81 ft) of radiating energy devices, such as radio frequency transmitters, and electrical welders.
- Install supports for the segment cable at 3.0-m (9.84-ft) intervals or less, when spanning an open area.
- Coil any excess cable as close to the terminated ends as possible and ensure that the radius of the coil is at least 250 mm (9.84 in).
- When installing a segment cable in conduit, be sure to install a pull box for every connector, terminator, and transceiver. The boxes should be at least 35.6-cm (14-in) square by 15.2-cm (6-in) deep. When installing conduit and pull boxes, ensure that the segment cable can be routed through the upper portion of the pull boxes for installation of transceivers.
- Ground the outer shield of the segment cable to the nearest low-voltage main ground, using 16-gauge copper wire. Use part number 94275202 grounding strap attached to either a barrel or terminator connector. Grounding at the terminator is recommended. Insulate all other segment cable connectors, adapters, terminators, transceivers, and devices from any earth ground and from all current-conducting surfaces of the building structure.
- Do not route coaxial cable directly over pipes, conduit, wiring, or similar surfaces and edges. Instead, route it so it rests on a supporting surface that minimizes the risk of sharp bends or kinks.
- Tie-wrap all transceiver interface cables to the segment cable. This provides strain relief for the cable tap and prevents tap movement.
- Connect transceivers only at the annular marks that appear on the segment cable sheath at 2.5 m ± 0.05 m (8.20 ft ± 0.2 ft) intervals.
- Try to keep connectors and transceivers within 3.0 m (9.84 ft) of the floor and readily accessible from a step ladder.
- In a ceiling installation, install connectors, terminators, and transceivers, so you can access them by removing only one section of the ceiling and reaching less than 30 mm (1.18 in) from the opening.

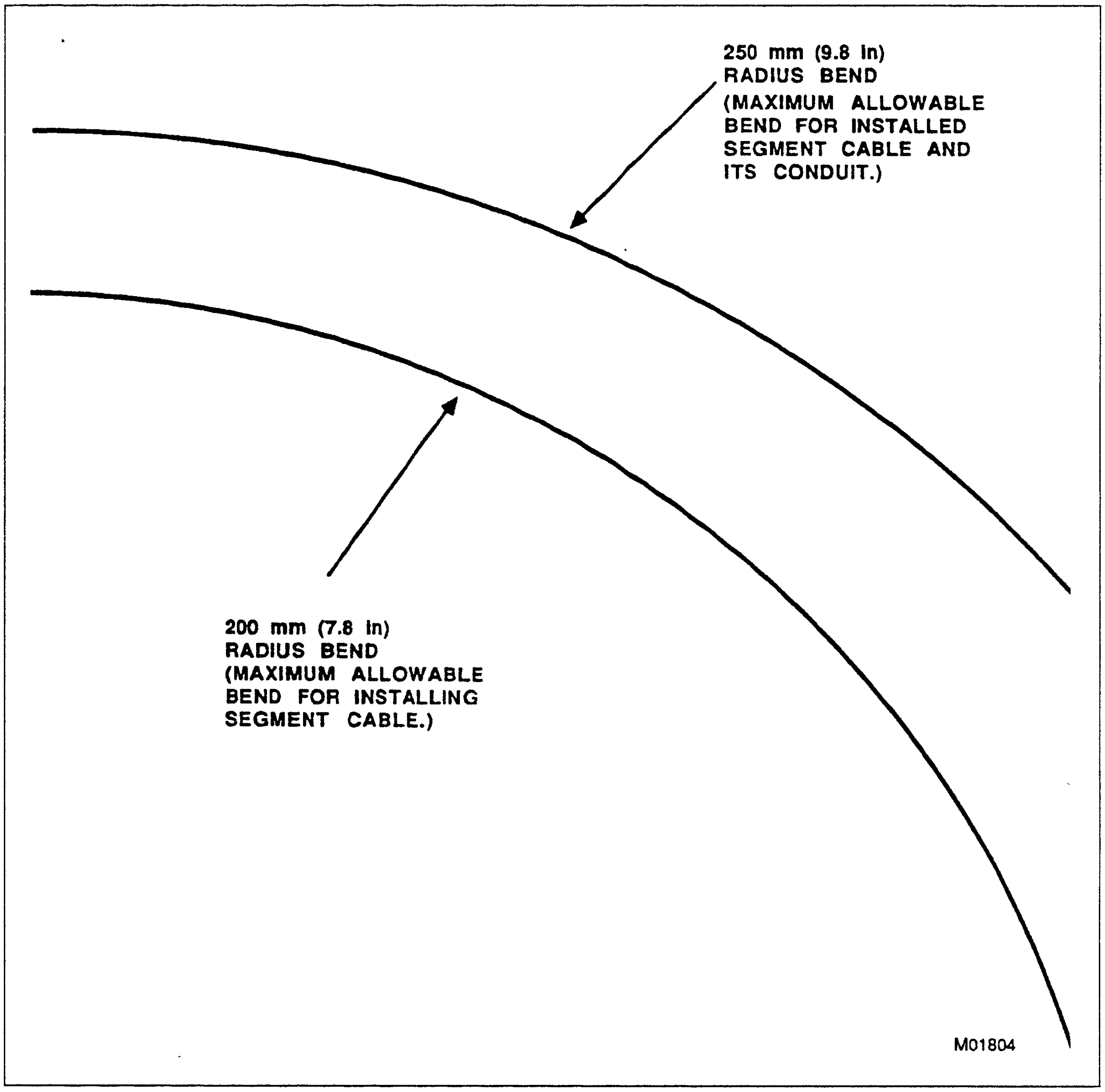


Figure 2-1. Maximum Bend Templates for Segment Cable and Conduit

- On the floor plan, accurately show the location of all connections, terminators, and transceivers.
- Tag or mark all cables so they are easily identified.
- When installing segment cable under the floor, leave enough slack so the terminated ends of the cable can be brought at least 300 mm (11.8 in) above floor level. This is necessary to allow connection to a time domain reflectometer (TDR).

Installing the Segment Cable and Components

The first step in installing the cable is to route it through the facility according to the floor plan. Because the actual process of routing the cable varies from site to site, a step-by-step procedure is not given here. Chapter 1 of this manual gives cable routing guidelines, so be certain to familiarize yourself with that information. Also be sure to comply with everything listed under Important Precautions and Guidelines at the front of this chapter.

2

The following paragraphs cover the various tasks involved during cable installation, such as joining sections of cable and terminating the cable. They also describe how to connect all necessary transceivers, repeaters, and multiplexers. The specific topics are as follows.

- Joining cable to form longer segments
- Terminating the cable
- Grounding the cable
- Installing TN111A transceivers and tap blocks
- Installing TN111B transceivers and tap blocks
- Installing TN114B repeaters
- Installing TN112C multiplexers
- Installing fiber-optic links

Joining Cable to Form Longer Segments

When stringing the segment cable, there will be times when you must join two or more cable sections together to form one continuous segment. Do this using N-connectors.

Several types of N-connectors exist. Control Data provides only the solder type, described here. When using another type of N-connector, refer to the instructions provided by the vendor. With the solder type, you solder a connector to the end of each segment and then connect them using a barrel type N-connector.

The process is described in the following two procedures.

- Soldering N-connectors to ends of cable sections
- Joining sections using barrel connectors

Tools Required

- 100 or 250 W soldering iron with soldering tweezers
- Solder
- Cable-stripping tool or utility knife
- Side cutters
- Wire brush
- Crescent wrench adjustable to 18 mm (0.72 in)
- Torque wrench capable of tightening to 20 in lbs
- Utility saw for cutting segment cable
- Ruler that reads to 0.5 mm (0.1 in)
- Volt-ohm meter
- Tie-wraps
- Shrink-wrap tubing with about 25.4-mm (l-in) original diameter

Soldering N-Connectors To Ends of Cable Sections

To install a solder-type N-cable connector, refer to figure 2-2 and perform the following steps. Figure 2-2 is drawn to scale so you can use it as a template for cutting the cable jacket, shield, and dielectric.

1. Cut end of segment cable using a utility saw to prevent crushing of dielectric.

2. Cut cable jacket 6.6 mm to 7.6 mm (0.26 in to 0.30 in) from end of cable, taking care not to cut shield braid, then remove jacket.

3. Slide threaded collar, rubber gasket, and braid clamp onto cable. Note that V-groove on rubber gasket faces cut end of cable.

4. Cut shield braid and outer foil so that approximately 5-mm (0.2-in) of braid remains on dielectric.

5. Fold shield braid over braid clamp. You may have to unbraid the shield to fold it over the braid clamp. Cut braid so that it is not more than 0.5 mm (0.02 in) from flange of braid clamp, yet does not overlap flange.

6. Expose center conductor by cutting dielectric and inner foil back 3.8 mm (0.15 in). Approximately 2.5 mm (0.1 in) of dielectric should extend beyond the folded-back shield braid. Ensure that center conductor is straight and in line with the cable.

7. Check that there are no strands of braid or pieces of foil shorting between center conductor and inner foil.

8. Using soldering iron and solder, tin the end of center conductor.

9. Slide center pin over center conductor. Keep pin in line with cable and feed solder into side hole while heating. Ensure that no solder goes onto the mating part of the pin (narrow section). Trim off any excess solder from wide part of pin. Ensure that pin is in line with the cable and is well soldered.

10. Put on connector shell. Hold body flats of shell with wrench, and screw on collar. Use a torque wrench to torque collar to 20 in lbs.

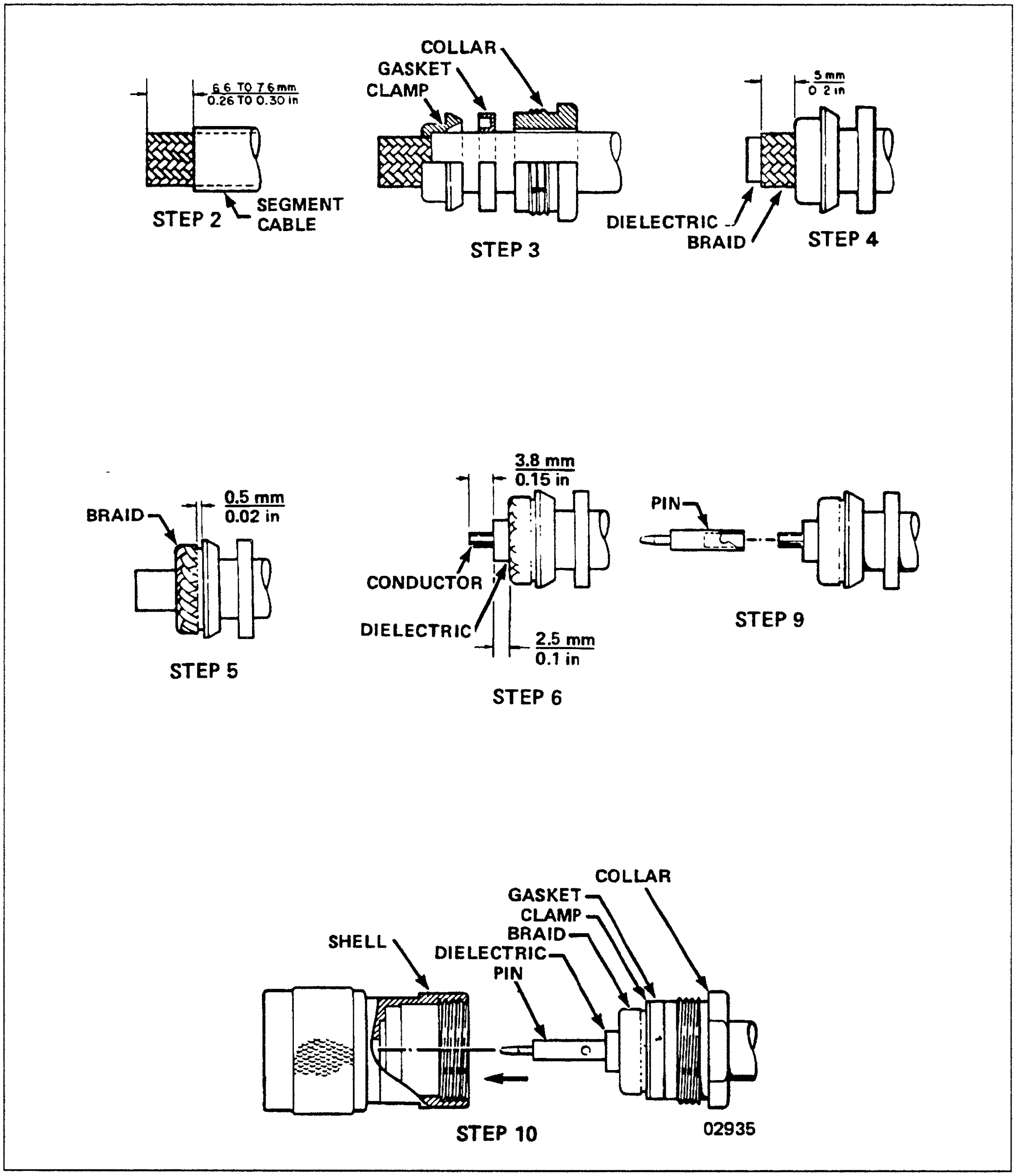


Figure 2-2. Installing a Solder-Type N-Connector Part 1

11. Using a volt-ohm meter, check that center pin is not shorted to inner body of connector.

12. Install a terminator or barrel connector into N-connector as described in those procedures.

13. Slide insulation sleeving over connectors so that all metallic parts are covered. Secure with tie-wraps (figure 2-3).

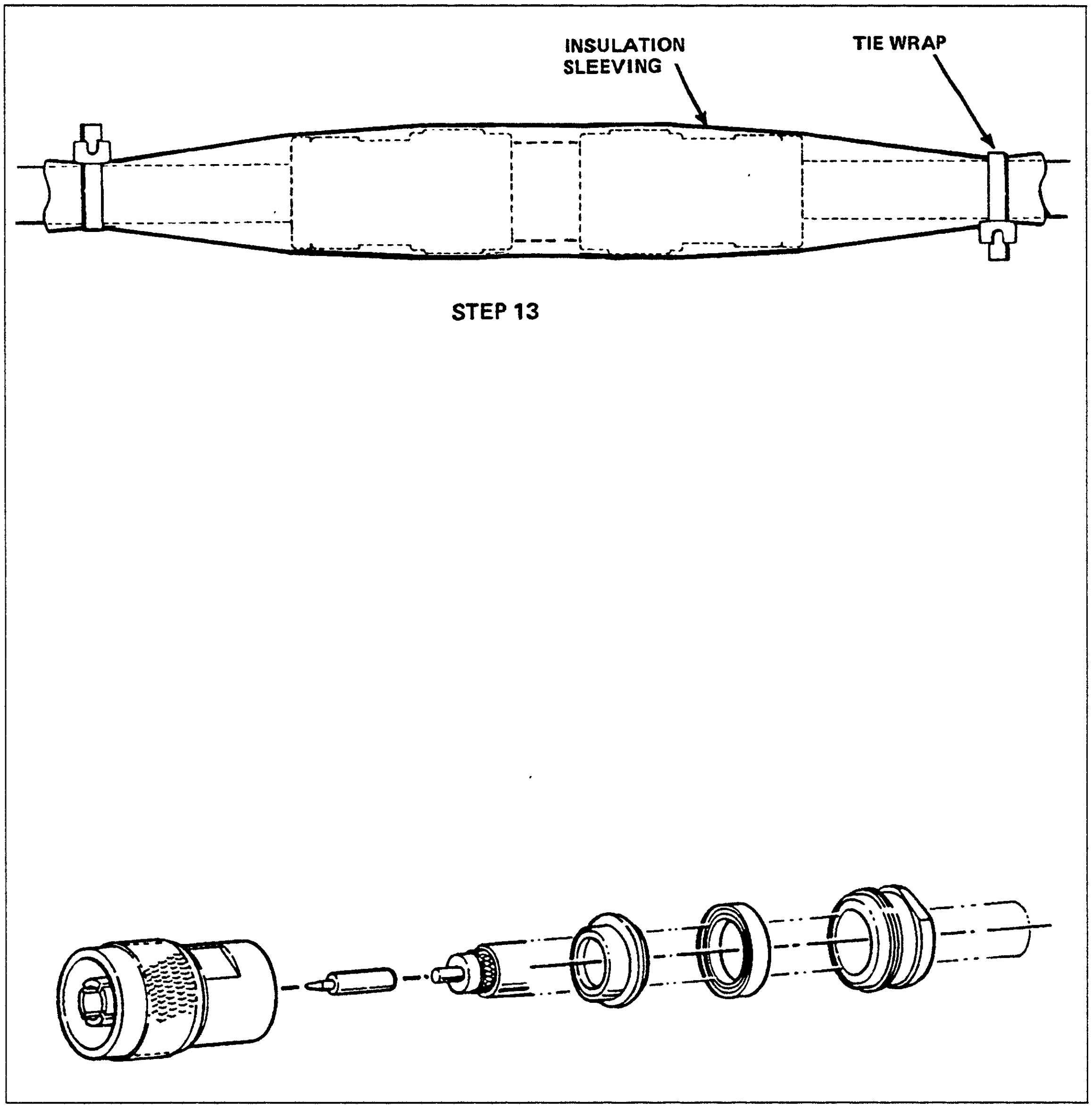


Figure 2-3. Installing a Solder-Type N-Connector Part 2

Joining Cable Sections With Barrel Connectors

To join two sections into one continuous segment, first install solder type N-connectors on the two ends to be joined (see previous procedure). Then connect them using an N-type barrel connector, as described below.

1. Check that both ends to be joined have N-connectors.
2. Slide insulation sleeving over one of the cable ends and push it back far enough to expose the entire N-connector.
3. Install barrel connector between plug connectors that are attached to the ends of the cables. The connectors should be hand-tightened only.
4. Push insulation sleeving over the three connectors, covering all metallic parts. Secure with tie-wraps (figure 2-3).

Terminating the Cable

Terminate both ends of each segment cable with a type N 50-ohm terminator (part number 15386105). The procedure is as follows:

1. Check that an N-connector is installed on both ends of the cable. If necessary, install connector(s) by following the procedure given earlier in this section.

2. Install a terminator at one end of segment cable. The terminator and connector should be hand-tightened only.

3. Check continuity of segment cable by measuring between center pin and outer shell of connector at unterminated end of cable. The reading should be about 50 ohms. If an open or a short is present:

   - Try another terminator

   - Check N-connectors

   - Check for cable damage

4. Install second terminator and repeat step 3 by temporarily removing the first terminator. When check is complete, make sure both terminators are properly installed.

5. Push insulation sleeving over terminators and connectors, covering all metallic parts. Secure with tie-wraps.

Grounding the Cable

Connect the outer braid of each segment cable to a low-voltage main supply ground. Ground it at only one point, preferably at terminator. Insulate all other connectors and conductors from ground. The procedure is as follows:

1. Using a clamp as shown in figure 2-4, connect one end of a 16-gauge copper wire to either a terminator or barrel connector on the segment cable. A terminator is recommended.

   NOTE

   Consult facility electrician if you have doubts about where to ground the cable.

2. Attach the other end of grounding wire to nearest low-voltage main supply ground.
3. Check that both ends of grounding wire are securely attached.
4. Ensure that all other points on the cable are insulated from ground.

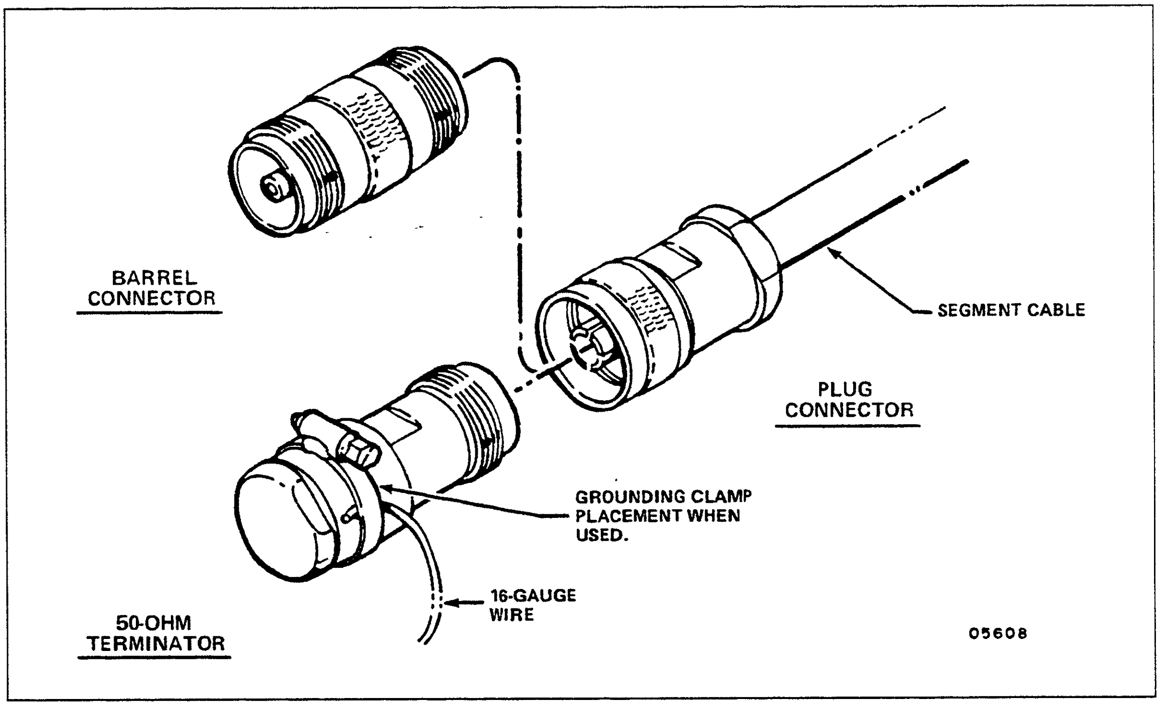


Figure 2-4. Grounding the Segment Cable

Installing TN111A Transceivers With YA300A Tap Blocks

The TN111A and YA300A (figure 2-5) are no longer provided by Control Data. They were replaced by the TN111B and YA331A (see next procedure). However, if you encounter them in an existing installation, the procedure below describes how to install both the transceiver and tap block on the segment cable.

Tools Required:

- 9/16-in wrench
- Cable-tap-tool kit (see Special Tools and Kits in chapter 1)
- Tweezers
- Freon dust chaser (part number 95047800)

NOTE

For installation on Teflon cable, place a shim (supplied with transceiver) on cable with split facing tap block nut. Center tap block on shim with threaded hole pointing in direction in which transceiver will be mounted.

1. Position transceiver tap block at one of the annular placement marks on segment cable. These marks are located every 2.5 m (8.25 ft). Using a 9/16-in wrench, clamp tap block to segment cable with threaded hole pointing in direction in which transceiver will be mounted.

NOTE

The cutting depth of the shield-removal tool can be adjusted, if necessary. Use a hex-head wrench for adjustment.

2. Screw cable-coring tool (part number 12263657) into hole in tap block and work tool back and forth a few times until the threads bottom out. Remove coring tool.

WARNING

Wear safety glasses when blowing particles from hole.

CAUTION

If there is any braid left in hole, screwing in transceiver can short the coaxial cable and make the network inoperable.

3. Insert shield-removal tool (part number 12263663) into hole and while applying pressure, rotate clockwise to remove any excess braid or foil. Use tweezers to remove larger pieces of insulation or shielding particles. Use dust chaser to blow out finer particles.
4. Screw in inner insulation-piercing tool (part number 12263665) into access hole until you can feel conductor. Remove insulation-piercing tool.

CAUTION

The stinger is fragile so handle it with care. Damage can affect reliability and is not covered under warranty.

5. Unscrew protective F-connector covering stinger on transceiver. Save the F-connector, you will need it to cover the stinger if you remove the transceiver.
6. Install O-ring onto threads of transceiver. Screw transceiver into tap block access hole and finger-tighten. Do not overtighten transceiver.
7. Connect transceiver interface cable to transceiver using slide latches to lock type D subminiature connector to transceiver.
8. Tie-wrap transceiver interface cable to segment cable to provide a strain relief for transceiver.
9. Insulate transceiver, tap block, and connectors, ensuring no metal parts are left exposed. Secure with tie-wraps. Transceiver must be isolated from ground (for example, metal ducts, conduit).
10. Place a tag on segment cable next to transceiver to indicate its position on schematic layout.

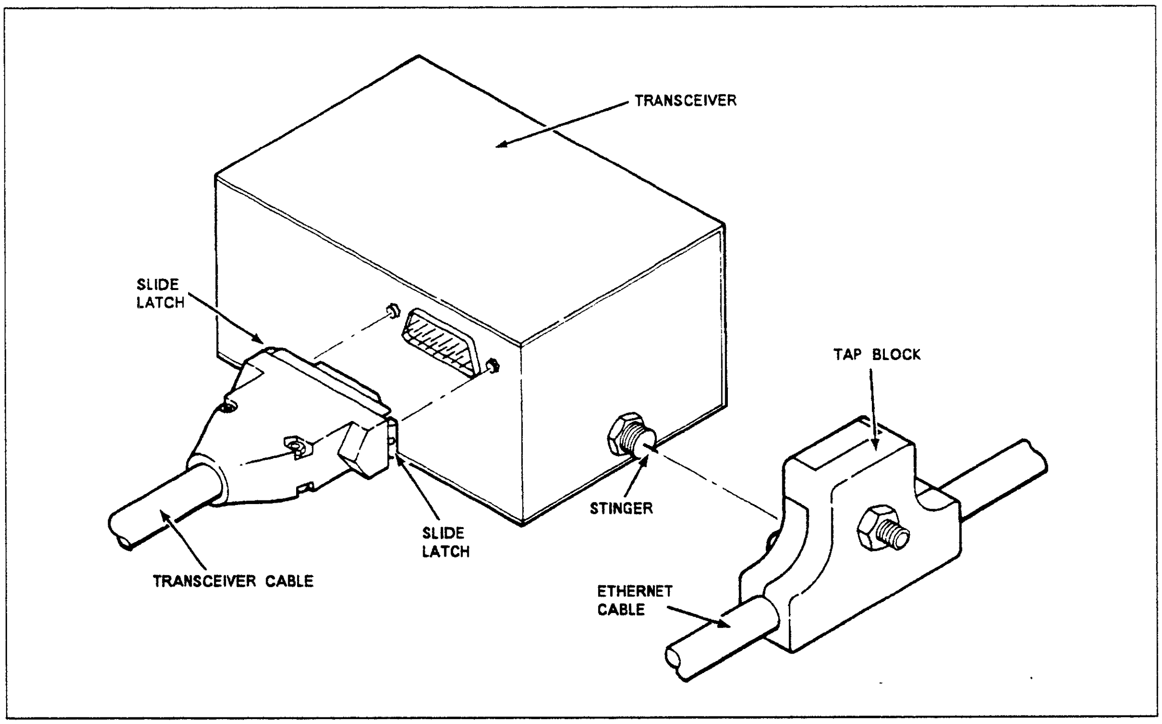


Figure 2-5. Installing TN111A Transceiver and YA300A Tap Block

Installing TN111B Transceivers with YA331A Tap Blocks

The following procedure describes how to install a Control Data TN111B transceiver and its associated YA331B tap block onto a segment cable. Figure 2-6 is an exploded view of the transceiver and tap block. The procedure is the same for either PVC or teflon cable.

Tools Required:

- Cable tap tool kit (see Special Tools and Kits in chapter 1).
- Screwdriver
- Tweezers
- Freon dust chaser (part number 95047800)

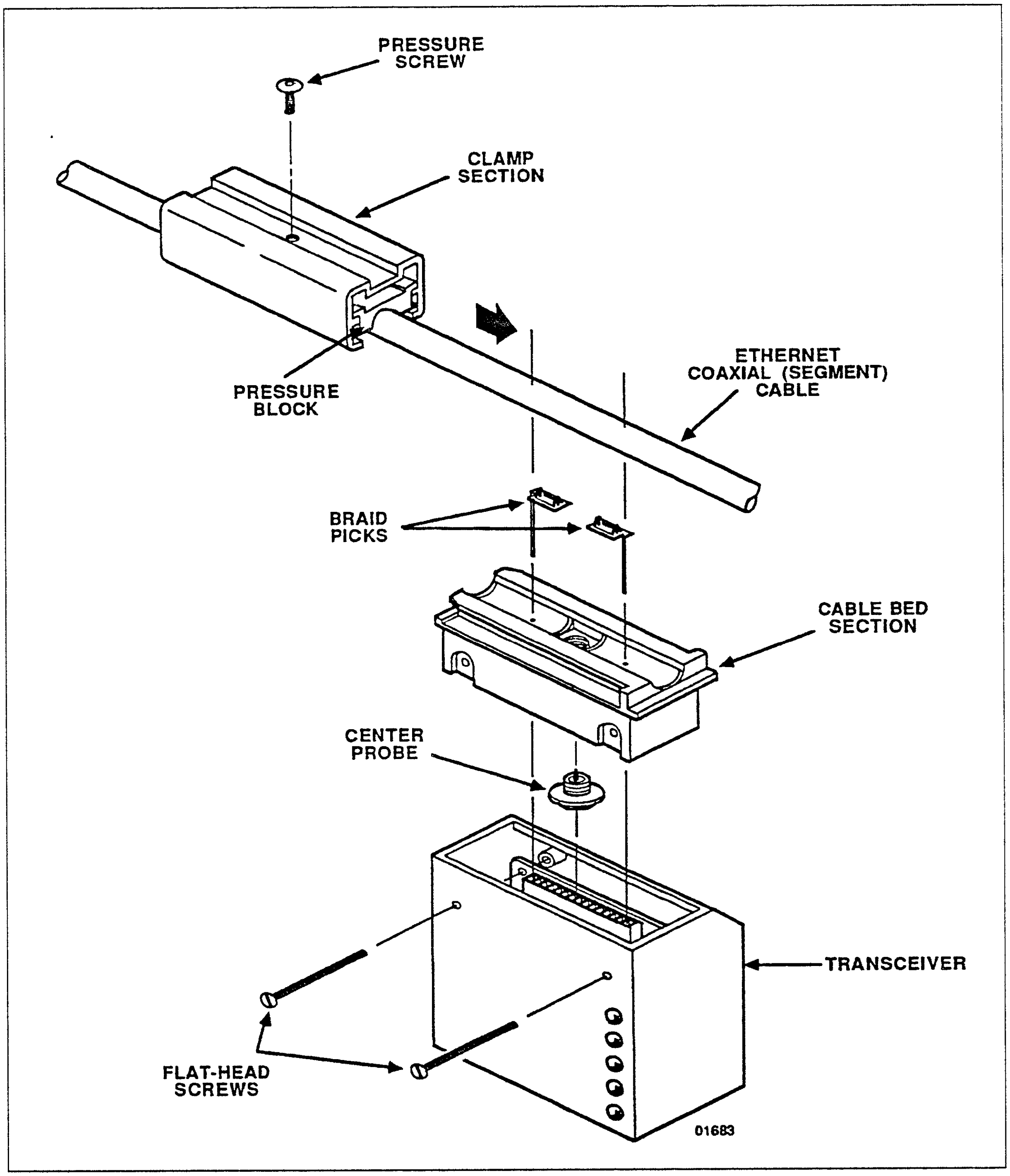


Figure 2-6. TN111B Transceiver and YA331A Tap Assembly Details

1. Insert pins on braid picks through holes in cable bed section of tap (figure 2-7). Position picks so they face inward.

2. Find placement mark on segment cable at which you will install tap. The marks occur at 2.5-m (8.25-ft) intervals.

3. Straighten cable and center it in cable channel of cable bed section of tap.

4. Hold cable bed section in place and slide clamp section onto cable bed section. Look through hole in cable bed section to ensure cable is centered.

   CAUTION

   Do not overtighten pressure screw or you may break clamp section. If pressure block does not bottom out, check that cable is straight.

5. Using an Allen wrench, thread pressure screw into clamp section until pressure block bottoms on track and holds cable securely. Check that pressure block bottoms on all four corners (figure 2-7).

6. Using drill bit end of cable tap tool, drill through cable to center conductor (tool has a stop to prevent overdrilling). Hole should go through outer jacket, braid shield, and into white dielectric (figure 2-7).

   WARNING

   Wear safety glasses when blowing particles from hole.

   CAUTION

   Any metal braid left in hole can short the coaxial cable and make the network inoperable.

7. Inspect hole to ensure it does not contain any particles of shield or other matter. Use tweezers to remove larger pieces of insulation or shielding. Use dust chaser to blow out finer particles.

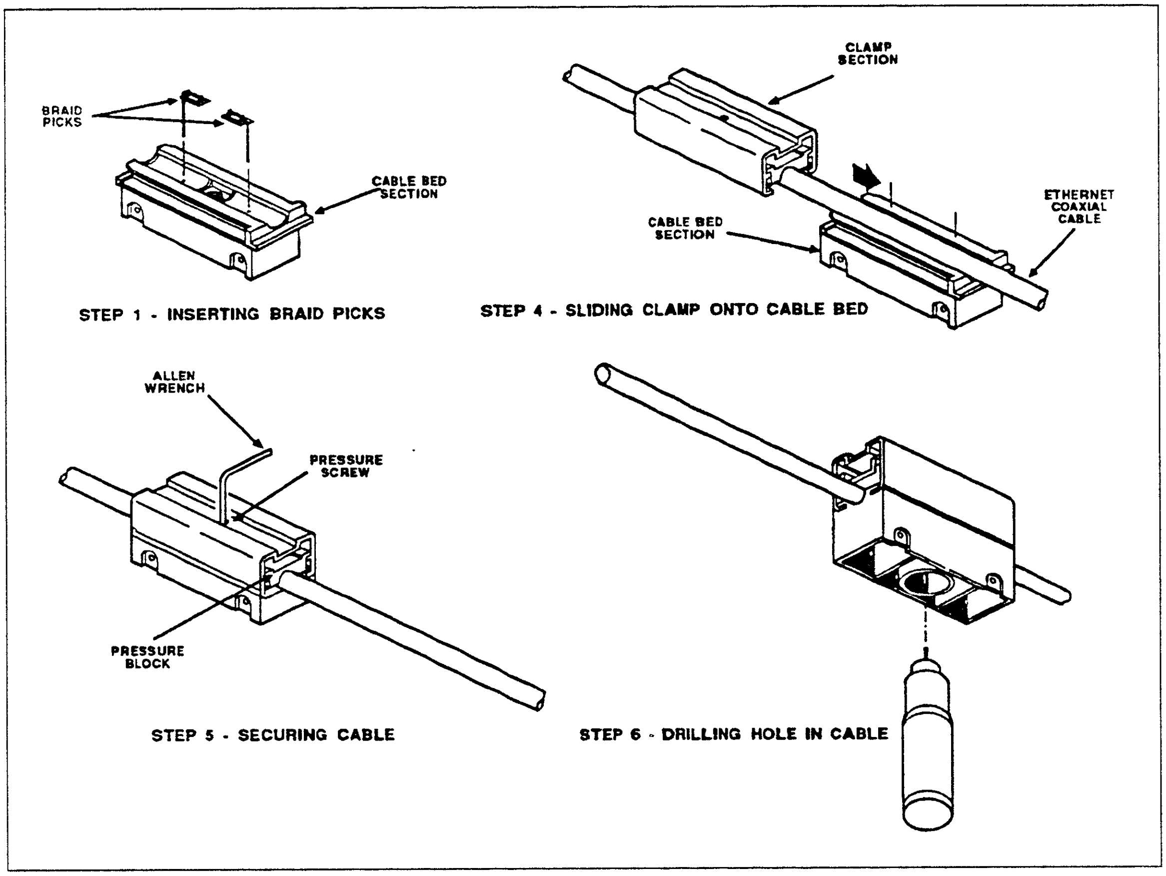


Figure 2-7. TN111B Transceiver and YA331A Tap Installation - Part 1

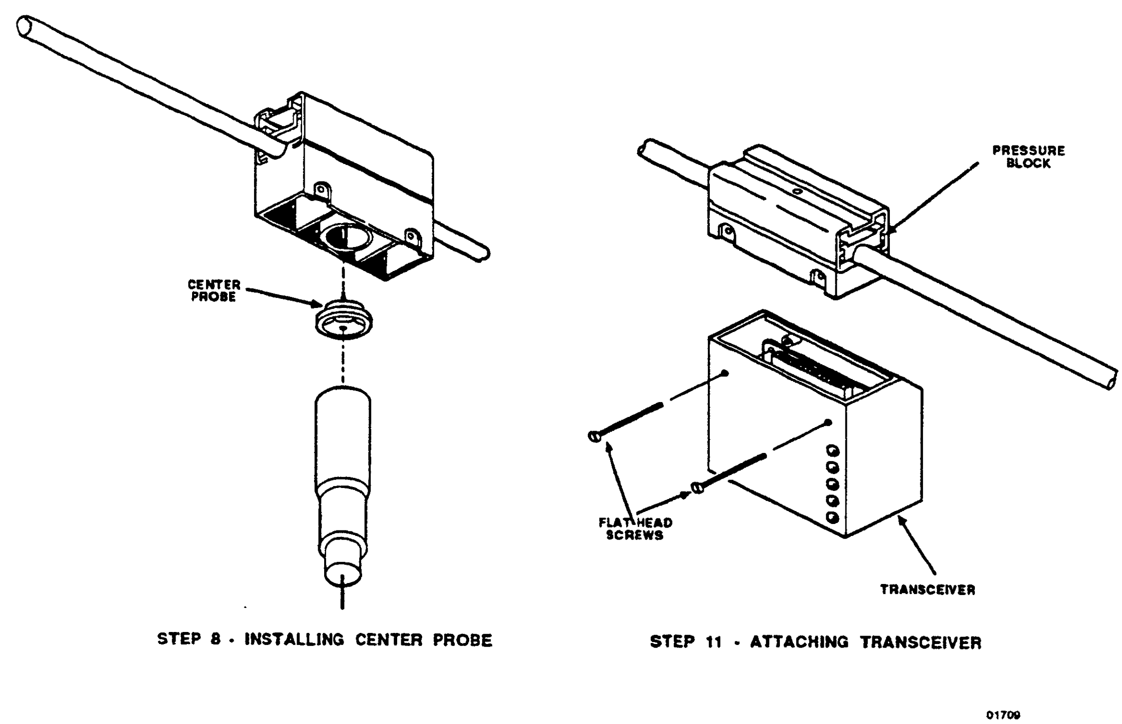


Figure 2-8. TN111B Transceiver and YA331A Tap Installation - Part 2

8. Using socket wrench end of hand tool, thread center probe assembly into central hole of cable bed and tighten snugly (see figure 2-8).

9. Set transceiver SQE (Signal Quality Error) jumper to the proper position for the type of device being connected to the transceiver. Refer to figure 2-9 for a top view of open transceiver (without tap attached) showing SQE jumper locations.

   a. For device interface (DI), integrated communications adapter (ICA), or multiplexer (mux), turn heartbeat test (SQE) on by moving jumper to third and fourth positions from right (figure 2-9).

   b. For repeater, turn SQE test off by moving jumper to fourth and fifth positions from right (figure 2-9).

   c. Mark SQE setting on outside of transceiver.

10. Remove screws from side of transceiver (figure 2-8).

CAUTION

Do not force tap into transceiver case. Very little pressure is necessary. If tap does not slide in easily, the pins in tap probably need to be aligned with their respective contacts on the transceiver board. If necessary, straighten them with a tweezers.

11. Check that tap center probe pin and braid pick pins are straight. Then insert tap into open end of transceiver and align screw holes.

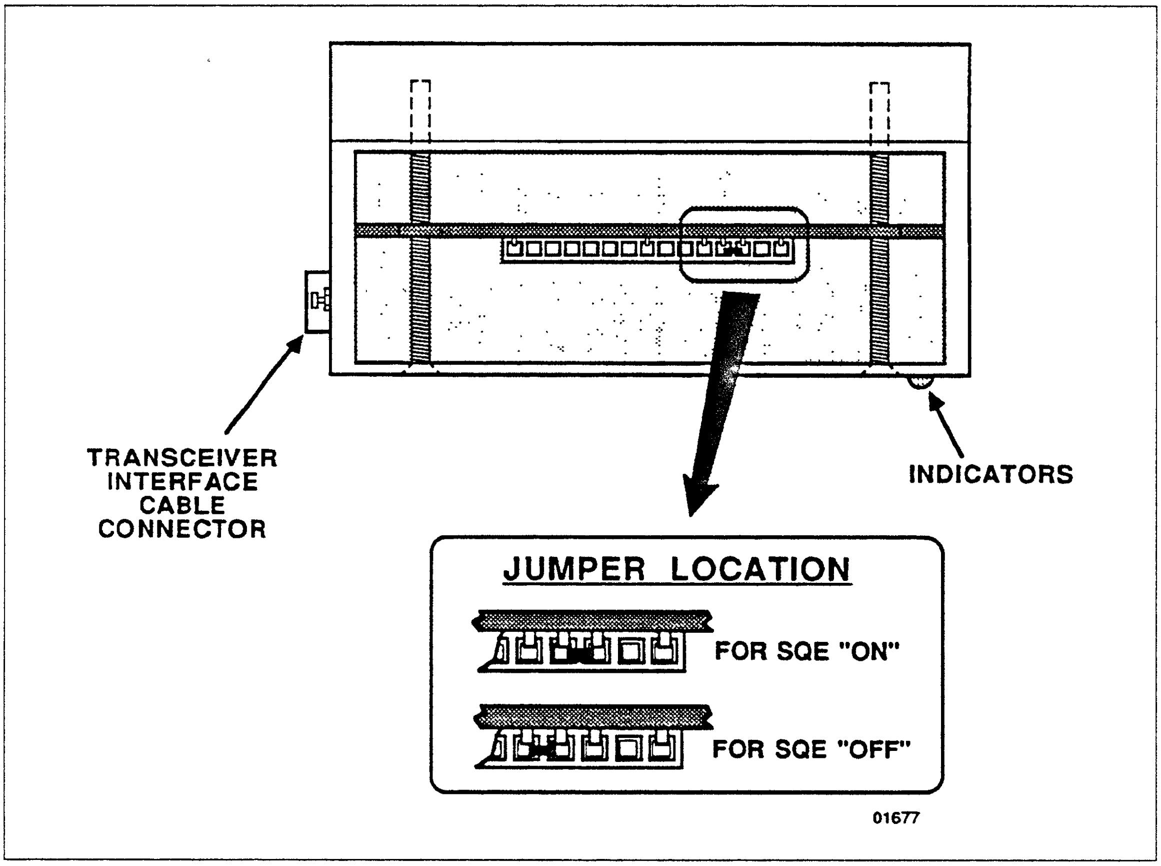


Figure 2-9. SQE Jumper Locations

12. Push screws through holes and tighten them.

13. Connect transceiver interface cable to transceiver and lock in place with slide latch on cable connector.

14. Provide strain relief for transceiver by using tie-wraps to secure transceiver interface cable to segment cable about 15.24 cm (6 in) from transceiver.

15. Insulate transceiver, tap, and connectors with transparent material, ensuring that no metal parts are left exposed. Secure with tie-wraps. Transceiver must be isolated from ground (for example, metal ducts, conduits).

16. Save protective dust cover that came with the tap. You will need it to cover tap if you remove transceiver.

Installing TN114B Repeaters

The following procedure describes how to install a Control Data TN114B repeater. If you encounter other types, refer to the specific vendor's documentation for information.

1. Check voltage selector setting by looking through window in fuse cover on rear panel. If setting does not match your ac power source, change setting and fuses as follows:

   a. Remove ac power cord from power connector.

   b. Using small screwdriver, pry open righthand side of fuse cover. Figure 2-10 shows voltage selector drum and fuse holders.

   c. Remove voltage selector drum, rotate it so desired input voltage will be visible, and remount it.

   d. Remove fuse holders by pulling them outwards. Refer to table 2-1 and replace with fuses having proper rating. Insert fuse holders into their slots, ensuring that white arrows on fuse holders match those inside fuse cover.

   e. Close fuse cover.

Table 2-1. Fuses For 2632-1 Repeater

Source Voltage	Fuse Rating	Part Number
100 V ±10%	1 A antisurge	15185575
120 V ±10%	1 A antisurge	15185575
220 V ±10%	500 mA antisurge	95967854
240 V ±10%	500 mA antisurge	95967854

WARNING

To avoid possibility of personal injury due to electrical shock, always connect the equipment's ground wire to a properly earth-grounded system.

2. Check power plug and ensure it is the right one for your application. Repeaters come with a 3-prong plug for use with 120-V, 60-Hz, 10-A circuits. If necessary, replace existing plug with one appropriate for your power source. Wire replacement plug as follows:

Color	Circuit Connection
Brown	Live
Blue	Neutral
Green/yellow	Ground

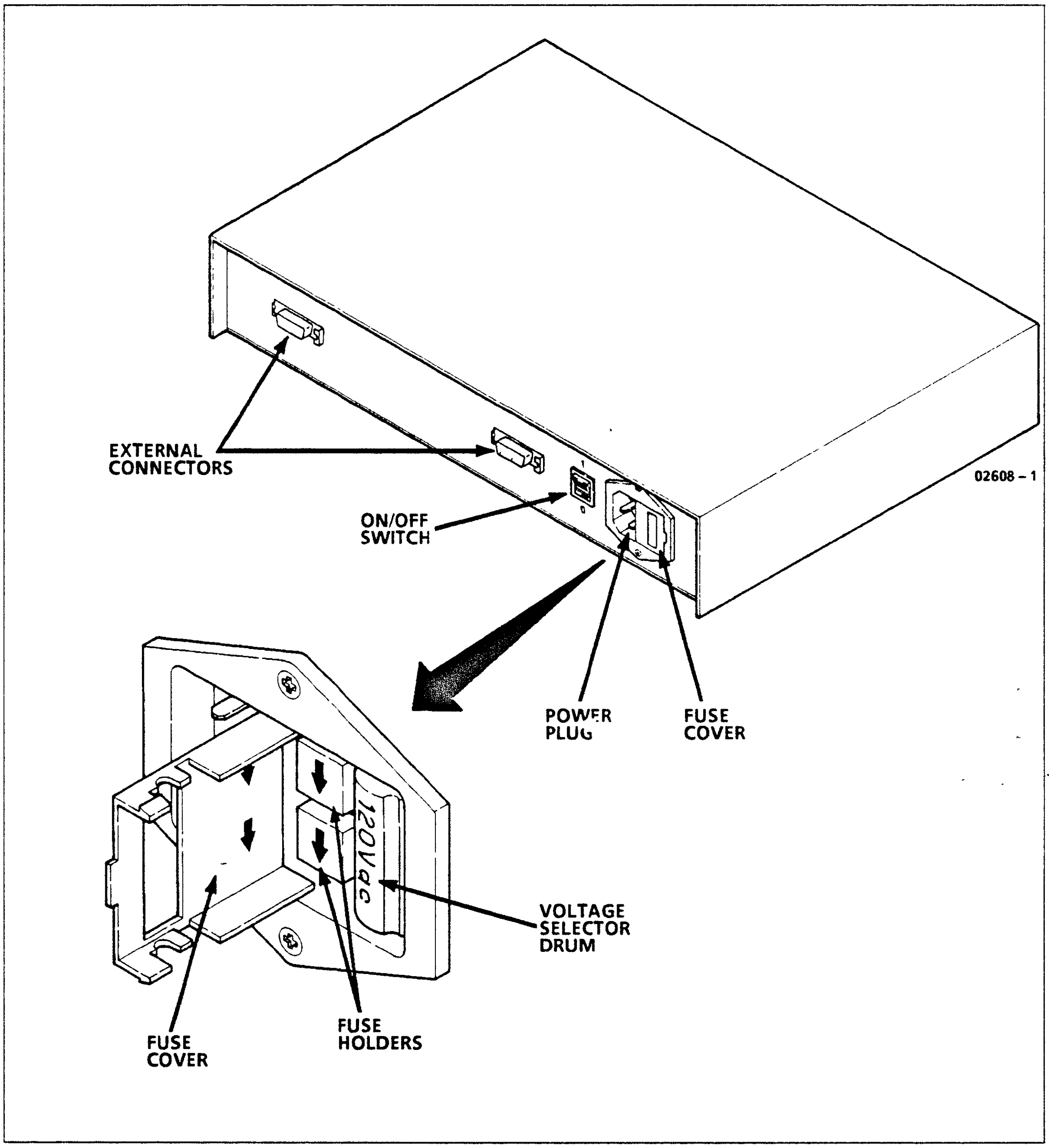


Figure 2-10. Repeater Voltage Selection

3. Place repeater at desired location between the two segment cables you are linking. When locating the repeater ensure that:

   - An ac outlet is within reach of the power cord.
   - Unit is positioned horizontally.
   - Air can flow around unit and through its vents.

4. Install transceivers on segment cables per the transceiver installation procedure described previously. Set transceiver SQE test to off.

5. Connect transceiver interface cables between transceivers and repeater and lock them in place with the slide latches on cable connectors (figure 2-11).

6. Connect one end of ac power cord to repeater and the other end to an ac outlet.

7. Press Power switch, on repeater rear panel, to 1 (On) position. Observe that POWER indicator, on front panel, lights to show that both dc power supplies are operating. If POWER indicator does not light, replace fuse (see step 1). If fuse fails repeatedly, replace the repeater.

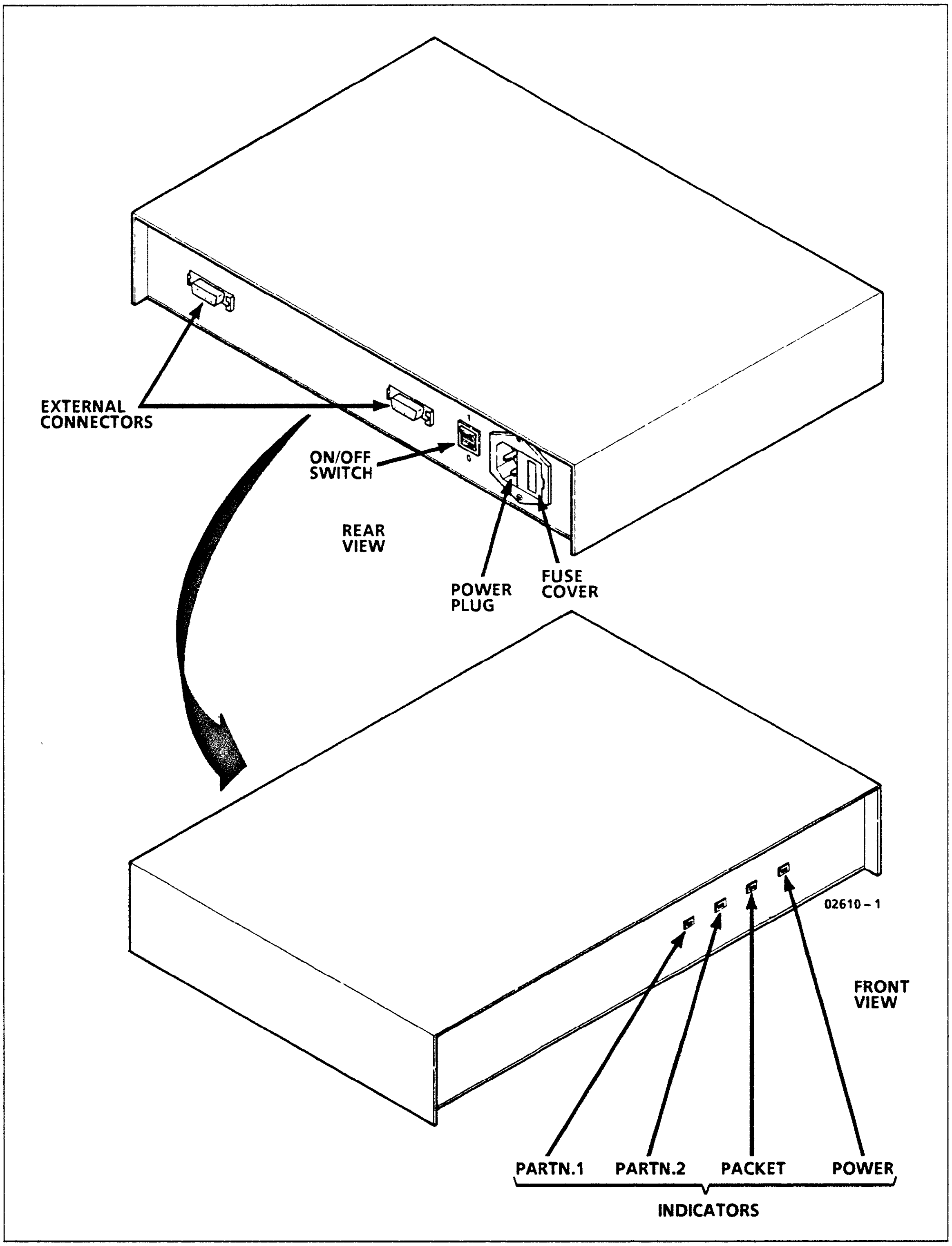


Figure 2-11. Repeater Connectors, Switches, and Indicators

Installing TN112C Multiplexers

The following procedure describes how to install a Control Data TN112C multiplexer. If you encounter other types, refer to the specific vendor's documentation for information.

1. Check voltage selector setting by looking through window in fuse cover on rear panel. If setting does not match your ac power source, change setting and fuses as follows:

   a. Remove ac power cord from power connector.

   b. Using small screwdriver, pry open righthand side of fuse cover. Figure 2-12 shows voltage selector drum and fuse holders.

   c. Remove voltage selector drum, rotate it so desired input voltage will be visible, and remount it.

   d. Remove fuse holders by pulling them outwards. Refer to table 2-2 and replace with fuses having proper rating. Insert fuse holders into their slots, ensuring that white arrows on fuse holders match those inside fuse cover.

   e. Close fuse cover.

Table 2-2. Fuses For 2631-2 Multiplexer

Source Voltage	Fuse Rating	Part Number
100 V ±10%	1 A antisurge	15185575
120 V ±10%	1 A antisurge	15185575
220 V ±10%	500 mA antisurge	95967854
240 V ±10%	500 mA antisurge	95967854

WARNING

To avoid possiblity of personal injury due to electrical shock, always connect the equipment's ground wire to a properly earth-grounded system.

2. Check power plug and ensure it is the right one for your application. Multiplexers come with a 3-prong plug for use with 120-V, 10-A circuits. If necessary, replace existing plug with one appropriate for your power source. Wire replacement plug as follows:

Color	Circuit Connection
Brown	Live
Blue	Neutral
Green/yellow	Ground

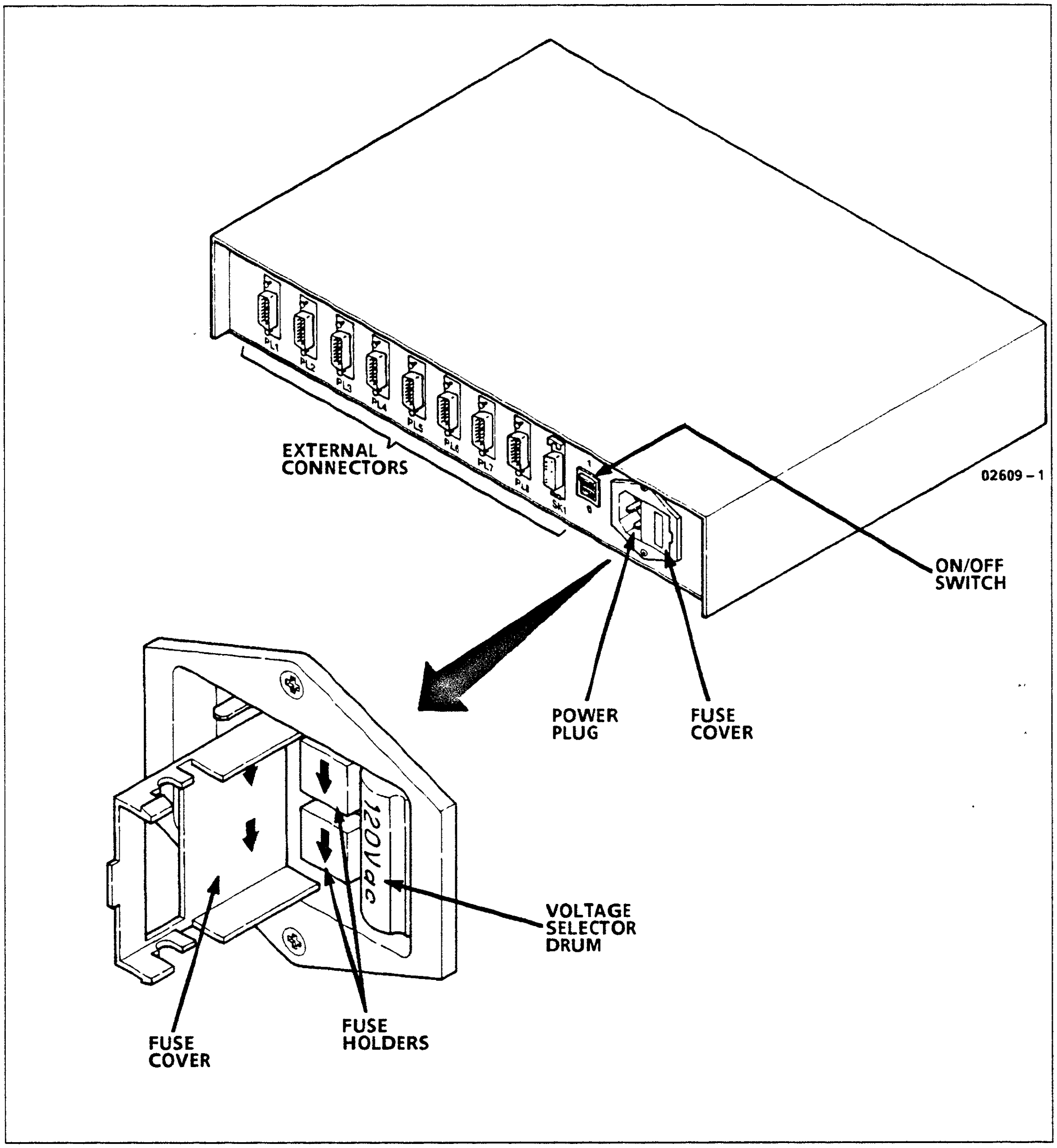


Figure 2-12. Multiplexer Voltage Selection

3. Place multiplexer at desired location. Ensure that:

   - An ac outlet is within reach of the power cord.
   - Unit is positioned horizontally.
   - Air can flow around unit and through its vents.

4. Install transceivers on segment cables per the transceiver installation procedure described previously. Set transceiver SQE test to On.

5. Connect transceiver interface cable between transceiver and SK1 on multiplexer and lock it in place with the slide latches on cable connectors (figure 2-13).

6. Connect up to eight DIs to multiplexer by routing transceiver interface cables between the DIs, and PL1 through PL8 on multiplexer.

7. Connect one end of ac power cord to multiplexer and the other end to an ac outlet.

8. Set Power switch on multiplexer rear panel to 1 (On) position (figure 2-13). Observe that PWR ON and TCVR PWR indicators, on front panel, light to show that both dc power supplies are operating. If indicators do not light, replace fuse (see step 1). If fuse fails repeatedly, replace the multiplexer.

Installing Fiber-Optic Links

Control Data does not sell fiber-optic products. If your installation uses fiber-optic links, refer to the vendor's documentation for installation instructions. Chapter 10 has information on vendors that supply fiber-optic devices.

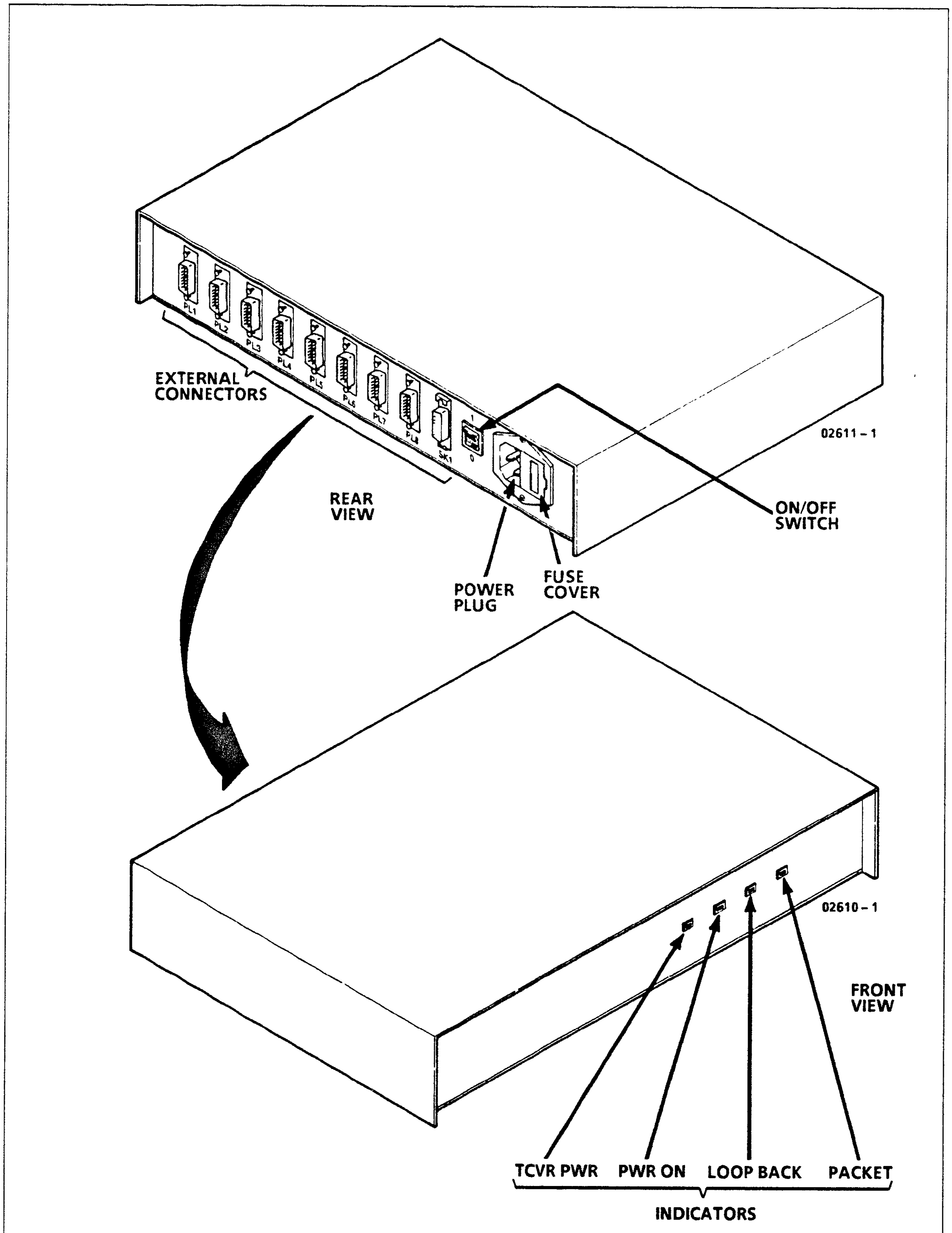


Figure 2-13. Multiplexer Connectors, Switches, and Indicators

Verifying Cable and Component Installation

The following describes how to check out the cabling portion of the installation. Chapter 5 gives information for testing transceivers, repeaters, and multiplexers. The DIs must be operating to check out those components.

Without DIs you are limited to:

- Verifying that layout matches the plan
- Testing With a Time Domain Reflectometer

Verifying that Layout Matches the Plan

The first step in verifying the cable and component installation is to compare the actual layout with the planned layout. Ensure that:

- Segment cable follows the proper route. At the same time, you can also double-check that the installation follows the precautions and guidelines given at the front of this chapter.
- All necessary transceivers, repeaters, and multiplexers are in place and that they power-up properly.
- Transceiver cables are routed from transceivers and multiplexers to areas where DIs will be installed.
- All components are properly labeled.

After you complete the above steps, proceed to test the segment cable.

Testing With a Time Domain Reflectometer

The following describes the time domain reflectometer (TDR) and how to use it to check out the segment cable. If you do not have a TDR, proceed to DI installation.

Recommended Model

The TDR recommended for coaxial cable network commissioning tests is the TEKTRONIX 1503 Cable Tester with Option 01 (distance calculator), Option 04 (chart recorder) and Option 05 (metric readout). This device has a maximum range of 1500 meters with a $\pm 2\%$ accuracy.

What is a Time Domain Reflectometer (TDR)?

The time domain reflectometer is a device that locates points of discontinuity in a segment cable. A discontinuity, as used here, is any physical fault in the cable that interferes with the transmission of signals. Interference is in the form of signal energy reflected from the point of the fault.

How Does the Time Domain Reflectometer Work?

The TDR detects discontinuities by sending a step voltage pulse down the cable and then monitoring the reflected signals. Every cable fault causes energy to be reflected back to the TDR. The TDR superimposes the reflected signals on the transmitted signal and displays the result on its CRT.

Reflections appear as either a step-up or step-down transition. Inductive faults and those with higher resistance than the resistive component of the cable impedance, cause a step-down transition. Capacitive faults and those with lower resistance than the cable's resistive component, cause a step-up transition.

The time delay between the transmitted and reflected signals give the distance of the fault from the TDR. The TDR automatically converts this time interval to meters.

NOTE

Transceivers must not transmit during TDR testing. If transmission occurs, the input to the TDR may become invalid.

Interpreting TDR Results

When testing with a TDR, you will detect reflections at all connections, including those where transceivers are connected to the cable. Reflections also occur at points where the cable has been damaged. A problem exists whenever the amplitude of the reflections is greater than 4% of the transmitted step voltage. The amplitude of any reflections and the location of the related fault is displayed by the TDR.

Badly formed cable connections or terminations will produce unacceptable reflections. Open or shorted cables, or damaged dielectric will also exceed specifications.

For example, a simple cable network could consist of one continuous section of segment cable 1000-ft long. When tested with a TDR, there would be no visible step on the TDR display unless the terminator was missing or the cable was damaged. If the terminator was missing, there would be a very definite upward step at 1000 feet, indicating an open circuit. For damaged cable, an observable impedance change occurs at the location of the cable fault. Figure 2-14 shows examples of reflections for these and other typical conditions.

During troubleshooting, you can use the TDR printer to make a map of the segment cable. This map will show the location of problems. It will also show all normal connections and transceiver taps as discontinuities, even though they may be within specifications. When all problems are eliminated and the cable meets specifications, you can print out a final copy of the map. Future maps can be compared to this original to detect problems.

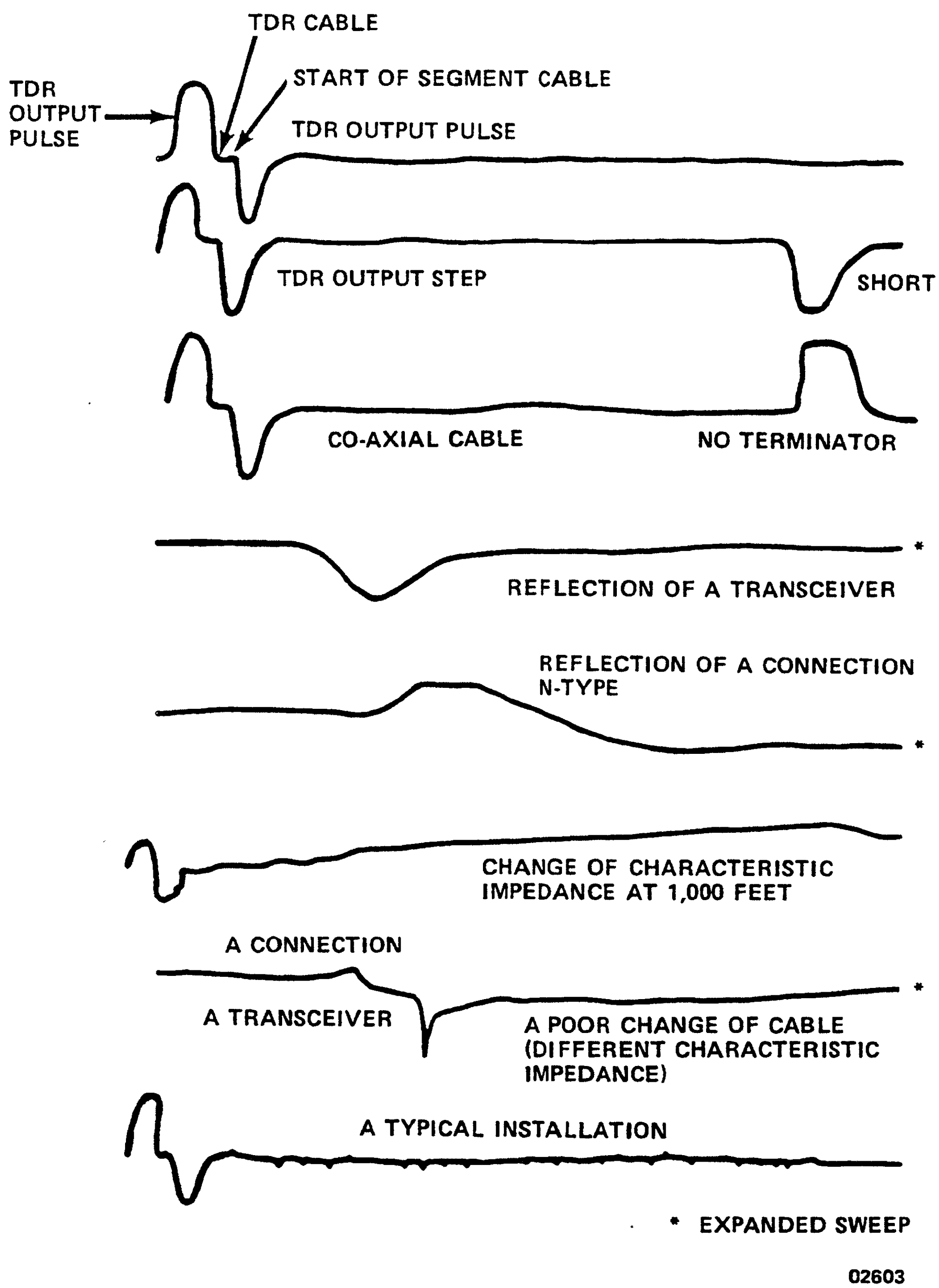


Figure 2-14. Typical Reflections as Viewed on a TDR

Factors That Affect TDR Accuracy

Two main factors affect how well the TDR can detect problems.

- Cable length
- Propagation velocity

Both are discussed in the following paragraphs.

Cable Length Affects Resolution

Resolution is the ability of the TDR to distinguish between separate faults. Resolution gets poorer as the cable length increases, because the rise time of the pulses is degraded as it travels down the cable. The longer the cable, the more degradation occurs. Eventually, two separate faults appear as one.

Propagation Velocity Affects Distance Measurements

Propagation velocity is the speed at which a signal travels down the cable, and depends on both the dielectric material used for the cable insulation and the geometry of the cable cross-section. The TDR uses the assumed propagation velocity to calculate distance and assumes a constant velocity for the entire cable. If velocity is not constant, distance accuracy is adversely affected. The accuracy to which the propagation velocity is known and controlled determines the accuracy of TDR measurements.

Velocity is normally not a concern when all cable is from the same manufacturer, because most cable manufacturers can control propagation velocity to within 0.5%. But propagation velocity may vary 2% to 3% between manufacturers, and mixing cable from different manufacturers in the same cable segment can affect TDR results.

Improving the Accuracy of TDR Measurements

Cable length reduces the TDR waveform and, subsequently, the ability of the TDR to determine feature characteristics of the cable. The shorter the length of segment cable between the TDR and the point of interest, the better the picture.

For example, if the cable run is 500 m (1650 ft), and cannot be broken for test purposes, the worst-case situation is a point of discontinuity at a distance of 250 m (825 ft) from one end (midpoint of the cable run). This point can be identified within 10 m (33 ft).

Two basic ways to improve distance measurement accuracy are:

- Take Multiple Readings - Since all TDR distance errors are percentage errors of the scan length, a useful technique is to move closer to the fault to get progressively more accurate distance readings.
- Use all available information - By using known points on the cable to calibrate TDR timing, improved accuracy is possible. For example, if it is known that a change of cable propagation velocity exists at 300 m (900 ft), calibrate the TDR for the dielectric of the first section using a scan length of 300 m (900 ft).

Guidelines for Expanding the Network

When expanding the network, as with the original installation, work from the floor plan and schematic created by the planner. Also, follow the same installation precautions and guidelines.

To add new equipment you may have to expand the network by adding transceivers, multiplexers, or new sections of segment cable. If the new equipment is close enough to the existing segment cable, attach a new transceiver or multiplexer to the existing segment cable. You can then route a transceiver cable between the transceiver or multiplexer and the new equipment. If the equipment is too far away from the segment cable to reach with a transceiver interface cable, add a length of segment cable to the network.

The procedures given earlier in this chapter describe how to add transceivers and multiplexers. The following three topics explain how to to add extra segment cable.

- Adding to the end of an existing cable
- Adding to the middle of an existing cable
- Adding a new segment cable

Adding to the End of an Existing Segment Cable

The main steps for adding to the end of an existing segment are outlined below. Refer to the procedures at the front of this chapter for detailed instructions on each step.

NOTE

Ensure that total segment cable length, with the addition, does not exceed 500 m (1650 ft). To avoid an impedance mismatch, use cable from the same lot as the existing cable segment. Too long a cable, or an impedance mismatch, may degrade performance enough that you must add a repeater between new and existing cables.

1. Route the new length of segment cable.
2. Install N-connectors on each end of new cable.
3. Remove terminator from end of existing segment cable to which you will add the section.
4. Connect new section to end of existing cable using barrel connectors.
5. Terminate open end of new cable.
6. Install required transceivers, repeaters, multiplexers on new section and check them out.
7. Make necessary additions to floor plan and schematic.

Adding to the Middle of an Existing Segment Cable

The following gives the main steps for adding to the middle of an existing segment. Refer to the procedures at the front of this chapter for detailed instructions on each step.

NOTE

Ensure that total segment cable length, with the addition, does not exceed 500 m (1650 ft). To avoid an impedance mismatch, use cable from the same lot as the existing cable segment. Too long a cable, or an impedance mismatch, may degrade performance enough that you must add a repeater between new and existing cables.

1. Obtain and route the new length of segment cable.
2. Install N-connectors on each end of new cable.
3. Cut existing cable and add a connector to cut ends.
4. Add new section to existing cable using barrel connectors.
5. Install required transceivers, repeaters, multiplexers on new section and check them out.
6. Make necessary additions to floor plan and schematic.

Adding a New Segment Cable

The following gives the main steps for adding a new segment and repeater. Refer to the procedures at the front of this chapter for detailed instructions on each step.

1. Route the new segment cable.
2. Install N-connectors and terminators on ends of new cable.
3. Install transceivers at appropriate points on both the existing and the new segment cable.
4. Install repeater between the two segments.
5. Attach required transceivers, repeaters, multiplexers to new segment and check them out.
6. Make necessary additions to floor plan and schematic.

Installing the Device Interface (DI) 3

Installing the Device Interface (DI) 3

This chapter describes how to install the device interface (DI). It also explains how to run the onboard diagnostics to ensure that the device interface is operating properly.

The procedures here assume all segment cables and related components, such as transceivers and repeaters, have been installed as described in chapter 2. They also assume that the installer has been trained by Control Data.

This chapter covers the following major areas:

- Important things to consider before starting
- Setting up the DI cabinet
- Installing DI logic boards
- Checking out the DI offline using onboard diagnostics
- Installing the DI in a rack or enclosure table
- Connecting the DI to the network
- Checking out the DI online using onboard diagnostics

Important Things To Consider Before Starting

Consider the following factors before starting to install the device interface.

- Protecting components from static discharge damage
- Where to unpack and check out the DI
- What tools are needed
- Verifying circuit boards and FCO level of equipment
- Using the DI cabinet configuration form

The following paragraphs explain each of the above factors.

CAUTION

Failure to observe the following electrostatic discharge precautions can result in equipment damage.

Protecting Components From Static Discharge Damage

All DI electronic assemblies are sensitive to static electricity due to the electrostatically sensitive devices within the circuitry. Although some of these devices, such as metal-oxide semiconductors, are extremely sensitive, all semiconductors as well as some resistors and capacitors may be damaged or degraded by static electricity.

Electrostatic damage may be caused by a direct discharge of a charged conductor, or by exposure to the static fields that surround charged objects. To avoid damage to electronic assemblies, observe the following precautions when servicing the DI.

- Keep boards in conductive shielding bags when the boards are not installed in the DI. See chapter 10 for part numbers. These bags provide absolute protection from direct static discharge and static fields surrounding charged objects. It is important to remember these bags are conductive. Do not place them where they might cause an electrical short circuit.
- Ground yourself to the DI when the electronics are or will be exposed. Connect yourself to ground by attaching your wrist strap to the ground lug on the front of the DI cabinet (figure 3-1), or to another suitable ground point on the DI. As a general rule, remember that you, the DI cabinet, and the circuit boards must all be at ground potential to avoid damaging static discharges. See chapter 10 for wrist strap part numbers.
- Remove boards from bags only when you are grounded.
- Turn off DI power before removing or installing circuit boards.
- Never handle the boards by the gold backpanel connectors.
- Never use an ohmmeter on any circuit board.

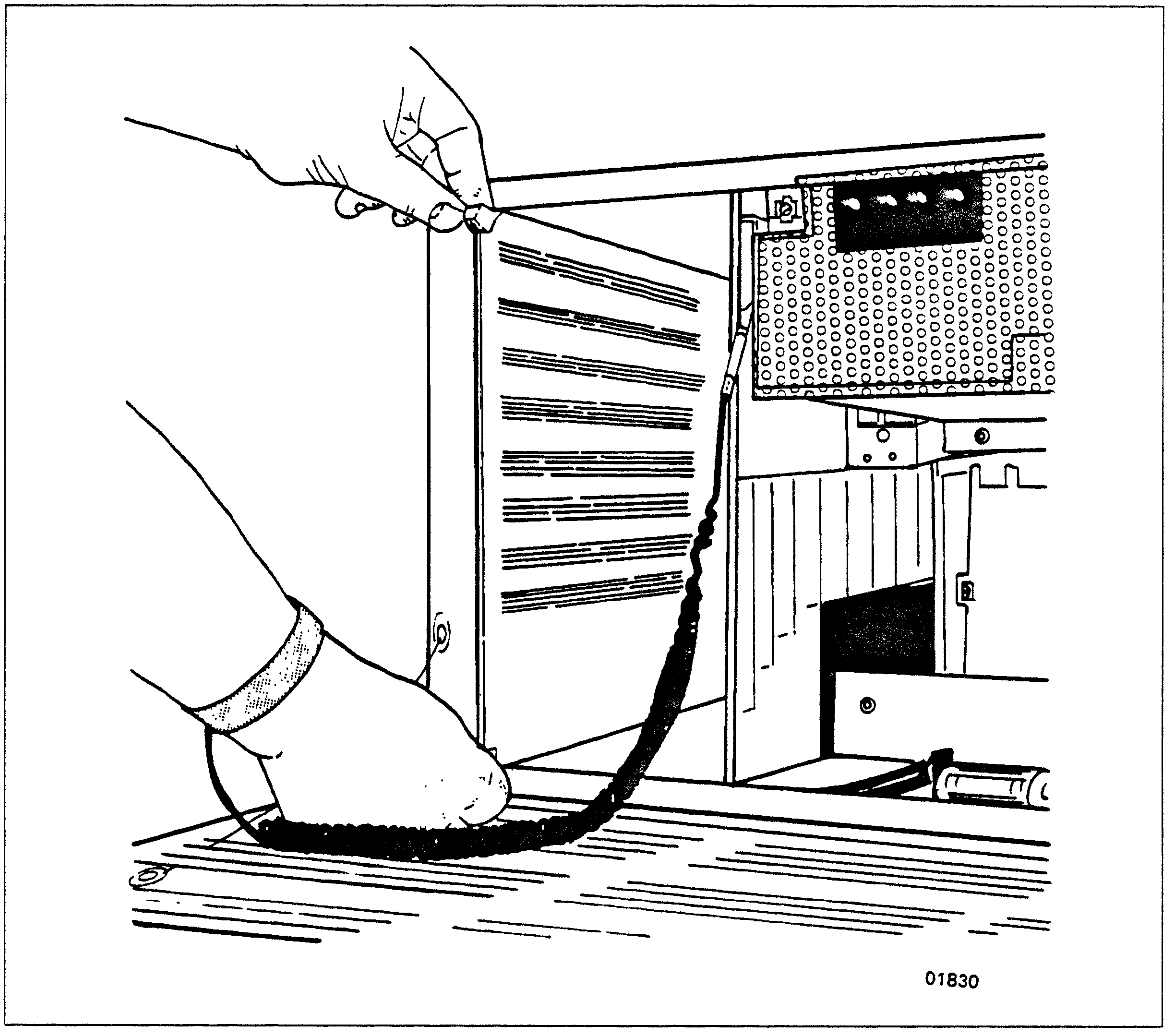


Figure 3-1. Using the Static Control Wrist Strap

Where To Unpack and Check Out the DI

WARNING

Moving an assembled (all boards installed) DI, requires two persons. If you are installing the DI by yourself, remove the boards before moving the unit to its final network location (cabinet or equipment rack).

CAUTION

Remove all logic boards before shipping the DI to another site or building.

The most convenient place to unpack, assemble, and check out the DIs depends on how many units will be installed. If there are many DIs, consider doing these procedures in a central area, then moving the DIs to the network locations. If there are only one or two DIs, it is probably be easier to do the whole process near the permanent network location (computer room, office, and so on).

Either way, make sure there is a table or workbench available to set the DI on. Also ensure that there is an ac receptacle within 8 feet of the workbench.

What Tools Are Needed?

The following is a list of tools you will need to perform the procedures in this chapter.

- 3/16-in Allen wrench for locking/unlocking the DI door.
- 1/4-hex socket or number 20 torx driver for removing and installing retainer plates on the back of the DI (phillips screwdriver on older units).
- Static-discharge wrist guard to prevent static electricity from damaging the logic boards.
- Ball-point pen, metal paper clip, or small tool for setting switches on the logic boards. Do not use a pencil -- graphite can damage the switches.
- Tie-wraps for securing cables in the cabinet.
- Needle-nose pliers or similar tool for installing jumper straps.
- RS-232-C ASCII terminal for entering the system identifier, and a null modem cable (part number 774875846) for connecting terminal to DI. A maintenance port cable (part number 22179467) may also be needed (see Entering the System Identifier, later in this chapter)

Verifying Circuit Boards and FCO Level of Equipment

For the DI to work properly, the circuit boards must be at the proper revision level and all applicable FCOs (field change orders) must be installed. If the DI is new from the factory, everything is at the latest level and you do not have to verify it. But when reinstalling an older unit, check that it is up to date by referring to Verifying FCO Level of Equipment, in chapter 10. Also, before swapping any boards between units, be sure that they are all at a usable revision level by referring to Logic Board Interchangeability, in chapter 10.

Using the DI Cabinet Configuration Form

Before installing logic boards and cables, you need the information provided on the DI cabinet configuration form. This form looks similar to the example in figure 3-2 and should arrive with the DI from the factory. The information on the configuration form is explained below.

- CUSTOMER - Name of customer, corporation, division, and so on.
- DATE - Date that the form was filled out by the salesperson.
- REVISION NO. - A sequential number assigned by the salesperson.
- ORDER TRANSMITTAL NUMBER - Number assigned by district sales administration.
- CFN - Assigned by sales to indicate the customer receiving the order.
- CUSTOMER ASSIGNED DI CABINET NO. - A number assigned to each DI cabinet that uniquely identifies this DI cabinet in a specified location. This DI cabinet number correlates to the one on the DI Placement/Network Schematic, which accompanies this configuration form.
- DI CABINET LOCATION - Building and room where the DI is to be installed.
- DI CABINET PRODUCT NUMBER - Indicates the product number for the DI cabinet.
- 50 OR 60 Hz - Indicates whether the cabinet requires 50 or 60 Hz power.
- EXISTING DI CABINET - Indicates whether the listed products are being installed in a new DI cabinet or one that is already at the site.
- BOOT SOURCE - Identifies the primary and secondary boot sources. Possible boot sources are a 2607-1 mainframe channel interface, 2608-1 ethernet serial interface, or 2609-1 communications interface module. The secondary boot source is optional. The board installation instructions, given later in this chapter, explain how to enable the boot features.
- MAIN BACKPANEL - Identifies the product number of the board for each slot in the main backpanel. If the board requires an external cable, the cable product number is also listed.
- LIM BACKPANEL - Identifies the product number of the board for each slot in the LIM backpanel. Cables, cable adapters, and the device to which each port connects are also listed.

CDCNET DEVICE INTERFACE (DI) CABINET CONFIGURATION FORM

CUSTOMER: Demo Inc DATE: 7/10/89 REVISION NO: A
ORDER TRANSMITTAL NUMBER: 566A CFN: 94069751
CUSTOMER ASSIGNED DI CABINET NO. (e.g. DI#1): DI# 2
DI CABINET LOCATION: BLDG Administration ROOM Classroom 1
DI CABINET PRODUCT NO: 2601-4 50 OR 60 HZ? 60
EXISTING DI CABINET: _____ YES X NO
BOOT SOURCE: (PRIMARY) 2607-1 SECONDARY _______ (2607-1, 2608-5, OR 2609-1)

MAIN BACKPANEL (large boards)

SLOT	PRODUCT NO.	CABLE PRODUCT NO. (NOTE 1)	SLOT	PRODUCT NO.	CABLE PRODUCT NO. (NOTE 1)
0	2601-1		4	2609-1	
1	2605-1		5	2608-5	2608-216
2	2604-1		6		
4			7	2607-1	

NOTE 1: IF A SLOT CONTAINS A 2608-5, LIST CABLE REQUIRED, I.E. 2608-XXX.
IF THE SLOTS CONTAIN TWO OR MORE 2609-1, LIST THE LIM SLOTS THAT EACH CONNECT TO, I.E. LIMS 0,1,2.

LIM BACKPANEL (small boards)

SLOT	PRODUCT NO.	PORT (NOTE 2)	CABLE PRODUCT NO. (NOTE 3)	CABLE ADAPTERS REQUIRED I.E. 2618-11	SPECIFY MANUFACTURER, PRODUCT, AND MODEL NO. OF THE DEVICE TO WHICH THE PORT IS ATTACHED
		0	2612-825	--	CDC 721
		1	2612-585	--	CDC 721
		2	2612-585	--	CDC 721
0	2612-1	3	2612-585	--	CDC 721
		4			
		5			
		6			
		7			
		0	2613-225	--	CDC 585
		1			
		2			
1	2613-1	3			
		4			
		5			
		6			
		7			

NOTE 2: NUMBER OF PORTS DEPENDS ON LIM TYPE.
NOTE 3: SEE CDCNET PRODUCT DESCRIPTION MANUAL SECTION 5 FOR CABLE DATA.
ADDITIONAL CABLE DATA AVAILABLE IN THE PRODUCT CONFIGURATION MANUAL.

Figure 3-2. Sample DI Cabinet Configuration Form

Setting Up the DI Cabinet

The following discussions describe unpacking and other steps to take before installing logic boards into the DI cabinet. The areas covered are:

- Unpacking the DI cabinet
- Inspecting the DI Cabinet
- Performing a power-on check

Unpacking the DI Cabinet

The DI cabinet is shipped without logic boards and packaged in a carton as shown on figure 3-3. Unpack the DI cabinet and remove it from the carton (figure 3-4).

Each logic board (and any associated cables) is shipped in a separate package (figure 3-3). The equipment number of the enclosed assembly is listed on the outside of the package. Check that all necessary boards are present, but do not unpack them until they are needed (refer to Unpacking DI Logic Boards later in this chapter).

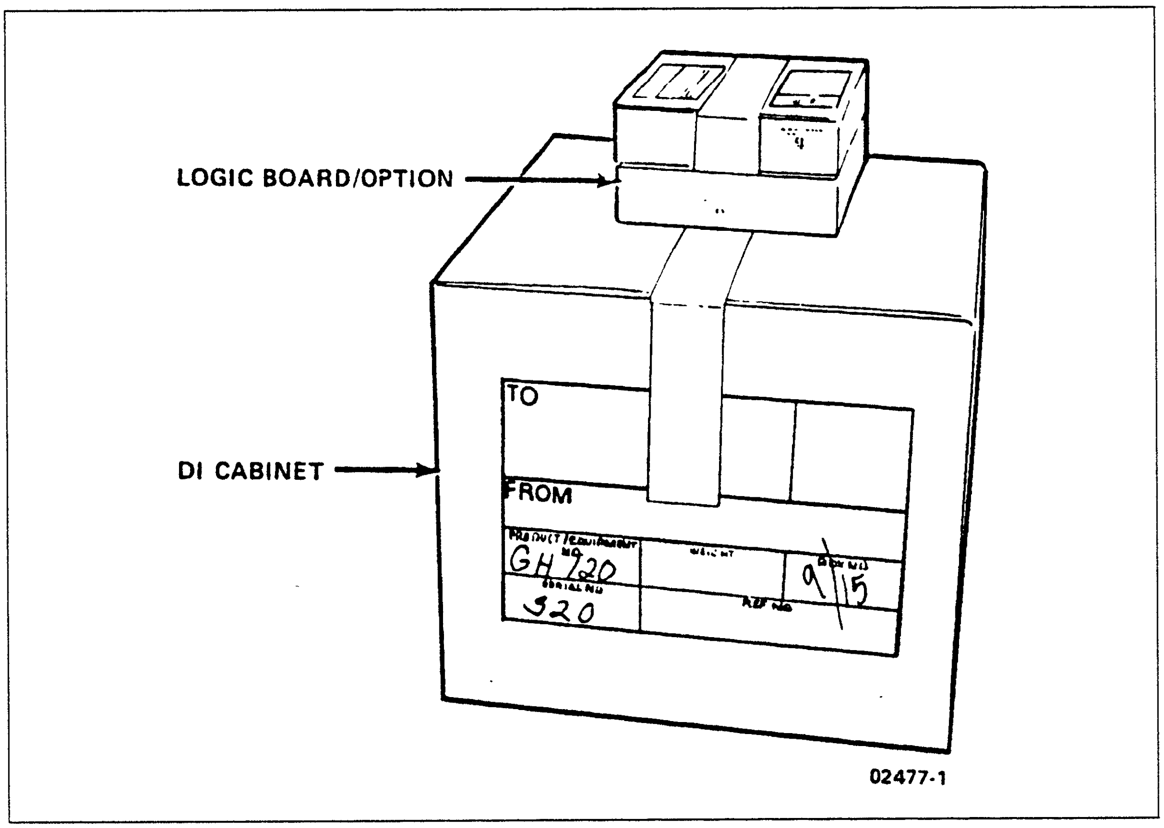


Figure 3-3. DI Cabinet and Options Shipping Cartons

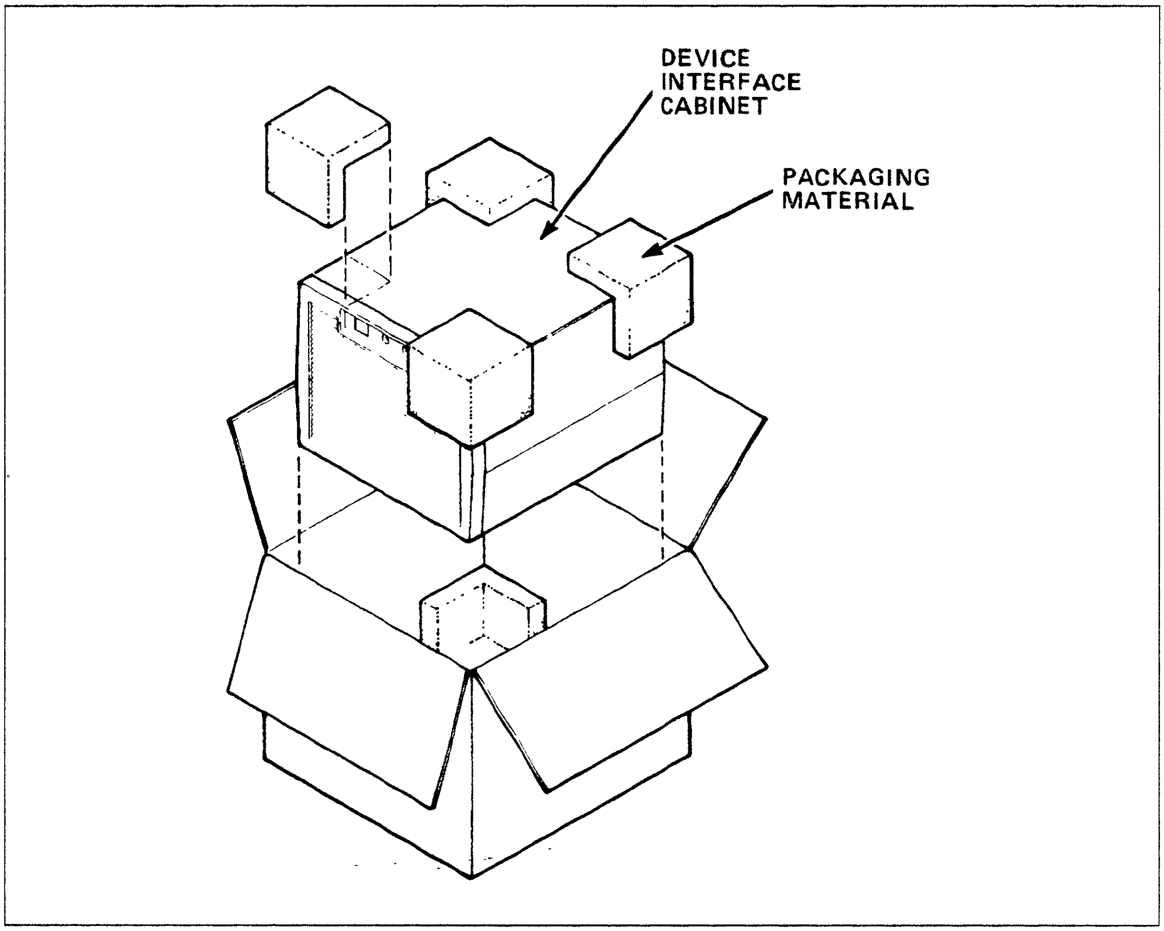


Figure 3-4. Unpacking the DI Cabinet

Inspecting the DI Cabinet

After unpacking the DI cabinet, perform a visual inspection to check for missing or damaged parts. Another purpose of this inspection is to familiarize you with the major components referenced in the procedures.

1. Place the DI on a table or workbench. Position it so that you have access to both front and back.

2. Open the cabinet door by using a 3/16-in Allen wrench to turn the locking screw counterclockwise (see figure 3-5).

3. Remove the power cord that is packaged inside the cabinet and set it aside. You will connect the cord in the next procedure.

4. Check that the four AA batteries are installed in the battery holder (see figure 3-6). If you need replacement batteries, use only alkaline type.

5. Identify the components, in the DI cabinet, that are shown on figure 3-6. Close the front door.

6. Refer to figure 3-7, and identify the components on the back of the DI cabinet.

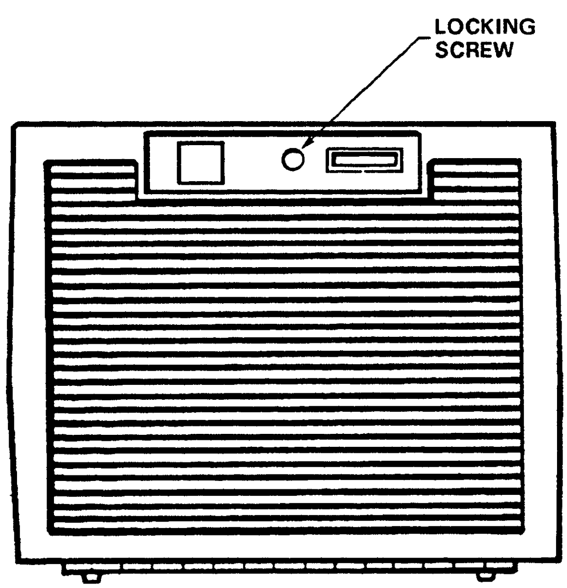


Figure 3-5. DI Cabinet Door Locking Screw

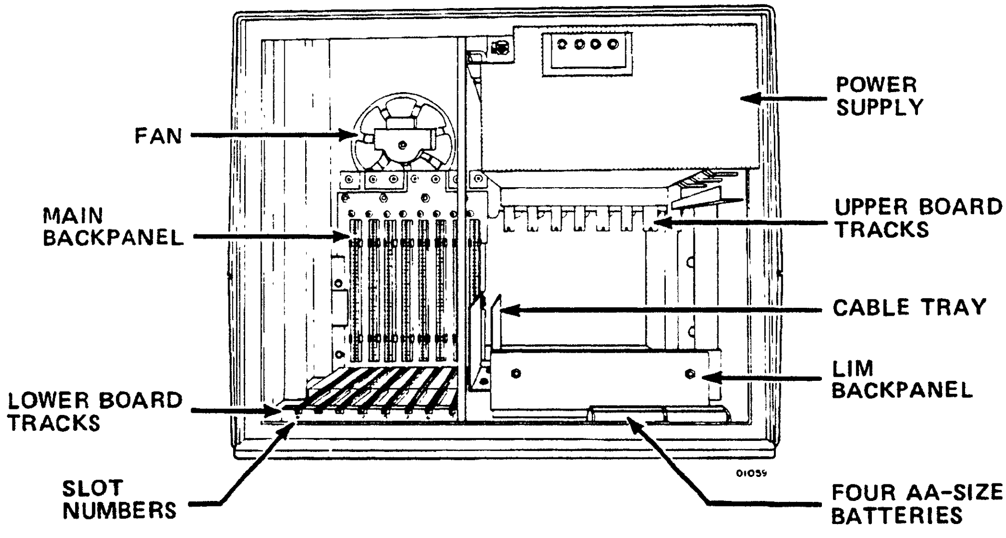


Figure 3-6. DI Cabinet Major Components - Front View

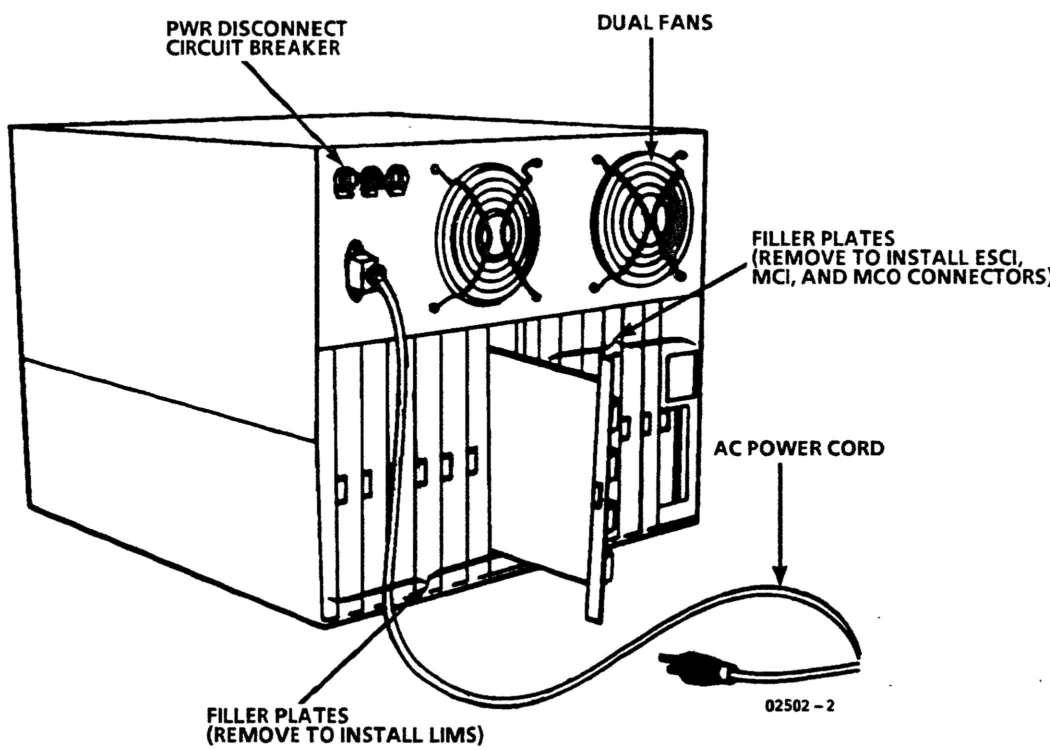


Figure 3-7. DI Cabinet Components - Back View

Performing an Operational Check on the DI Cabinet

The following describes how to connect the cabinet to ac power, power it up, and verify that it is operating properly. This check ensures that the cabinet is operating properly before you start to install cards.

1. Check DI equipment label on the back of DI cabinet (figure 3-8) and verify that DI power requirements match those of the site (120 V ac or 240 V ac).

2. Check ac power cord and verify that it matches your power requirements.

   120 V cord, part number 15165432
   240 V cord, part number 15165427

3. Connect ac power cord between receptacle on rear of DI cabinet and an ac power outlet.

4. Turn on DI power by setting PWR DISCONNECT circuit breaker to 1 (On) position.

5. Refer to figure 3-9 and check indicators on front of DI. The correct indications are as follows:

Indicator	Color	ON/OFF
BATT	YELLOW	OFF
ON	GREEN	ON
FAULT	RED	OFF
I/O	GREEN	OFF (not used)

If the indications are not as shown above, proceed as follows:

- If FAULT indicator is On, the unit may be overheated. Set PWR DISCONNECT circuit breaker to 0 (Off) and disconnect power cord.
- If ON indicator is not lit, set PWR DISCONNECT circuit breaker to 0 (Off), disconnect power cord, and refer to Troubleshooting DI Power Problems in chapter 5.
- If both fans are not operating, set PWR DISCONNECT circuit breaker to 0 (Off) and refer to Troubleshooting DI Power Problems, in chapter 5.

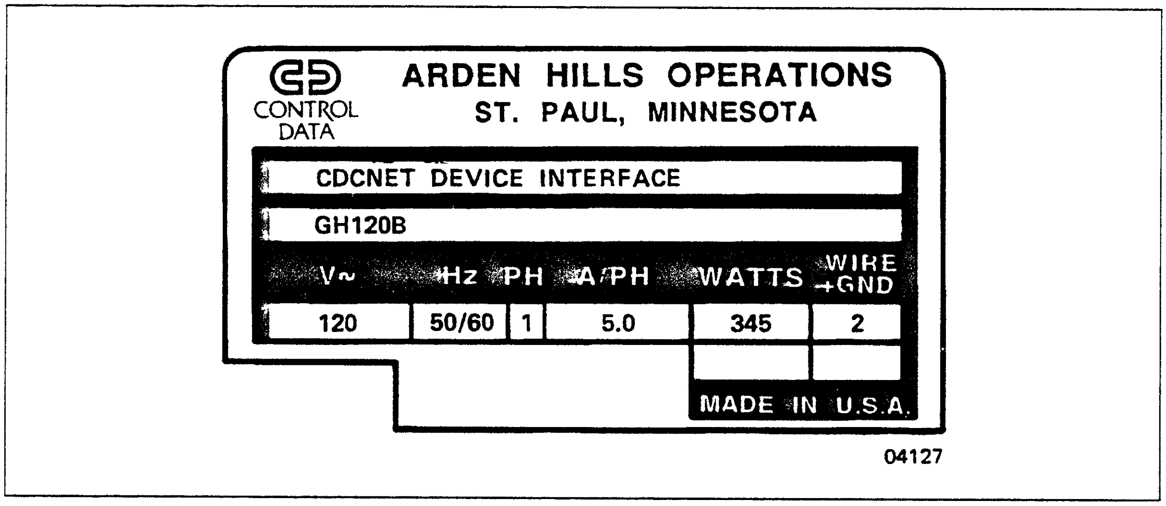


Figure 3-8. Typical DI Equipment Label

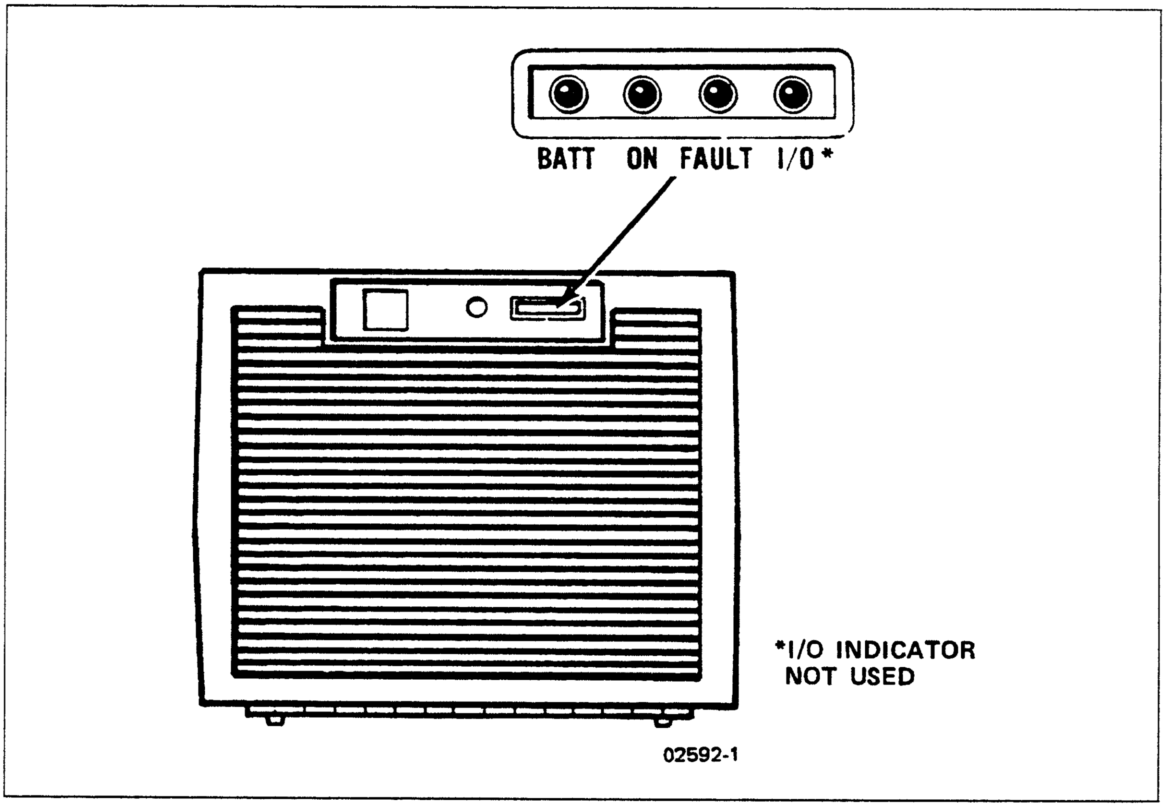


Figure 3-9. DI Cabinet Indicator Lights

Unpacking DI Logic Boards

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to lug on power supply as shown in figure 3-1. Do not handle the boards by the gold backpanel connectors. Always keep boards in electrostatic discharge (E.S.D.) bags when you are not handling them.

Figure 3-10 shows how boards are typically packaged. To minimize risk of damage, do not unpack the boards until they are needed.

When the cabinet is unpacked and operating correctly, install the logic boards. Refer to the cabinet configuration form (figure 3-2) to determine what boards are needed. Install all logic boards with the component side on the left, and make sure that the upper and lower edges of the board are guided into the upper and lower board tracks. Procedures for configuring and installing the boards are given later in this chapter.

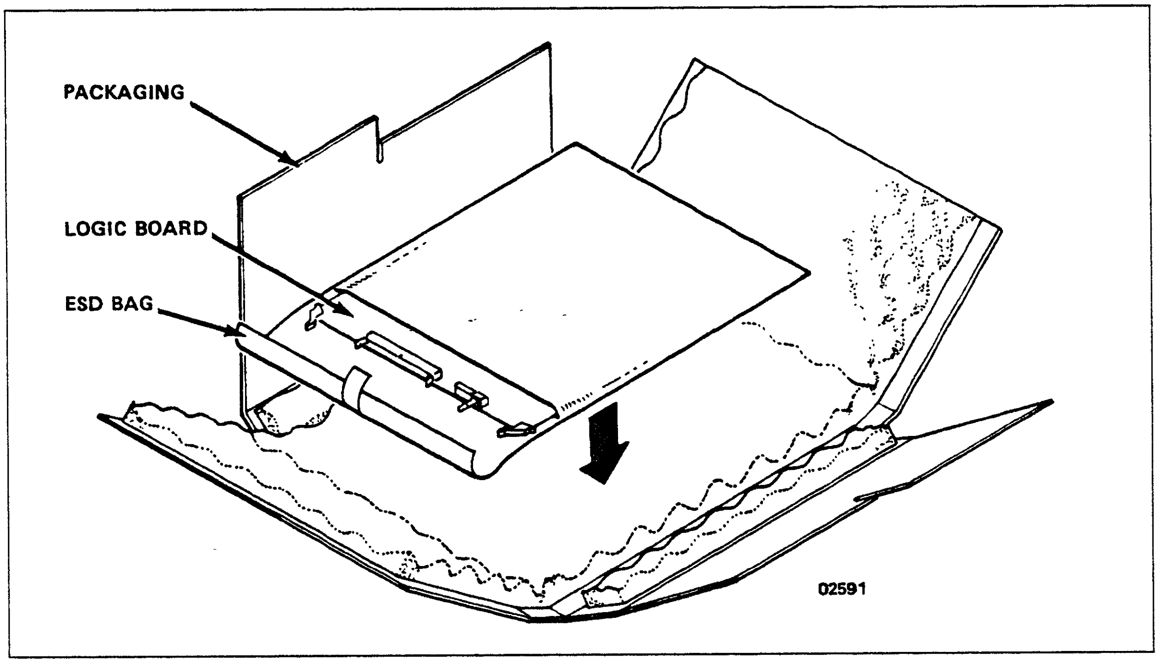


Figure 3-10. Logic Board Packaging

Installing the Maintenance Console Option (MCO)

Equipment Number: TN113-B

The maintenance console option (MCO), shown in figure 3-11, is an optional assembly that enables you to connect a modem or ASCII terminal directly to the main processor board. This is useful for certain maintenance activities. An alternative to the MCO is the maintenance port cable that comes in the CDCNET maintenance kit (see Entering the System Identifier Using an ASCII Terminal, for more information).

NOTE

On newer versions, the TO TERMINAL and TO MODEM connectors are connected in parallel and wired identically. You can use either one. However, you cannot use them both at the same time (see note on figure 3-11). On older versions, you can use only the TO MODEM connector.

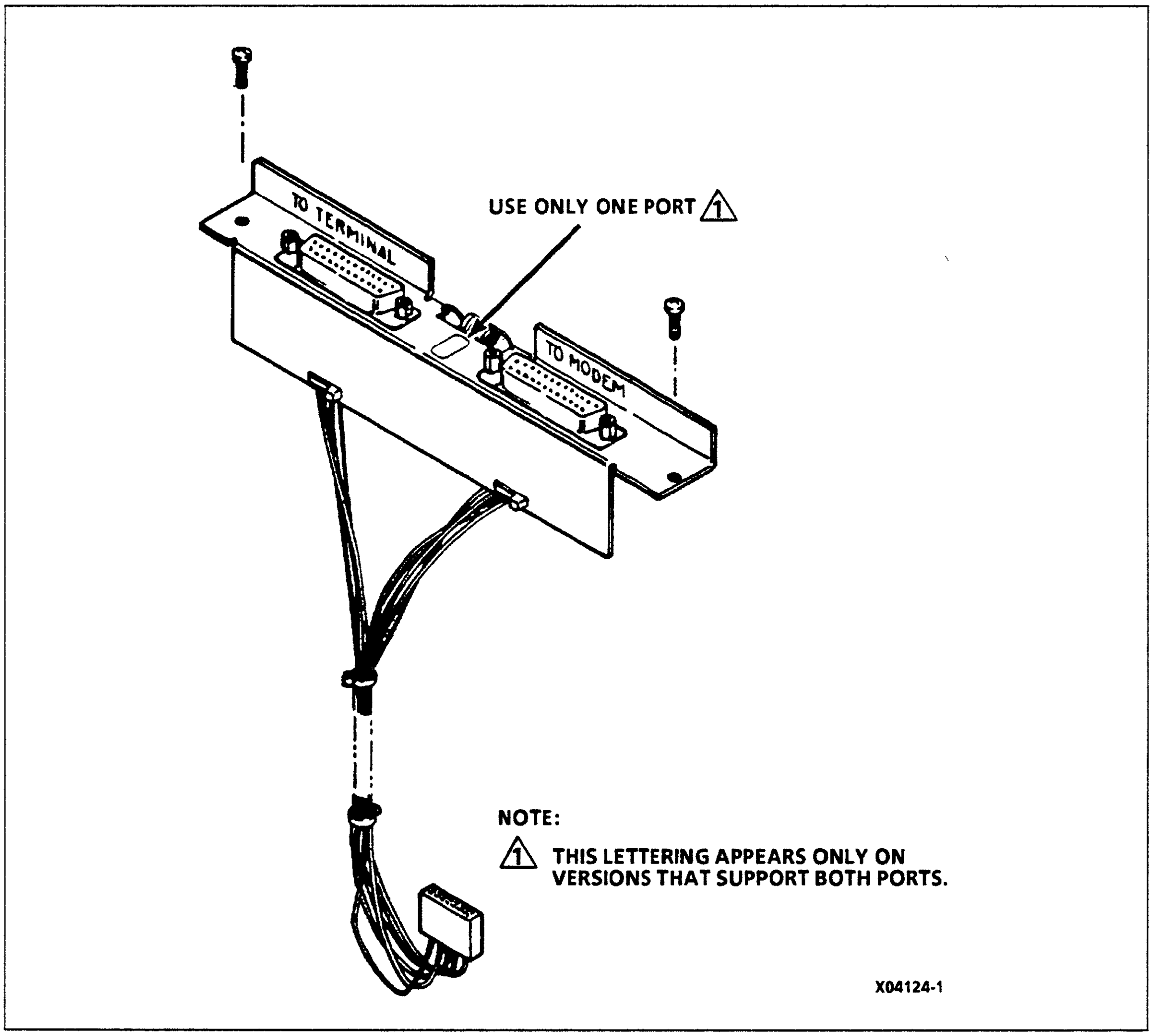


Figure 3-11. Maintenance Console Option (MCO)

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.

2. Remove the two filler plates located on the far right at the back of the cabinet (figure 3-12). Note that rightmost plate is double width. Save the six screws for later use.

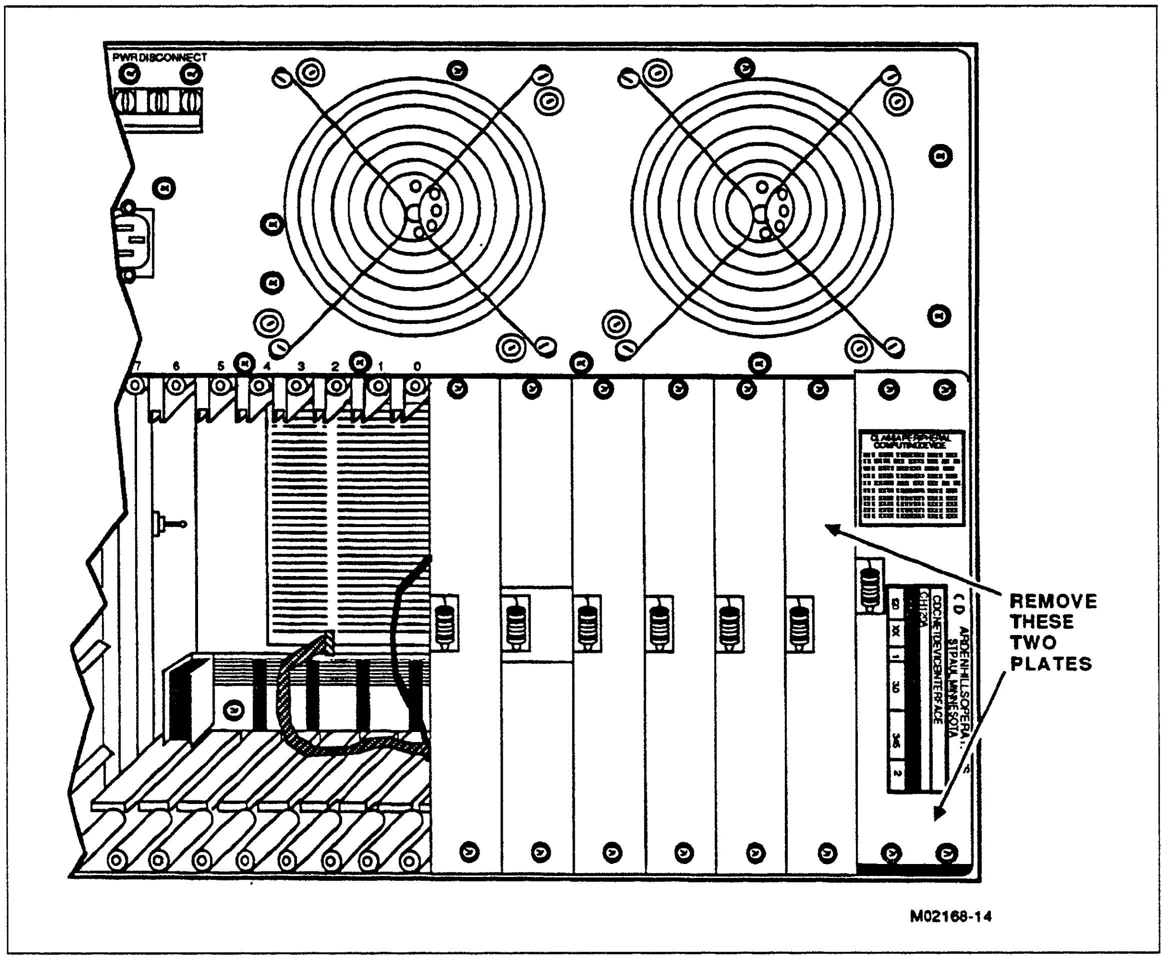


Figure 3-12. MCO Filler Plates

3. Refer to figure 3-13 and route cable from the back of the cabinet to the front, by passing it through the rectangular hole in backpanel.

4. Tie-wrap MCO cable to the cable mount on the left front side of cabinet. You will connect it to the main processor board (MPB) after that board is installed (next procedure).

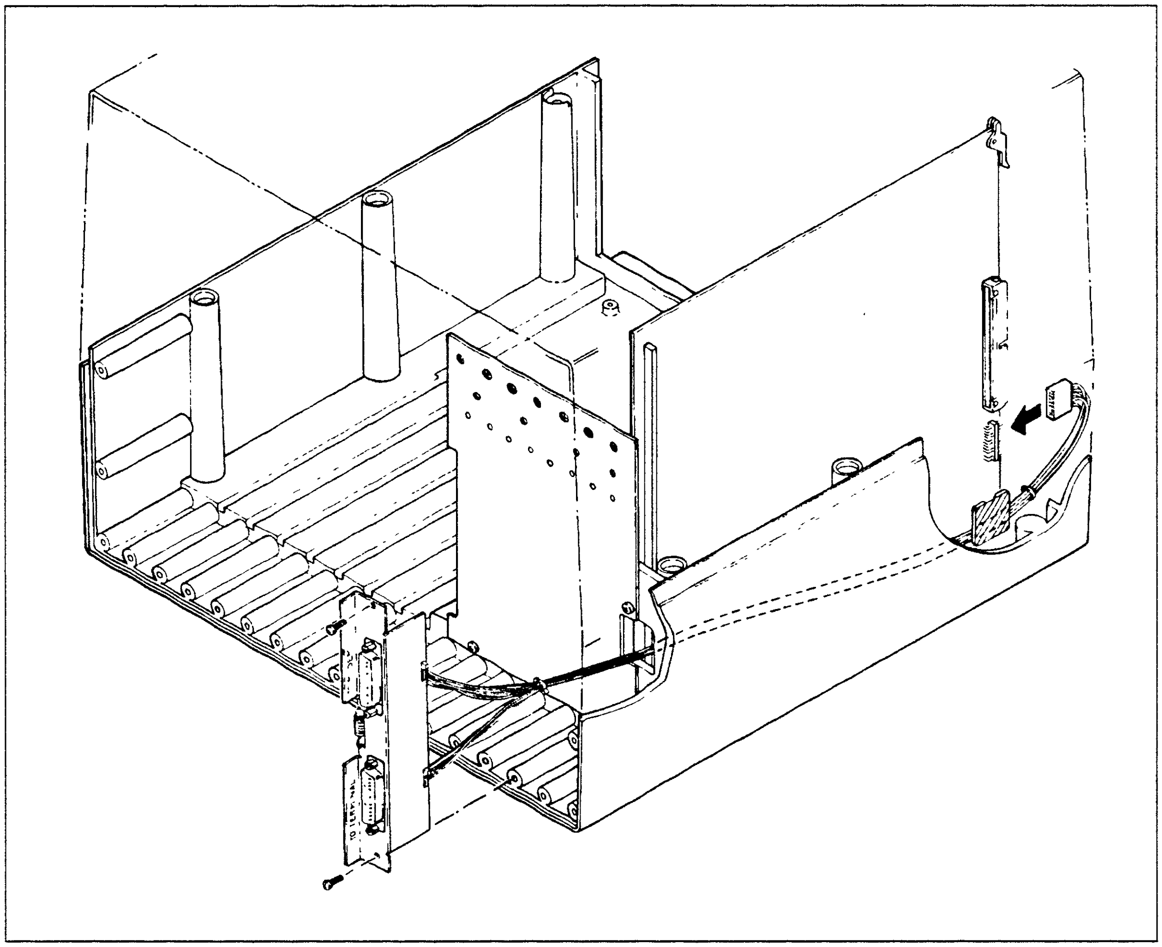


Figure 3-13. Routing the MCO Cable

CAUTION

Make sure that all empty locations on the back of the DI are covered by a filler plate. Open locations could cause radio-frequency interference (RFI). Also, do not remove the springs on the filler or retainer plates; they are electromagnetic filters.

5. Install MCO retainer plate in the location of the single-width plate removed in step 2. Ensure that spring on plate is on the left.
6. Replace double-width filler plate using four screws removed in step 2. Figure 3-14 shows the MCO installed.

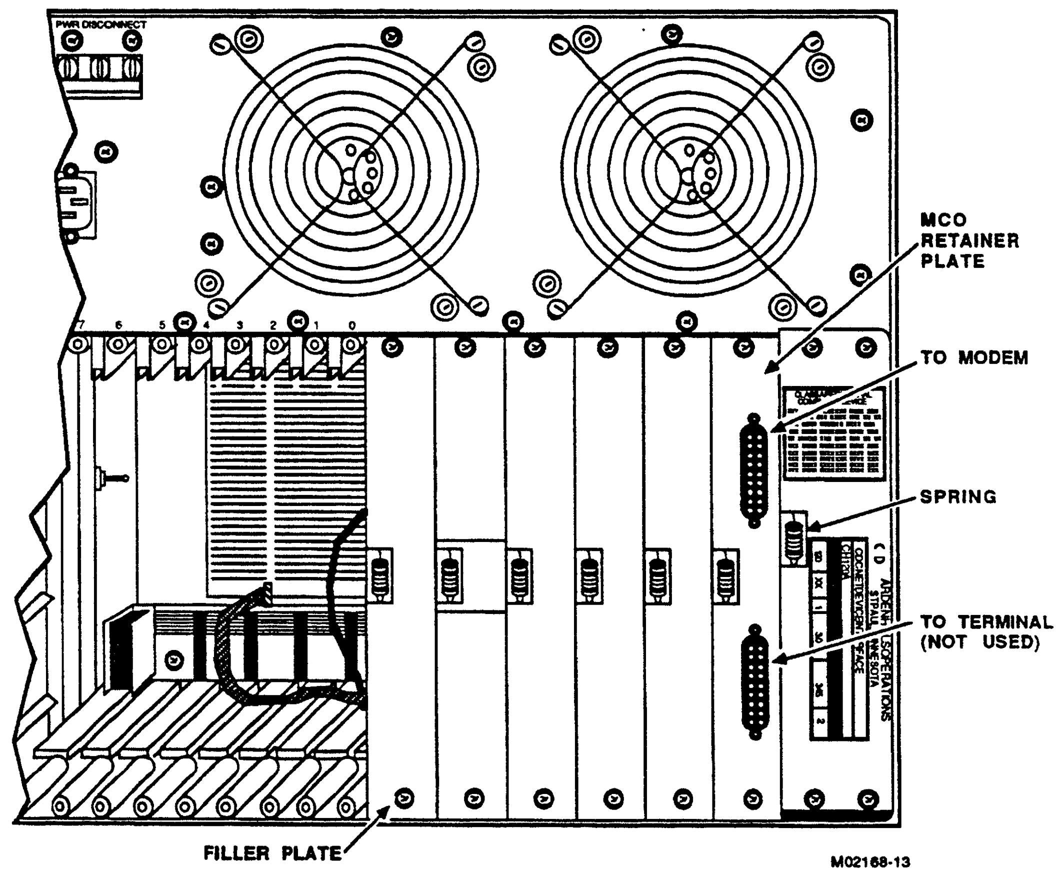


Figure 3-14. Installed MCO

Installing the Main Processor Board (MPB)

Equipment Number: DY245-A, AC117-A

CAUTION

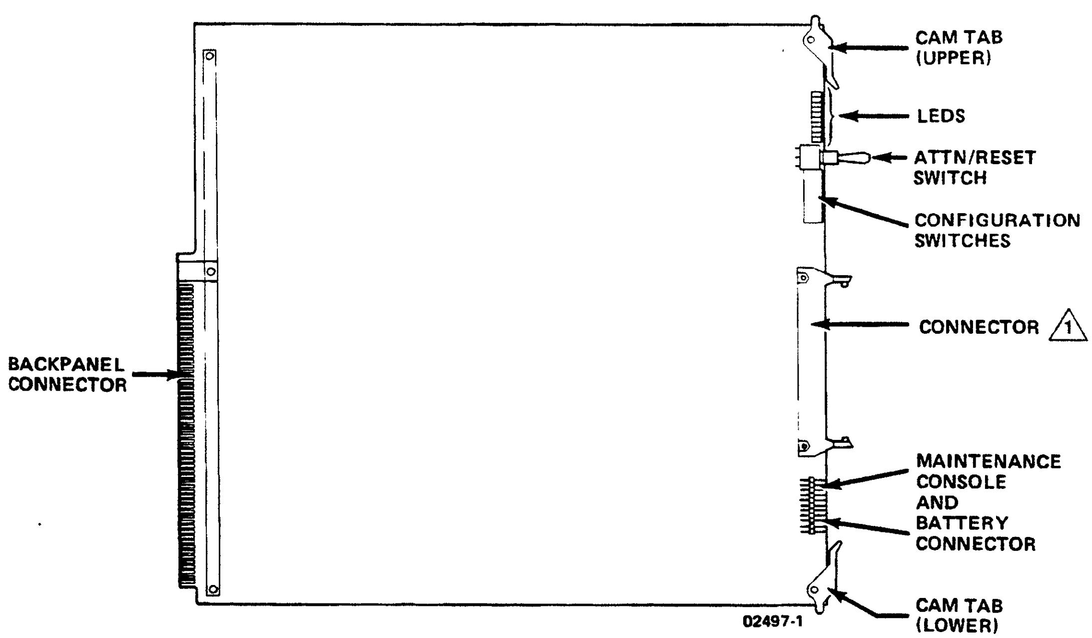
Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to lug on power supply as shown in figure 3-1. Do not handle boards by the gold backpanel connectors. Always keep boards in electrostatic discharge (E.S.D.) bags when you are not handling them.

There are three parts to this procedure. The first tells you how to install the board. The second describes how to enter the system identifier for the DI. The third explains how to set the MPB switches for normal operation.

Installing the MPB Board In DI Cabinet

1. Unpack MPB (figure 3-15), equipment identification tag, and FCO label. Attach equipment identification tag and FCO label to plastic fold-out holder inside DI cabinet door.

2. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.



NOTE:

1 Used for MPB/PMM cable on DY245-A, not used on AC117-A.

Figure 3-15. Main Processor Board (MPB)

CAUTION

Before installing the MPB, ensure that the battery cable and MCO cable (if installed) are out of the way.

3. Install MPB board into backpanel as follows.

   a. Ensure that both upper and lower cam tabs are in the unlocked position (pointing toward you like the lower cam tab in figure 3-15).

   b. Slide the MPB into slot 0.

   c. Ensure that board is fully seated into the backpanel, then lock board into place by pressing top cam tab down and bottom cam tab up.

4. Refer to figure 3-16 and route the battery cable behind the vertical support rod and to the left side of the cabinet.

5. Connect the battery cable to bottom pins of connector on the lower front edge of the MPB (figure 3-16). The connectors are keyed to prevent improper installation. The MCO plugs onto the top pins, but do not connect it yet.

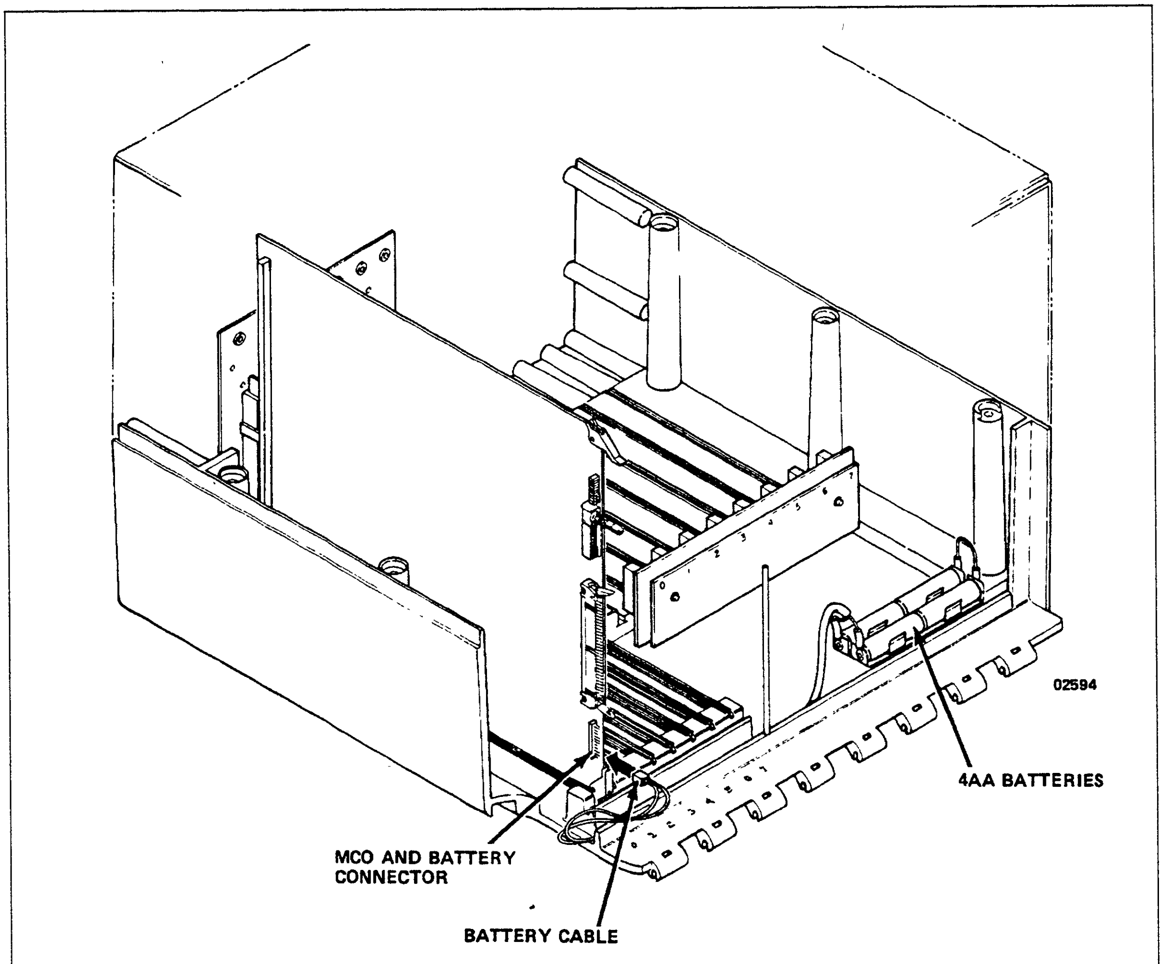


Figure 3-16. Connecting the MCO and Battery Cables

6. Turn on DI power by setting PWR DISCONNECT circuit breaker to 1 (On) position.

7. Check that Power On indicator (green) on MPB is lit (figure 3-17). If that indicator is not lit:

   a. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.

   b. Unplug power cord.

   c. Refer to Troubleshooting DI Power Problems in chapter 5.

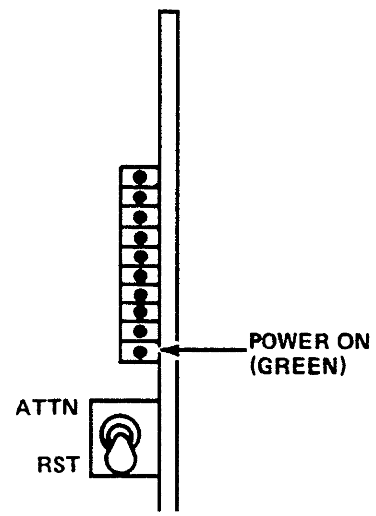


Figure 3-17. MPB Power Indicator

8. Check that BATT indicator, on top front of DI cabinet, is off (figure 3-18). If it is on, check for the following:

   - Batteries are installed according to the diagram on the battery holder.
   - Battery cable is connected.
   - Batteries are fresh (try another set or use a battery checker.)

9. Check BATT indicator as follows.

   a. Ensure that batteries are connected and cabinet power is on.

   b. Unplug battery connector from MPB board and observe that BATT indicator lights, to show loss of battery power. If it does not light, replace it following the procedure in chapter 9, Removing and Replacing Parts.

10. Reconnect battery cable (refer to step 5).

11. If you installed the MCO, plug its connector onto the pins directly above the battery connector (it is keyed to fit correctly).

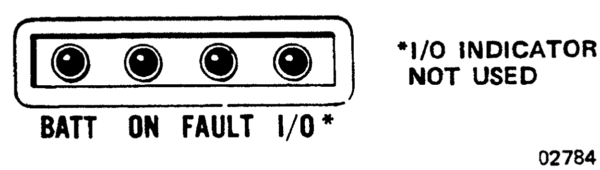


Figure 3-18. Cabinet BATT Indicator

Entering the System Identifier

NOTE

With a DY245-A MPB, make sure that the batteries are installed and in good condition before entering the system identifier. The BATT indicator should be out when DI power is on. If ac power is lost and the batteries fail, or the battery cable is disconnected, the identifier will be lost and must be reentered. Turning DI power off does not erase the identifier as long as the batteries are good.

With an AC117-A MPB, the system identifier is retained even if both DI and battery power are lost. However, you must reenter the ID if the board is moved to another DI.

Each DI has a unique system identifier (also referred to as the Initialization System Identifier).

The identifier is printed on a label on the plastic fold-out holder inside the front door of the DI. It is 16 hexadecimal digits in length. An example of a system identifier is 08-00-25-10-00-68-6A-88.

There are two ways to enter the system identifier.

- If the DI has the maintenance console option (MCO), you can use an RS-232-C ASCII display or printer terminal. This is the most convenient method. You can also use a maintenance port cable to connect to a display terminal or printer. The maintenance port cable is part of the CDCNET maintenance kit.
- If you do not have an ASCII terminal and either the MCO or maintenance port cable, use the configuration switches on the MPB board.

Both procedures are given below.

CAUTION

If you are using a terminal and the `TEMP HIGH - TURN OFF DI` message appears, turn off DI power immediately. Do not proceed until problem is fixed (see Overall Network Troubleshooting in chapter 5). This message indicates high cabinet temperature. The DI FAULT light also lights to indicate high cabinet temperature.

NOTE

While the terminal is connected to the MPB, it may display the following messages:

`REPLACE BATTERIES`	Tells you to replace the batteries before proceeding (the BATT indicator on the cabinet should also be on).
`ILLEGAL COMMAND` or `INPUT NOT HEX`	Indicates that an error was made when typing in commands.

Entering the System Identifier Using an ASCII Terminal

1. Set up terminal to operate with the following communications characteristics:

   RS-232-C Interface
   Asynchronous Mode
   7 bits with 1 stop bit
   Even Parity
   Baud Rate: 300, 1200, or 9600

   The terminal must also supply Data Terminal Ready (DTR).

   NOTE

   Perform either step 2 or 3, depending on whether you use the MCO or maintenance port cable.

2. If you use an MCO, connect a null-modem cable between the terminal and the top MCO connector, labeled TO MODEM, on the back of the DI (figure 3-19). Use part number 74875846 or equivalent cable.

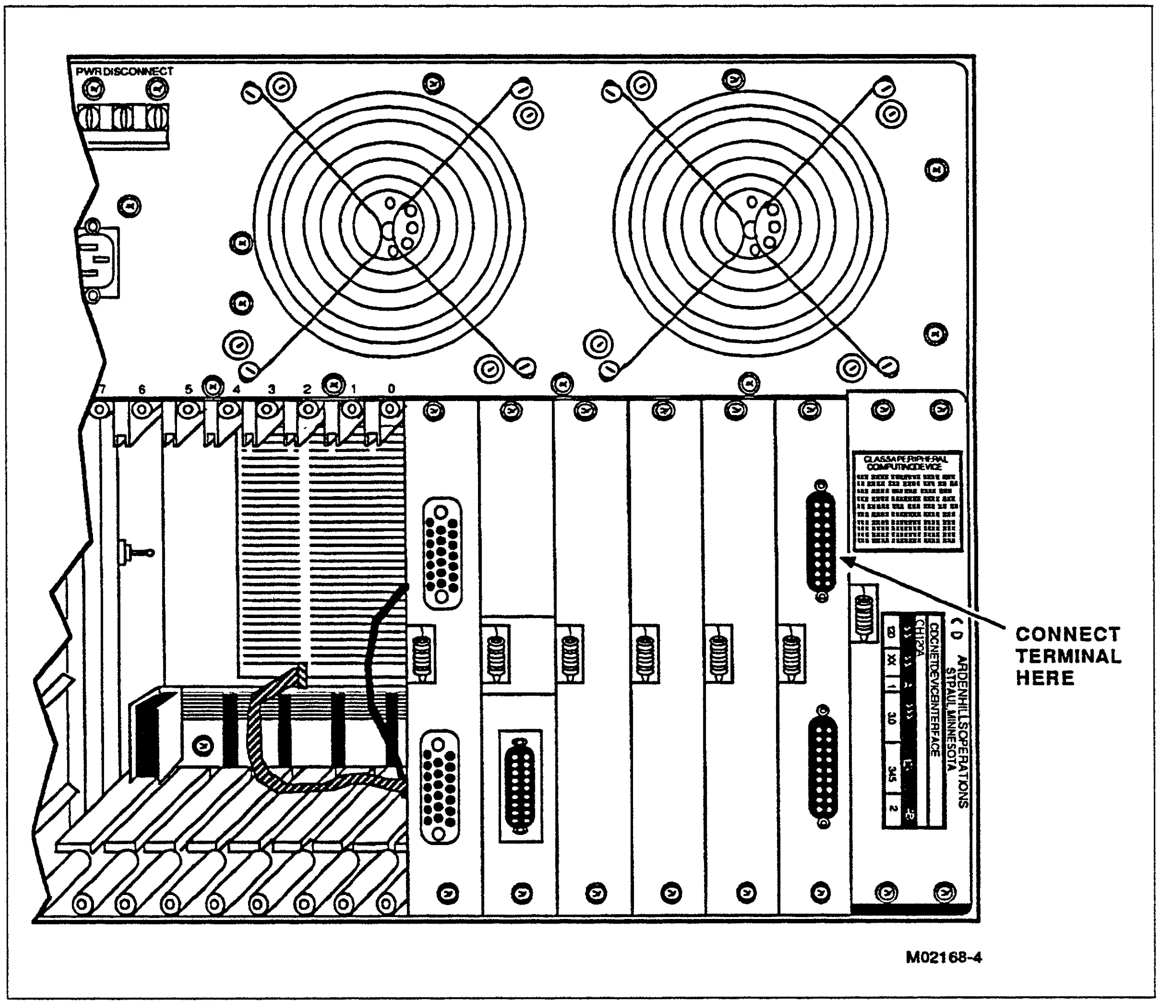


Figure 3-19. Connecting a Terminal to the MCO

3. If you use a maintenance port cable, install it as follows (figure 3-20).

   a. Unplug MCO (if installed) from MCO-and-battery connector.

   b. Plug maintenance port cable 18-pin connector to pins directly above battery connector plug. It is keyed to fit correctly.

   c. Connect null modem cable between maintenance port cable 25-pin connector and the terminal. Use part number 74875846 or equivalent null modem cable.

4. Turn on DI and terminal.

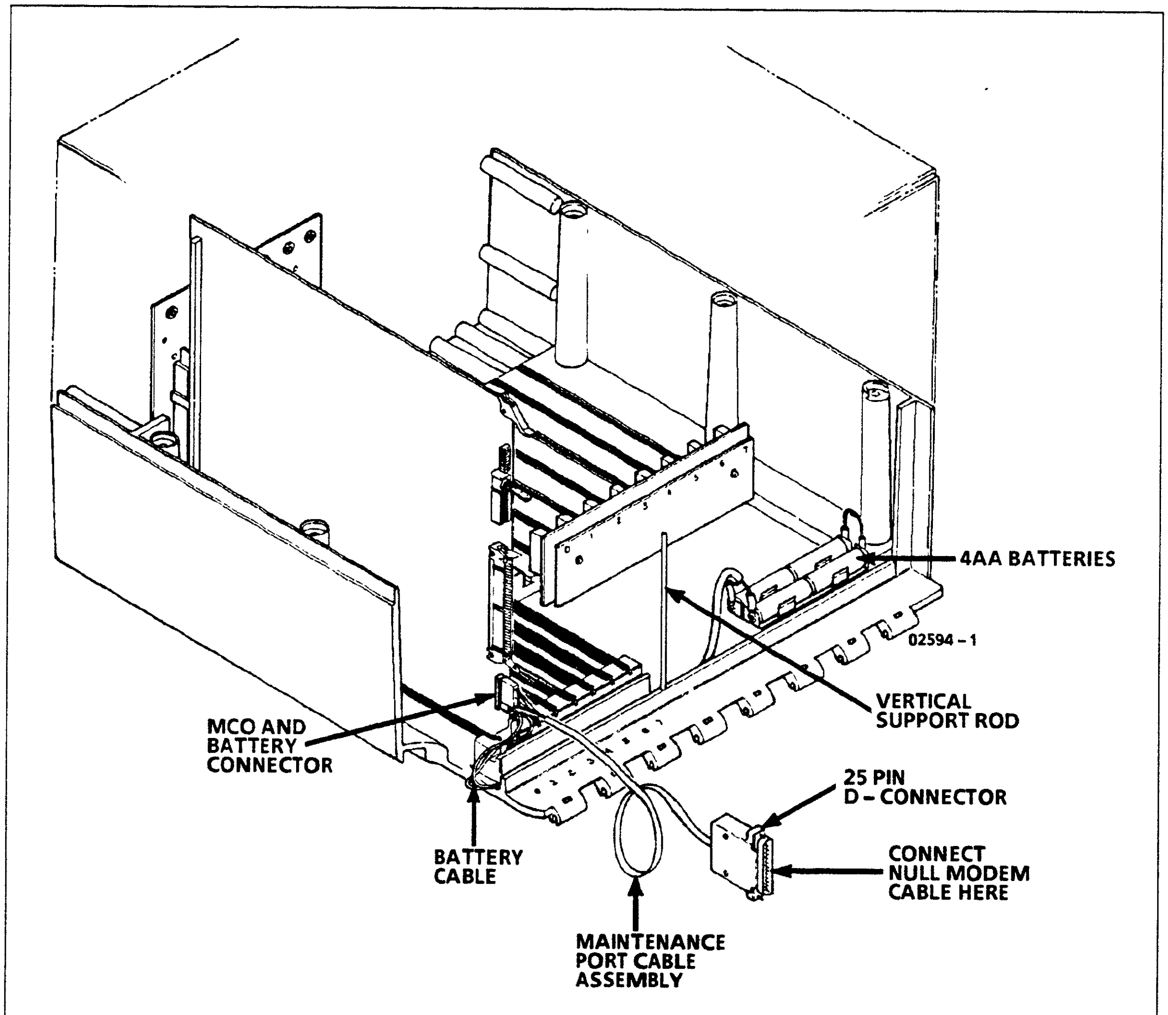


Figure 3-20. Connecting Maintenance Port Cable

NOTE

The following conventions apply to all configuration switches on the DI logic boards.

LEFT = OFF = "0"
RIGHT = ON = "1"

5. Set MPB configuration switches as follows (figure 3-21).

   a. Set switches 1 through 6 and switch 9 to the left (Off) and set switch 10 to the right (On). This puts the DI in maintenance mode.

   b. Set DI to match the baud rate of the terminal by setting switches 7 and 8 as follows (R=right, L=left).

Baud Rate	300	1200	9600
Switch 8	R	L	R
Switch 7	R	R	L

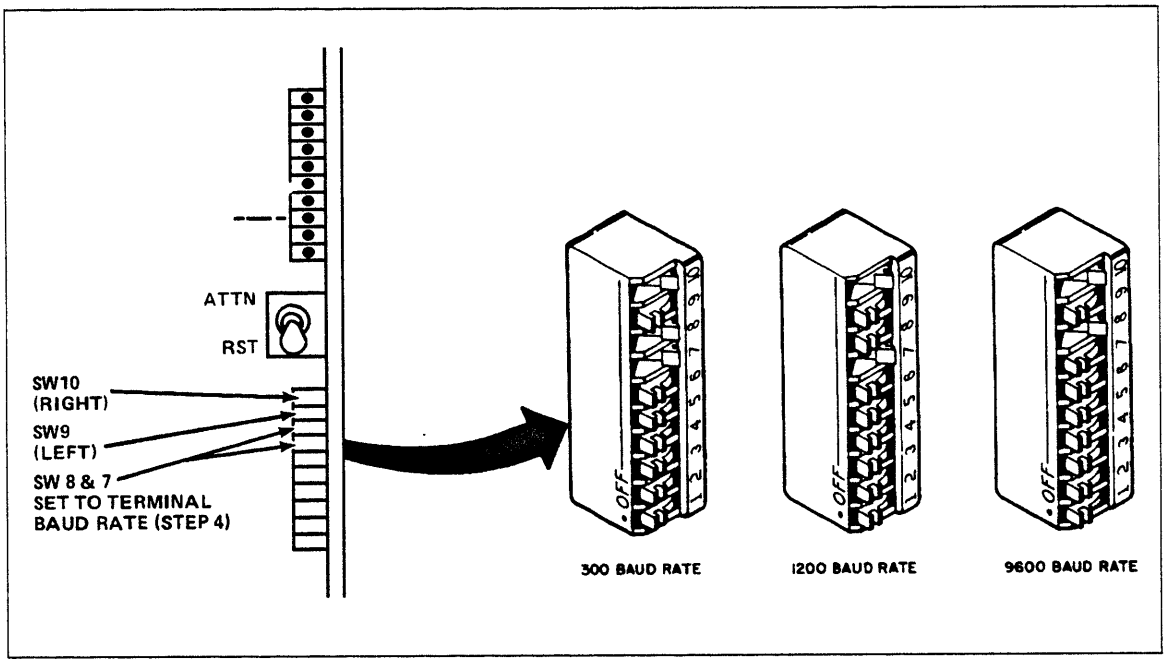


Figure 3-21. MPB Switch Settings for Entering System ID Through Terminal

6. Reset the DI by pulling out and pressing down momentarily on MPB ATTN/RST toggle switch. Depending on the type of MPB, one of the following messages appears on the terminal:

   - For an AC117-A:

     ```
     DI MAINTENANCE MODE

     PROGRAM EEPROM VERSION = 7001

     LCA EEPROM VERSION = 0036

     ** NODE ADDRESS CHECKSUM ERROR

     ENTER CN nnnn nnnn nnnn nnnn (CR)
     to change INITIALIZATION ID

     ?
     ```

     On this display:

     - Since the system ID is held in EEPROM, the checksum error message occurs only if a valid ID has never been entered or the EEPROM has been corrupted.
     - The (CR) indicates carriage return.
     - The ? is a prompt indicating that the terminal is waiting for a command. You will enter the command in the next step.

   - For a DY245-A MPB:

     ```
     DI MAINTENANCE MODE

     Registers:  D0 = (xxxxxxxx)/D1 = (xxxxxxxx)


     CHECKSUM ERROR

     Enter INITIALIZATION SYSTEM ID AT 8400

     ?
     ```

     On this display:

     - Ignore the D0 and D1 values.
     - Ignore the Checksum error. This appears because the system identifier has not been entered.
     - The ? is a prompt indicating that the terminal is waiting for a command. You will enter the command in the next step.

NOTE

The label on the plastic holder inside the front door shows the system identifier number as pairs of digits separated by dashes. However, you must enter it as shown below, groups of four digits separated by spaces.

---

7. Type in the following, including spaces, on the terminal keyboard.

- For an AC117-A, type:

```
CN nnnn nnnn nnnn nnnn (CR)
```

Where:

CN = CHANGE NODE ADDRESS command

nn = 16-digit system identifier

Remember, the spaces and carriage return (CR) are important. After you press carriage return, the terminal displays:

```
?
```

Identifier entry is complete.

- For a DY245-A, type:

```
E 8400 nnnn nnnn nnnn nnnn (CR)
```

where:

E = Enter memory command

8400 = Starting memory address

n...n = 16-digit system identifier

Remember, the spaces and carriage return (CR) are important.

After you press the carriage return, the terminal displays:

```
E 8408 ?
```

Simply press the carriage return again and the identifier entry is complete.

8. Pull out and press down on ATTN/RST switch to perform a manual reset.

   - If the CHECKSUM ERROR message does not appear, the identifier was entered successfully.

   - If CHECKSUM ERROR appears, the identifier was entered unsuccessfully. You can check the contents of memory by using the "Display Memory" command as follows:

     - For an AC117-A, type:

       ```
       D 1000400 10 (CR)
       ```

       Where:

       D = Display Memory Contents

       1000400 = First address to be displayed

       10 = Number of words to be displayed

     - For a DY245-A, type:

       ```
       D 8400 10 (CR)
       ```

       where:

       D = Display Memory Contents

       8400 = First address to be displayed

       10 = Number of words to be displayed

     Compare the identifier displayed on the terminal with the one on the label. If the identifier was entered incorrectly, reenter it (step 7). If it was entered correctly but the error message still appears, refer to Overall Network Troubleshooting in chapter 5 for further instructions.

   - Skip next procedure on Entering the System Identifier manually and perform procedure for setting MPB switches.

Entering the System Identifier Manually

If an ASCII terminal and either the MCO or maintenance port cable are not available, you must enter the system identifier with the configuration switches on the MPB.

1. On the MPB, set switch 10 to the right (On) and switches 9 through 1 to the left (Off).

2. Turn on DI power. All indicators come on for 1 second (figure 3-22), then indicator 5 (7 is top indicator) flashes for about 10 seconds; disregard other indicators.

3. Indicator 5 stops flashing and yellow indicator (second from bottom) stays on, meaning that diagnostic test could not continue because of an invalid identifier. After a 10-second timeout, the test restarts. Proceed to step 4 after indicator 5 stops flashing.

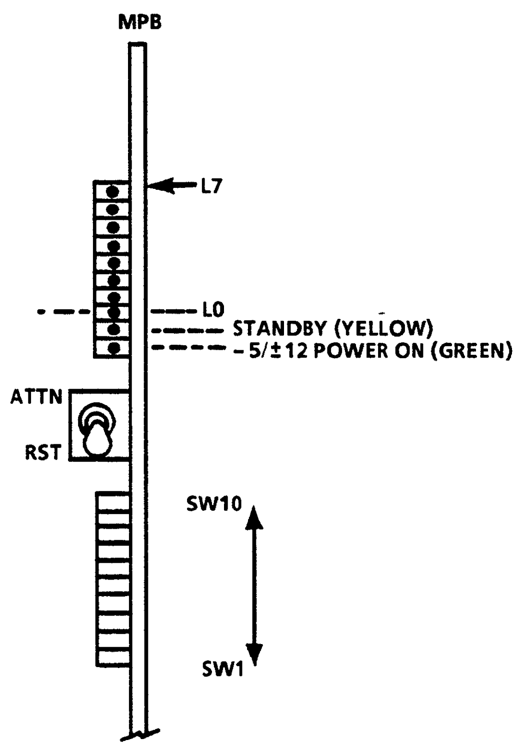


Figure 3-22. MPB Switch Settings for Entering System ID Manually

1000 8
1001 9
1010 A
1011 B
1100 C
1101 D
1110 E
1111 F

4. Manually reset the DI by pulling out and pressing down momentarily on ATTN/RST switch. This causes the following:

   - DI reads current system identifier (whatever happens to be in memory at this time) and displays two digits at a time (one hex byte) on indicators 7 through 0. The indicators stay lit for about 5 seconds per byte and the yellow indicator flashes as each byte is read out. LED 7 is the most significant bit.

   - When all 8 bytes have been displayed, the yellow indicator remains on, indicating an invalid identifier.

   - When the yellow indicator is on, proceed to step 5 and start entering the correct identifier. Do not try to enter the identifier until the yellow indicator stays on.

5. Enter identifier with MPB switches 8 through 1 (data bits 7 through 0). Switch 8 is the most significant bit and switch 1 is the least significant bit. Enter two digits at a time as follows:

   a. Enter first two digits of your identifier by following this example.

      Example: If the identifier were 08-00-25-10-00-68-6A-88, you would start by converting the first two digits (08) to binary as follows:

      0 hex = 0000 binary
      8 hex = 1000 binary

      Then you would set switches 8 through 1 to 00001000 (0 = left and 1 = right). The associated MPB indicator lights for each switch turned on.

   b. When switches 8 through 1 have been set to the first two digits of your identifier, pull out ATTN/RST switch and toggle it up to enter the digits.

   c. Enter the remaining digits, using ATTN/RST switch to enter each pair. When all digits are entered, proceed to step 6.

   NOTE

   If you made an incorrect entry and know which digits are incorrect, you do not have to reenter the entire identifier. But you must start at the beginning of the identifier. For example, if the error is in the third pair, you would reenter the first three pairs.

6. Read out the identifier as follows:

   a. Set switches 9 through 1 to the left (Off). Leave switch 10 to the right (On).

   b. Toggle ATTN/RST switch down to the reset position. The system identifier you just entered will be read out as follows.

      - Each byte displays for about 5 seconds. The yellow indicator flashes as each byte is displayed.

      - When readout is complete, all indicators should be off. If you entered the identifier incorrectly, the yellow indicator remains on and you must enter it again. If it fails again, try using another MPB. If the problem persists, refer to Overall Network Troubleshooting in chapter 5.

Setting the MPB Switches for Normal Operation

Figure 3-23 shows the MPB switches. There is one toggle switch (ATTN/RST) and 10 configuration switches. After you have entered the system identifier (previous procedure), set the switches as follows to prepare the MPB for normal operation.

1. Set the ATTN/RST toggle switch to the neutral (center) position for normal operation. The toggle switch is spring-loaded to return to neutral and must be pulled out to be set to the ATTN (up) or RST (down) position.

   CAUTION

   Do not use a pencil to set the configuration switches. Graphite can damage the switches. Instead, use a ball-point pen or small tool.

2. Set the configuration switches as follows (figure 3-23):

Configuration Switches	Description
10	Left (Off).
9	Left (Off).
6, 7, and 8	Left (Off)
5	**NOTE** Consult with both the customer and the Control Data sales representative before selecting short power-up mode. In general, use the short power-up feature only if the following conditions exist: • The site is subject to frequent and unexpected power outages. • Minimum recovery time is critical to the specific application. Also, when installing a DY245-A MPB, use DISPLAY_HARDWARE_STATUS to check the ROM level before enabling short power-up. DY245-A boards with a ROM level below 5204 do not have short power-up capability. Disable short power-up if the DY245-A has a ROM level below 7302 and is being installed with more than four DY225-A SMMs or more than one BS236-A SMM (otherwise, the test hangs). See Logic Board Interchangeability in chapter 10 for possible ROM levels. Set to the right (On) if you want the DI in short power-up mode. Here, the DI skips some of the MPB and SMM checks to reduce total power-up time. If the DI has a DY245-A MPB, power-up time is reduced by about 10 seconds for the MPB, 55 seconds for each 1 M byte SMM board, and 61 seconds for each 4 M byte SMM. If the DI has an AC117-A MPB, power-up time is reduced by about 10 seconds for the MPB, 13.2 seconds for each 1 M byte SMM, and 28 seconds for each 4 M byte SMM. Always leave the switch to the left (Off) during onboard diagnostic testing so the MPB and SMM boards are thoroughly tested.

Configuration Switches	Description
4	Left (Off).
3, 2, and 1	Refer to the cabinet configuration form (figure 3-2) to determine the slot number of the primary boot source. Set MPB switches 3, 2, and 1 equal to the slot number as shown in the table below. (L=left, R=right.) Figure 3-23 shows the location of the switches.

Boot Slot	0	1	2	3	4	5	6	7
Switch 3	L	L	L	L	R	R	R	R
Switch 2	L	L	R	R	L	L	R	R
Switch 1	L	R	L	R	L	R	L	R

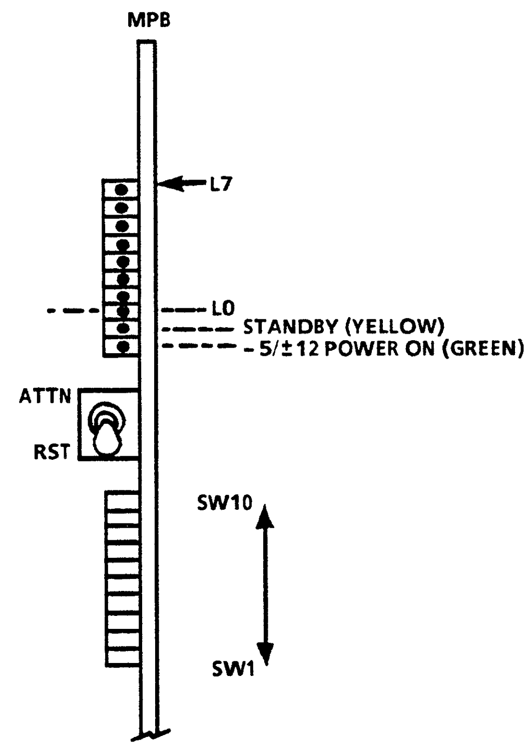


Figure 3-23. MPB Switches and Indicators

Installing Private Memory Module (PMM)

Equipment Number: DY232-A

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to lug on power supply as shown in figure 3-1. Do not handle boards by the gold backpanel connectors. Always keep boards in electrostatic discharge (E.S.D.) bags when you are not handling them.

NOTE

Do not install the PMM in DIs with an AC117-A MPB board. The PMM is not used with that type of MPB.

1. Unpack PMM board and MPB/PMM cable (figures 3-24 and 3-25) equipment identification tag, and FCO label.

2. Attach equipment identification tag and FCO label to plastic fold-out holder inside DI door.

3. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off).

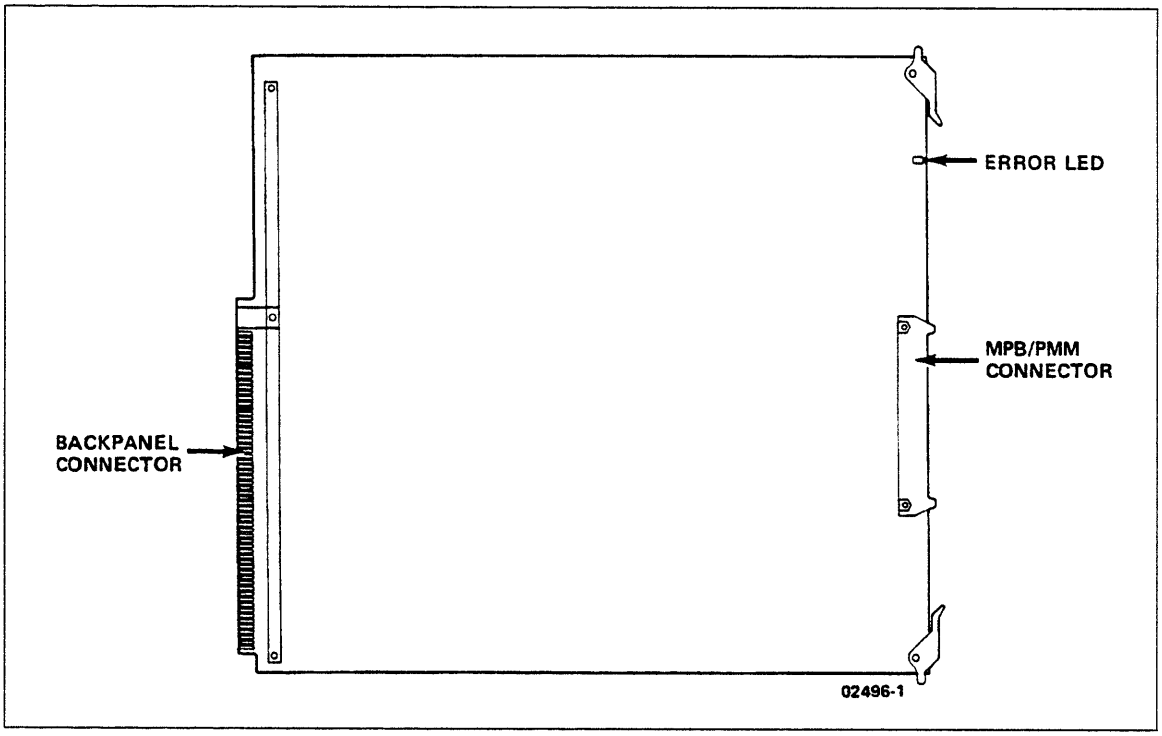


Figure 3-24. PMM Board

4. Slide PMM into slot 1.

5. Orient cable so edge with red stripe is on top and connect it to connectors on front edge of PMM and MPB boards (figure 3-25).

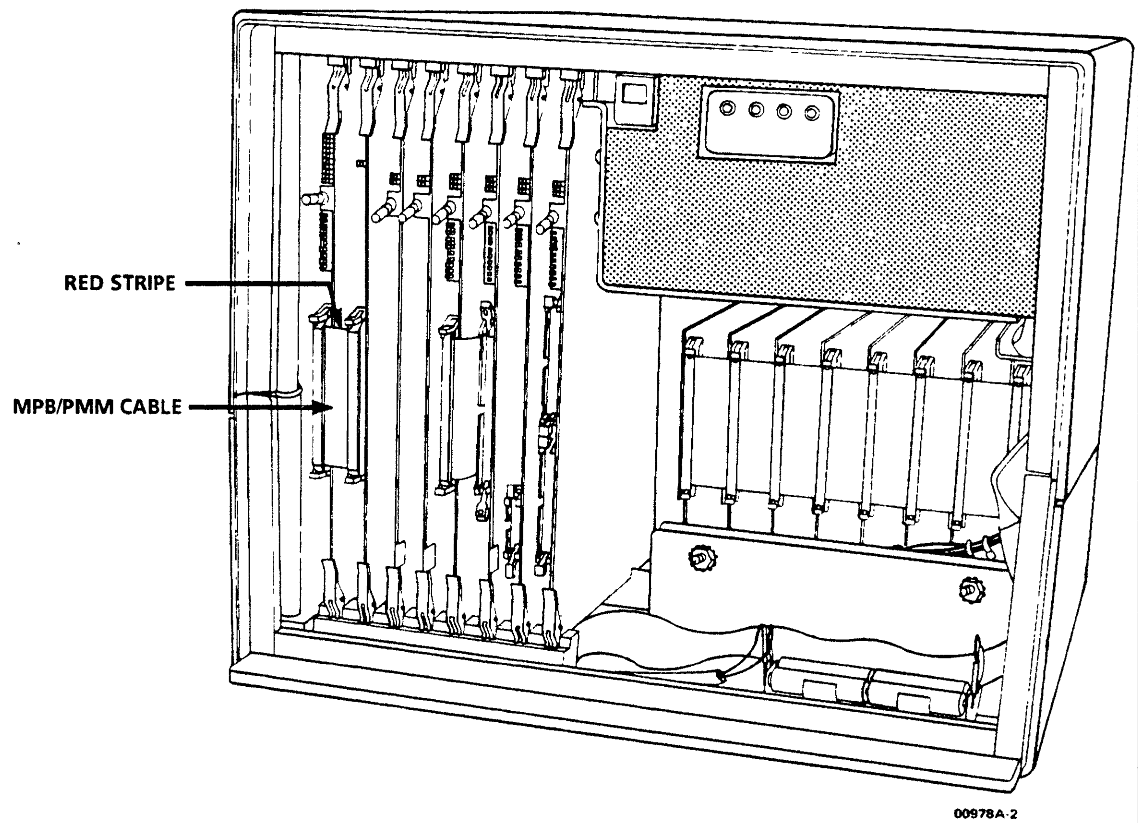


Figure 3-25. Installed MPB/PMM Cable

Installing System Main Memory (SMM) Board

Equipment Number: DY225-A (1024 K byte), BS236-A (4 M byte)

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to lug on power supply as shown in figure 3-1. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

NOTE

The BS236-A SMM replaces from one to four DY225-A SMMs and four DY225-A SMMs replace one BS236-A. However, do not mix the two types in the same DI. The number of SMMs installed may affect the short power-up feature (see Setting the MPB Switches for Normal Operation, earlier in this chapter).

1. Unpack SMM board (figure 3-26), equipment identifier label, and FCO label.
2. Attach equipment label and FCO label to plastic fold-out holder inside DI cabinet door.
3. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
4. Refer to cabinet configuration form (figure 3-2) for SMM slot position(s) and install SMM board(s). There are no cables to install on SMM boards.
5. Pull out and press down on Online/Offline toggle switch to put board in online mode (figure 3-26).

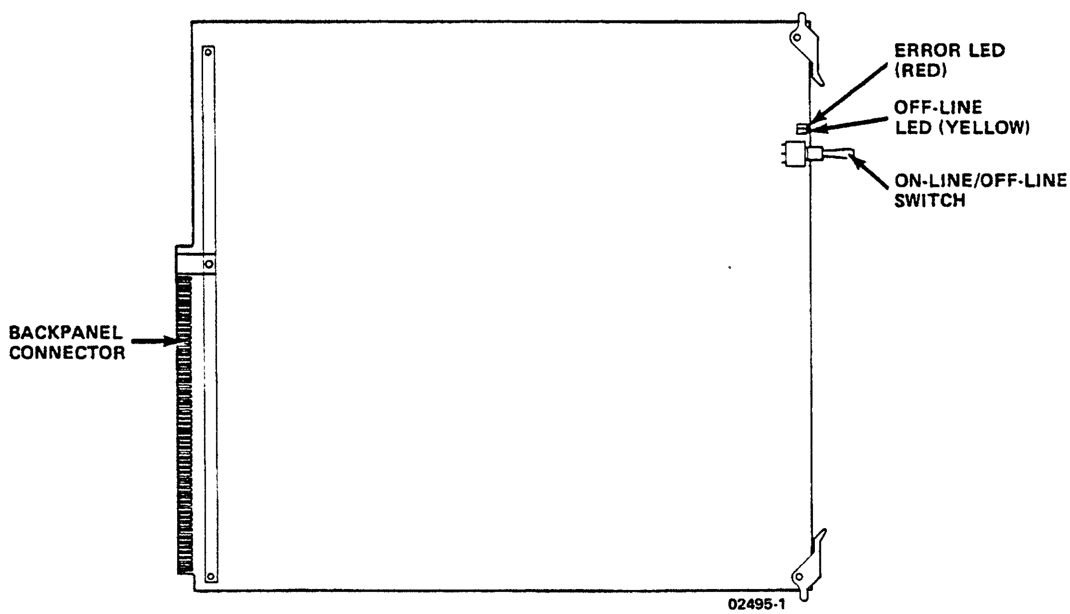


Figure 3-26. SMM Board

Installing Line Interface Modules (LIMs)

There are two tasks involved in installing a LIM board.

- Setting up the board to match your network's requirements
- Installing the Board in the DI cabinet

The following starts with a series of procedures that explains how to set up the various types of LIMs. The last procedure describes how to actually install the LIMs once the setup is complete.

Configuring RS-232-C, 4-Port Line Interface Modules (LIMs)

Equipment Number: DY229-B

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

NOTE

If your site must conform to European Public Telephone and Telegraph (PTT) requirements, refer to the CDCNET Product Descriptions manual for Qualification Data.

The 4-port, RS232-C LIM requires no setup prior to installation.

1. Refer to cabinet configuration form (figure 3-2) for the number of DY229 LIMs to install and the slot number of each.
2. Unpack LIM boards (figure 3-27), equipment labels, and FCO labels.
3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.
4. Proceed to Installing LIM Boards in DI Cabinet procedure, later in this chapter.

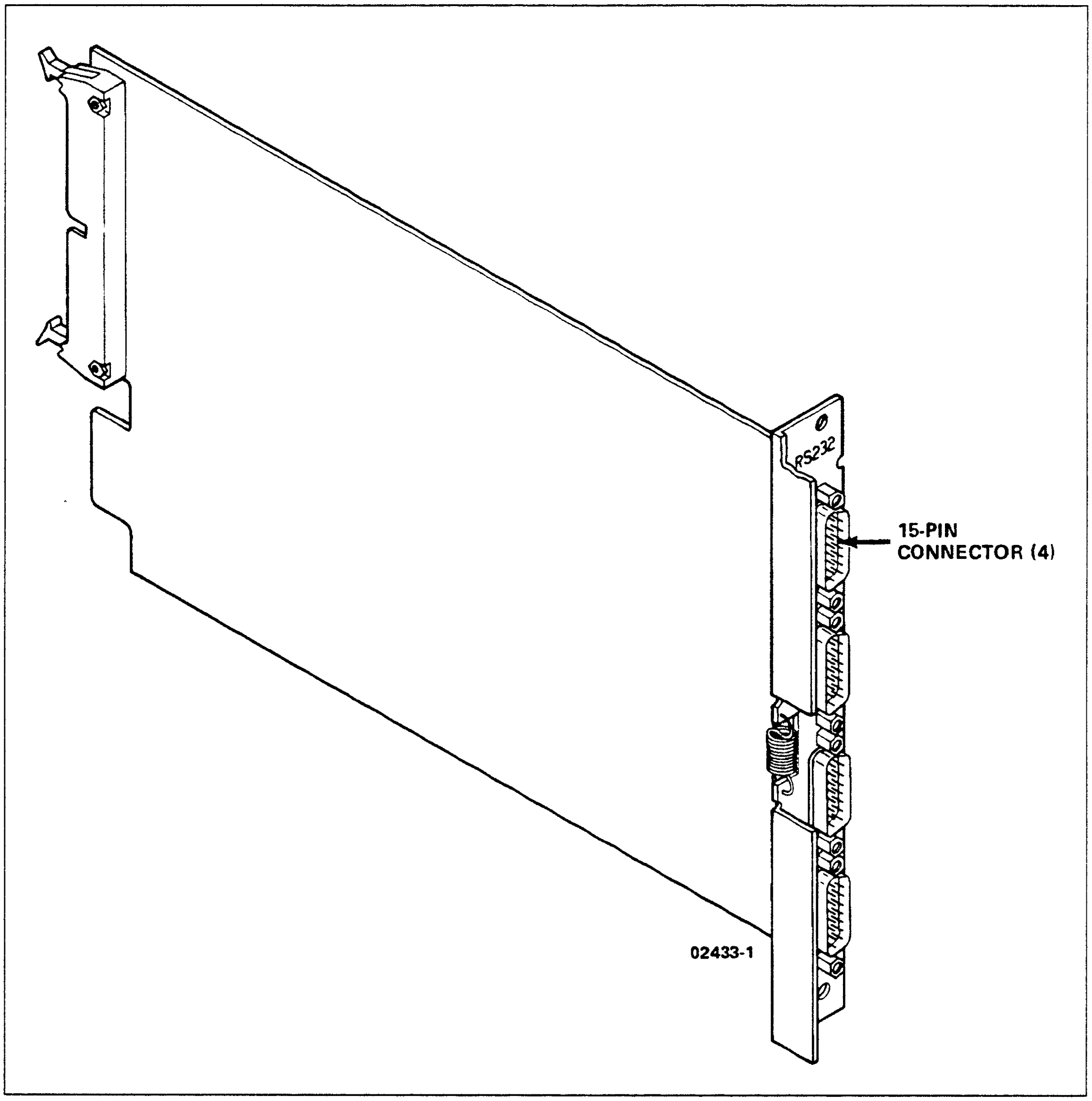


Figure 3-27. RS232-C, 4-Port LIM

Configuring RS-232-C, 8-Port Line Interface Modules (LIMs)

Equipment Number: DY267-A

CAUTION

Static electricity can damage the logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

NOTE

If your site must conform to European Public Telephone and Telegraph (PTT) requirements, refer to the CDCNET Product Descriptions manual for qualification data.

The 8-port LIM (figure 3-28) requires no setup prior to installation.

1. Refer to cabinet configuration form (figure 3-2) for the number of DY267 LIMs to install and the slot number of each.

2. Unpack LIM boards (figure 3-28), equipment labels, and FCO labels.

3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.

4. Proceed to Installing LIM Boards In DI Cabinet procedure later in this chapter.

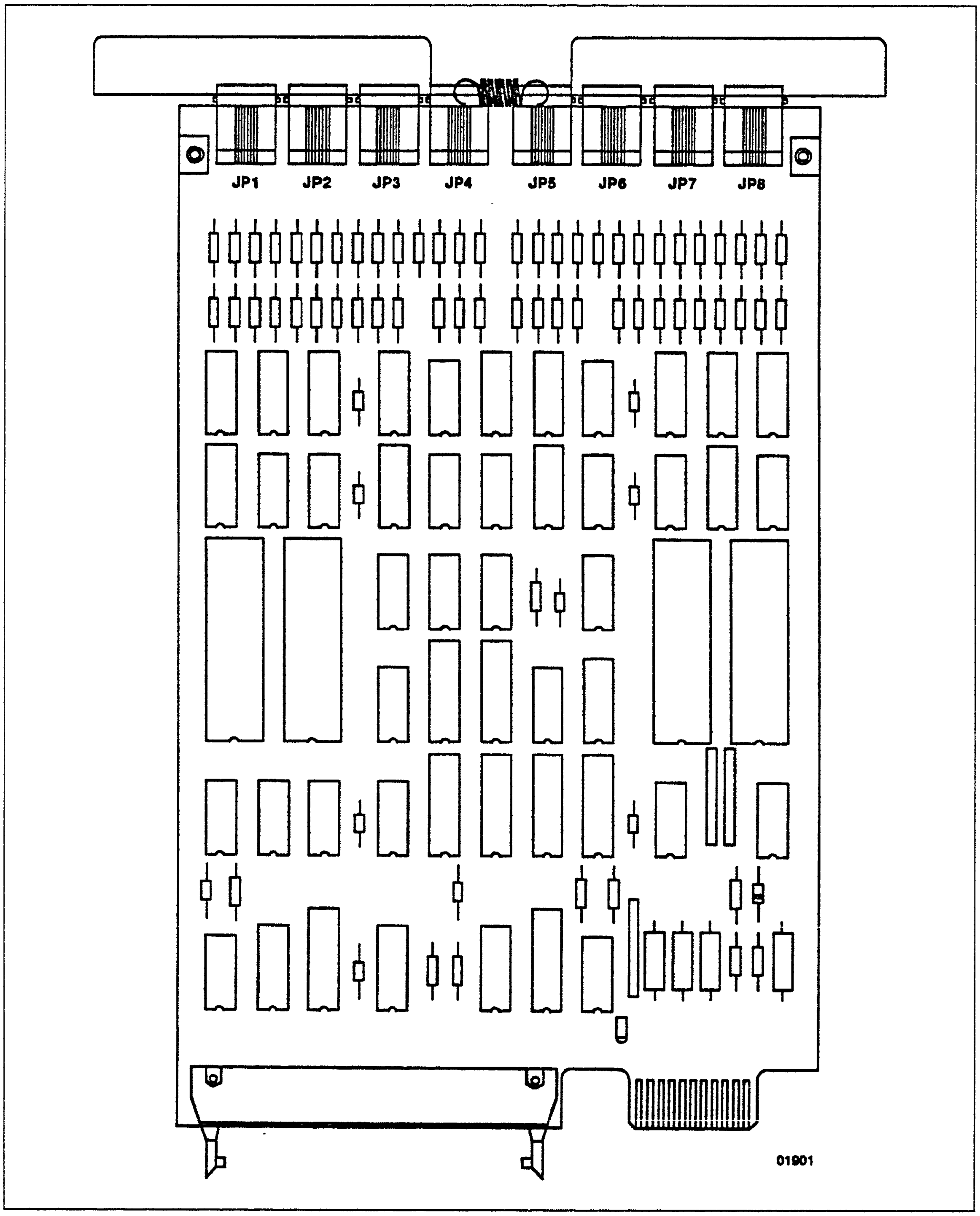


Figure 3-28. RS232-C, 8-Port LIM

Configuring RS-449, DY230A LIM for RS-422 Operation

Equipment Number: DY230-A

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

The DY230-A is an RS-449 LIM that can be set up for either RS-422 or RS-423 operation. This procedure describes how to set it up as an RS-422. The next procedure describes how to set it up as an RS-423. Figure 3-29 shows RS-422 jumper and IC placement.

1. Refer to cabinet configuration form (figure 3-2) for number of DY230-A, RS-422 LIMs to install and the slot number of each.

2. Unpack LIM boards, equipment labels, and FCO labels.

3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.

4. Check system configuration to see if port 0 or 1 supports a synchronous line (such as HDLC). If so, install external clock jumper as follows:

   - Port 1 - If port 1 uses external clock, install strap at position 4 of socket at board location D2. Otherwise, remove that strap.

   - Port 0 - If Port 0 uses external clock, install strap at position 9 of socket at board location D3. Otherwise, remove that strap.

5. Check the following jumpers to ensure that they are connected correctly. If they are not, use a needle-nose pliers or similar tool to make the proper connections (figure 3-29).

   - D1 - Install straps at locations 1, 2, and 3.

   - D2 - Install straps at locations 5 and 6.

   - D3 - There must be no straps in locations 1 through 8.

   CAUTION

   Do not apply power with RS-422 and RS-423 line drivers installed at the same time, as hardware damage can occur. Only one integrated circuit type per port can be installed.

   ---

6. Ensure that there are no integrated circuits in locations 63E4 and 63J0. If there are, use an integrated-circuit removal tool or small, flat screwdriver to remove them.

7. Ensure that there is a 26LS31 integrated circuit part number 15163320) at location 76F6 for Port 0 and 76G8 for Port 1.

8. Proceed to Installing LIM Boards In DI Cabinet procedure, later in this chapter.

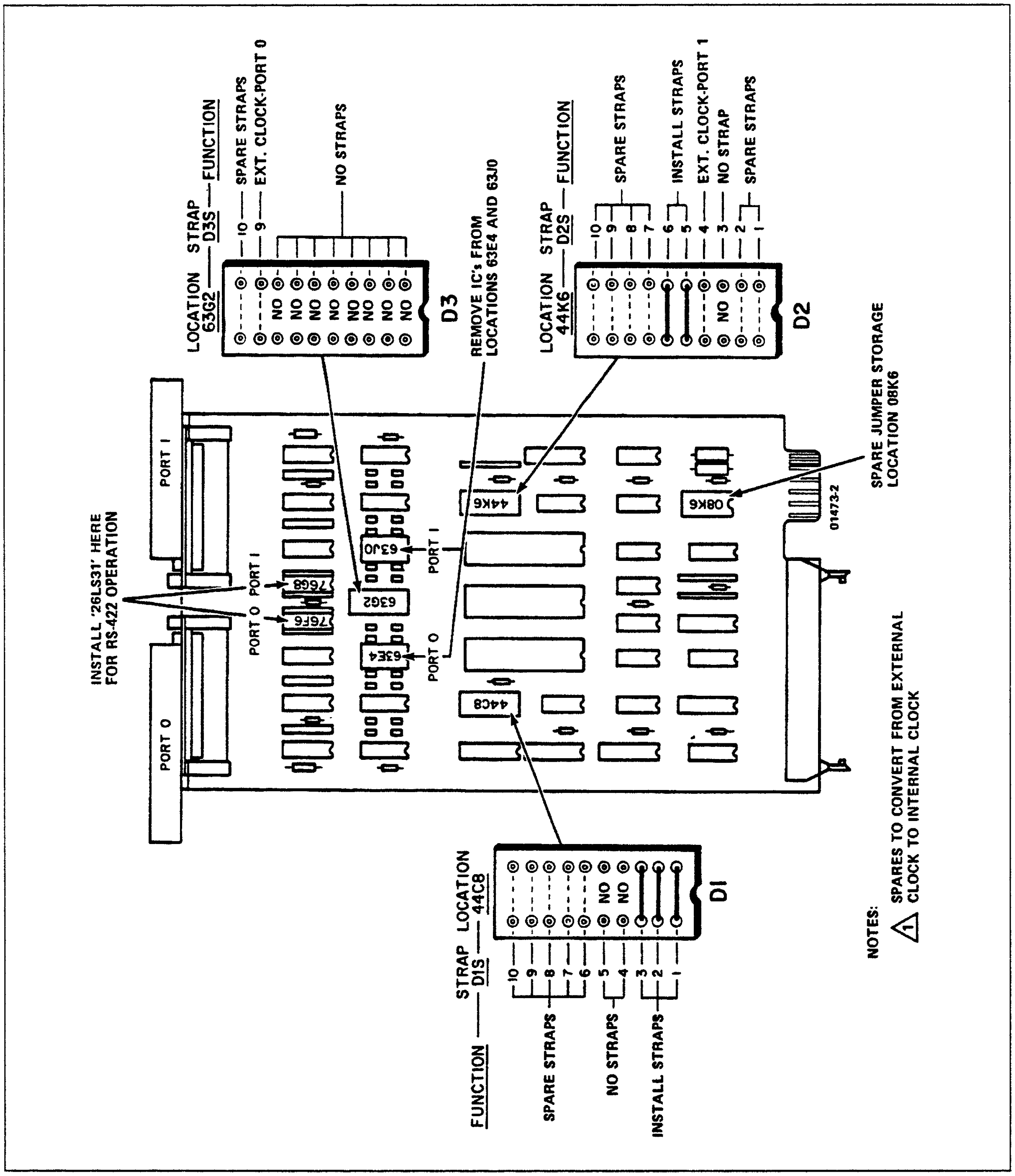


Figure 3-29. Configuring DY230-A LIM for RS-422 Operation

Configuring RS-449, DY230A LIM for RS-423 Operation

Equipment Number: DY230-A

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

The DY230-A is an RS-449 LIM that can be set up for either RS-422 or RS-423 operation. This procedure describes how to set it up as an RS-423. The previous procedure describes how to set it up as an RS-422. Figure 3-30 shows RS-423 jumper and IC placement.

1. Refer to cabinet configuration form (figure 3-2) for number of DY230-A RS-423 LIMs to install and the slot number of each.

2. Unpack LIM boards, equipment labels, and FCO labels.

3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.

4. Check system configuration to see if port 0 or 1 supports a synchronous line (such as HDLC). If so, install external clock jumper as follows:

   - Port 1 - If port 1 uses external clock, install strap at position 4 of socket at board location D2. Otherwise, remove that strap.

   - Port 0 - If Port 0 uses external clock, install strap at position 9 of socket at board location D3. Otherwise, remove that strap.

5. Check the following jumpers to ensure that they are connected correctly. If they are not, use a needle-nose pliers or similar tool to make the proper connections (figure 3-29).

   - D1 - Install straps at locations 1, 2, and 3.

   - D2 - Install straps at locations 5, 6, 7, and 8.

   - D3 - Install straps at locations 1 through 8.

   CAUTION

   Do not apply power with RS-422 and RS-423 line drivers installed at the same time, as hardware damage can occur. Only one integrated circuit type per port can be installed.

   ---

6. Ensure that there are no integrated circuits in locations 76F6 and 76G8. If there are, use an integrated-circuit removal tool or small, flat screwdriver to remove them.

7. Ensure that there is a 26LS29 integrated circuit (part number 15163723) at location 63E4 for Port 0 and 63J0 for Port 1.

8. Proceed to Installing LIM Boards In DI Cabinet procedure, later in this chapter.

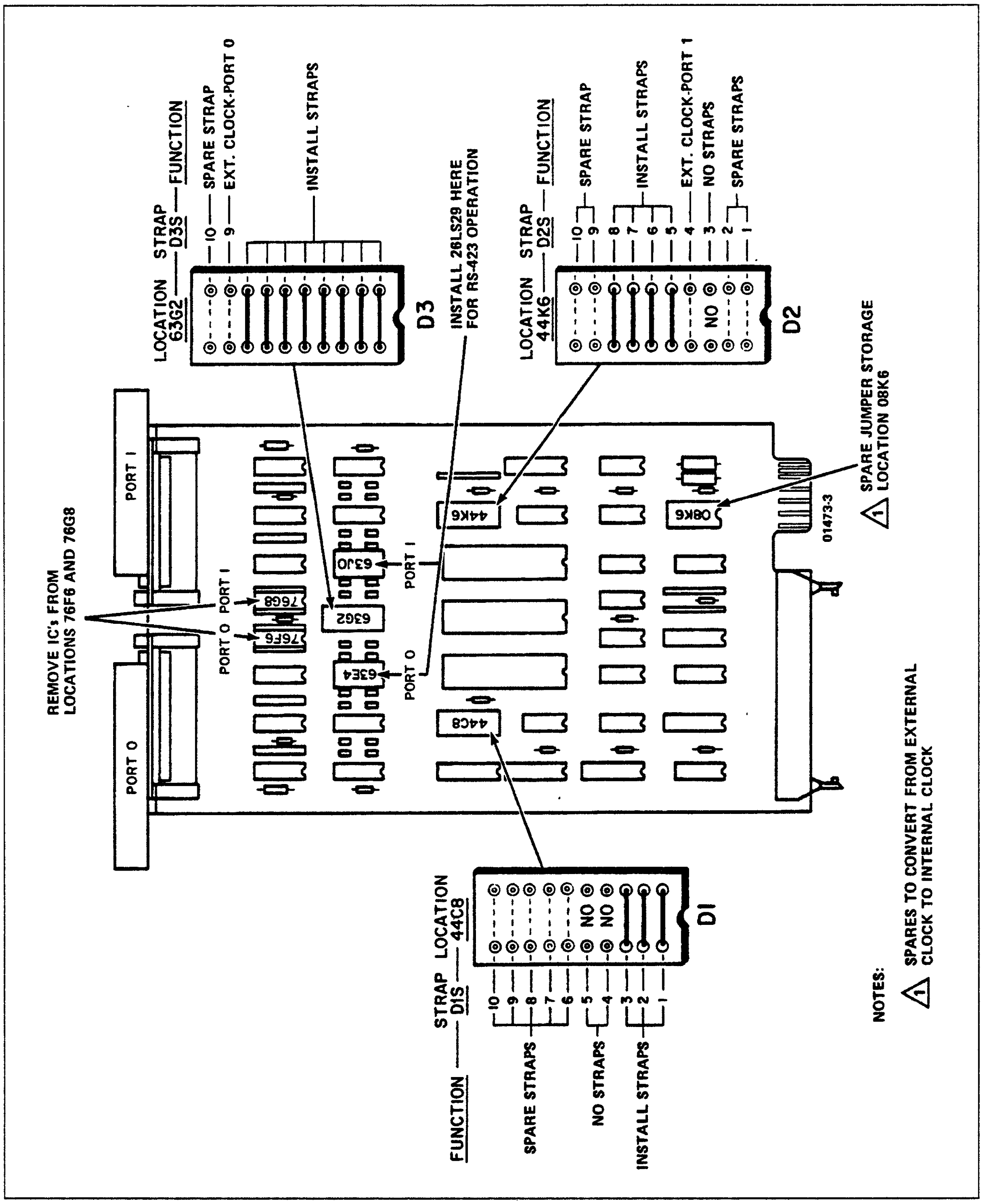


Figure 3-30. Configuring DY230-A LIM for RS-423 Operation

Configuring RS-449, DY230B LIM for Either RS-422 or RS-423 Operation

Equipment Number: DY230-B

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

CAUTION

Exercise care when removing the jumper plugs, as they are fragile and can be easily damaged.

The DY230-B is an RS-449 LIM that can be set up for either RS-422 or RS-423 operation. The position of the jumper plugs (figure 3-31) determines which way the LIM will operate. The following shows how to set the jumper plug to match your requirements.

1. Refer to cabinet configuration form (figure 3-2) for number of DY230-B LIMs to install and the slot number of each.
2. Unpack LIM boards, equipment labels, and FCO labels.
3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.
4. Determine whether the LIM port should be set as an RS-422 or an RS-423. Refer to figure 3-31 and proceed as follows:
   - For RS-422, position jumper plugs in rightmost slot between connector headers at location P1 and P2.
   - For RS-423, position jumper plugs in leftmost slot between connector headers at location P1 and P2.

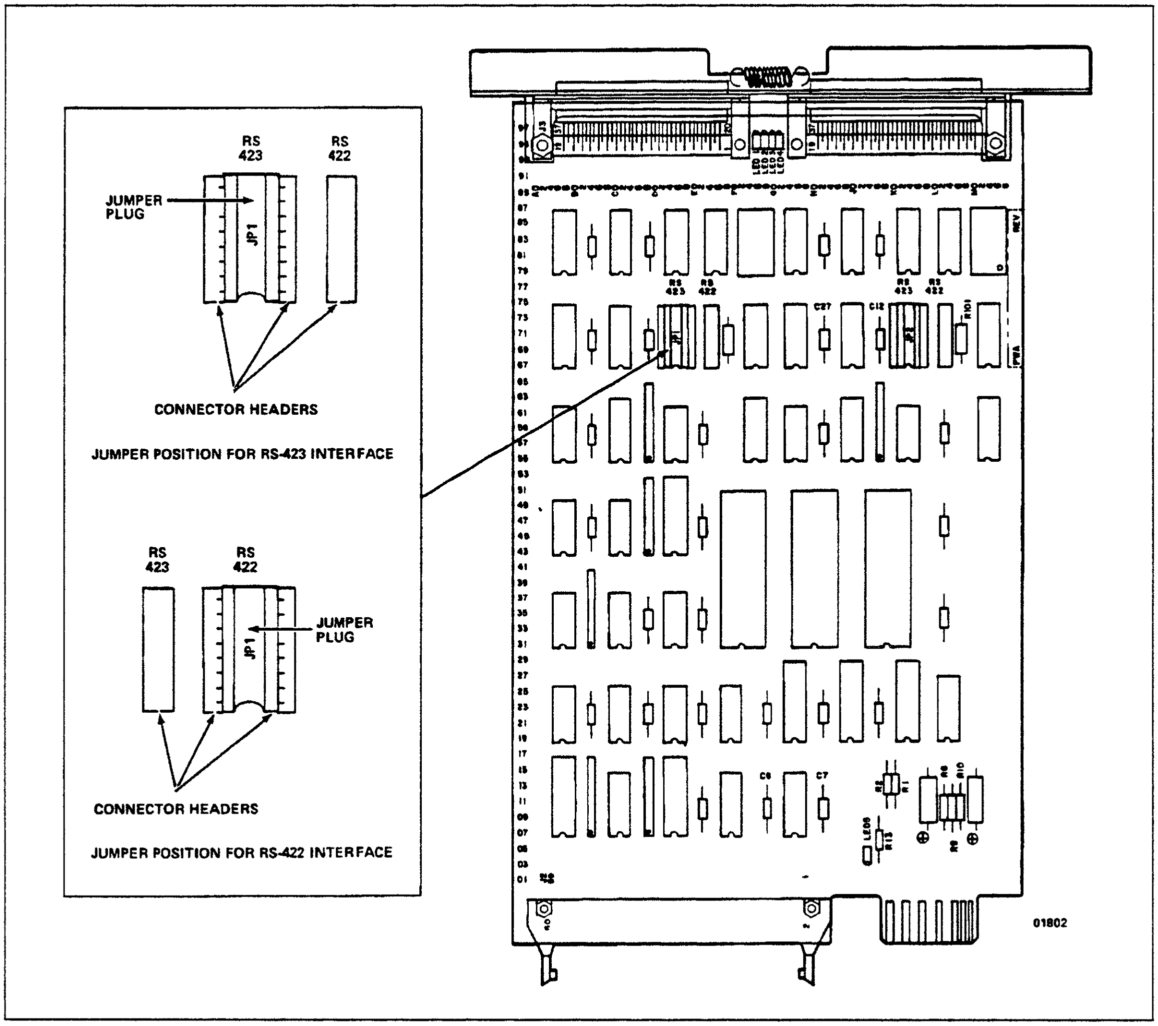


Figure 3-31. Jumper Placement for DY230-B LIM

Configuring a Unit Record Line Interface Module (URI)

Equipment Number: DY246-A

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

NOTE

The URI board currently works with only one type of printer, the Control Data Model 585, and this procedure applies to only that printer.

1. Refer to cabinet configuration form (figure 3-2) for the number of unit record interface boards (URIs) to install and slot number of each.

2. Unpack URI boards (figure 3-32), equipment labels, and FCO labels.

3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.

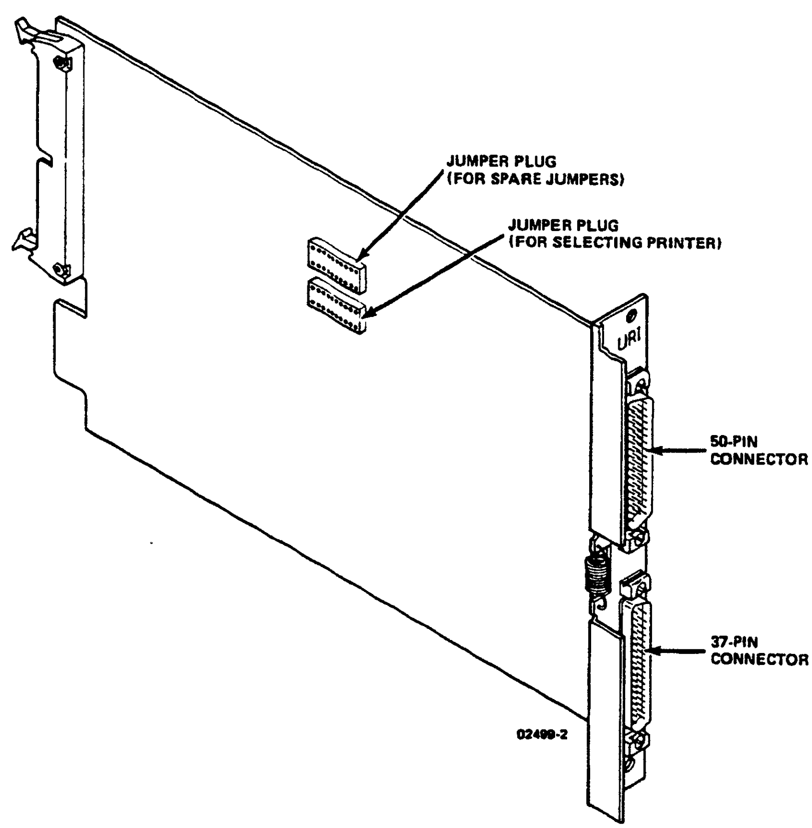


Figure 3-32. URI Board

4. Refer to figure 3-32 to find jumper plug for selecting printer (plug is at location 46EO).

5. Using a needle-nose pliers or similar tool, install jumpers in plug at 46EO, as shown on figure 3-33.

6. Set switches on printer as described in appendix C.

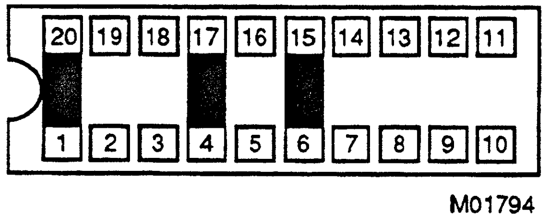


Figure 3-33. URI Configuration for 585 Printer

Configuring a V.35 Line Interface Module

Equipment Number: DY261-A

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

The V.35 LIMs require no setup prior to installation.

1. Refer to cabinet configuration form (figure 3-2) for number of LIMs to install and the slot number of each.
2. Unpack LIM boards (shown in figure 3-34), equipment labels, and FCO labels.
3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.
4. Proceed to Installing LIM Boards in DI Cabinet procedure.

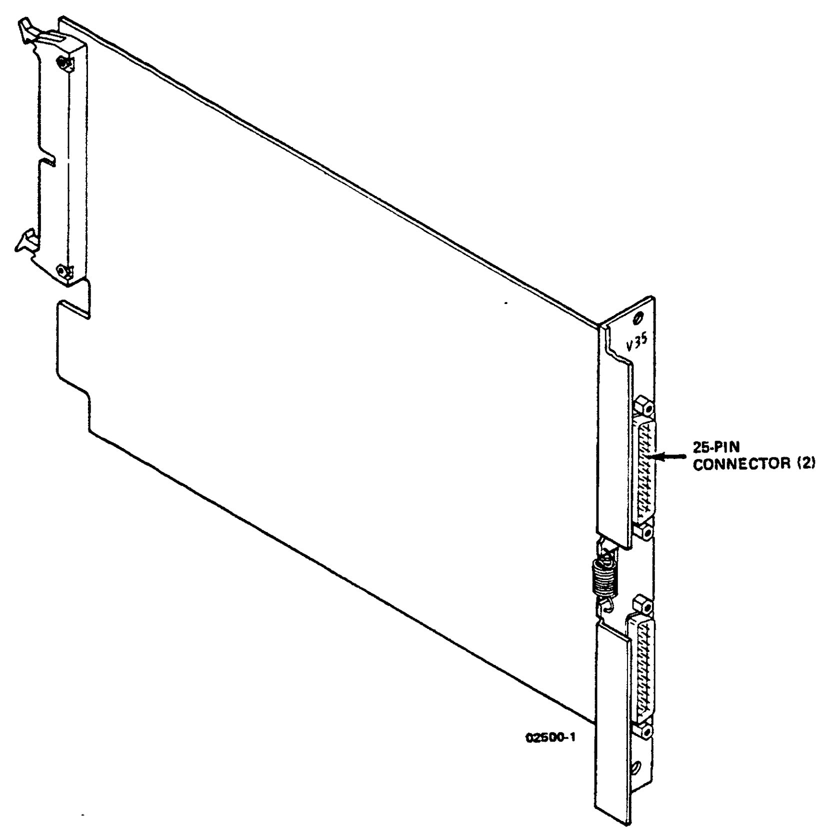


Figure 3-34. V.35 LIM Board

Configuring an X.24 Line Interface Module

Equipment Number: DY234-B

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

NOTE

Control Data Maintenance Services does not support X.24 modules.

The X.24 LIMs require no setup prior to installation.

1. Refer to cabinet configuration form (figure 3-2) for number of LIMs to install and the slot number of each.
2. Unpack LIM boards (shown in figure 3-35), equipment labels, and FCO labels.
3. Attach equipment labels and FCO labels to plastic fold-out holder inside DI door.
4. Proceed to Installing LIM Boards in DI Cabinet procedure.

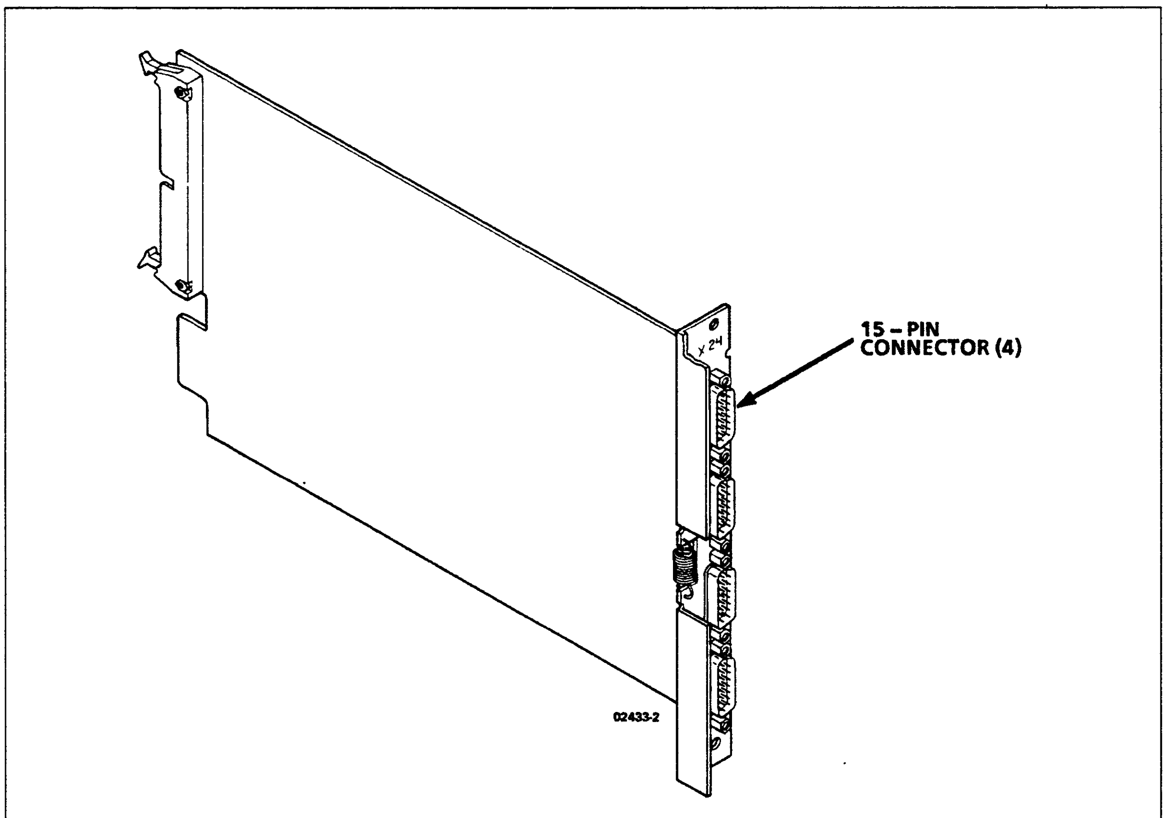


Figure 3-35. X.24 LIM Board

Installing LIM Boards in DI Cabinet

CAUTION

Static electricity can damage the board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the fan guard or other suitable ground point on the back of DI cabinet. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D. bags when you are not handling them.

NOTE

If you are installing a DY229B, RS-232 LIM for use with a synchronous line (for example, HASP or HDLC), ensure that FCO CA49717 is installed, or the line may not operate reliably. See Verifying FCO Level of Equipment, in chapter 10.

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Refer to cabinet configuration form (figure 3-2) for slot number of LIMs and remove filler plate(s) from back left of cabinet (figure 3-36).
3. Slide the board into the LIM backpanel and fasten it with the two screws removed from the filler plate. LIM installation is shown in figures 3-37 and 3-38.

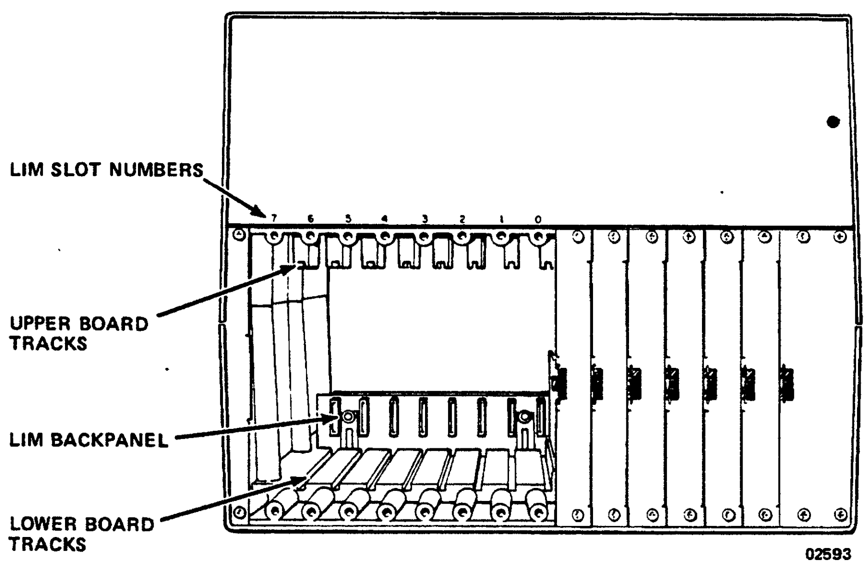


Figure 3-36. LIM Backpanel

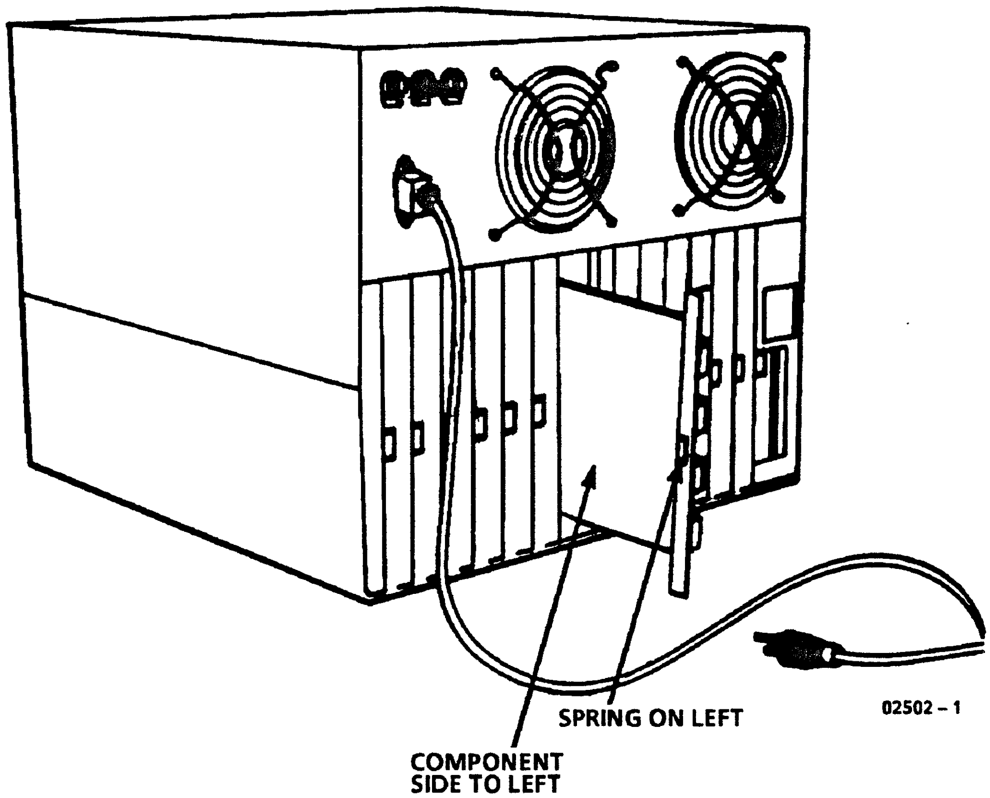


Figure 3-37. Installing LIM Boards

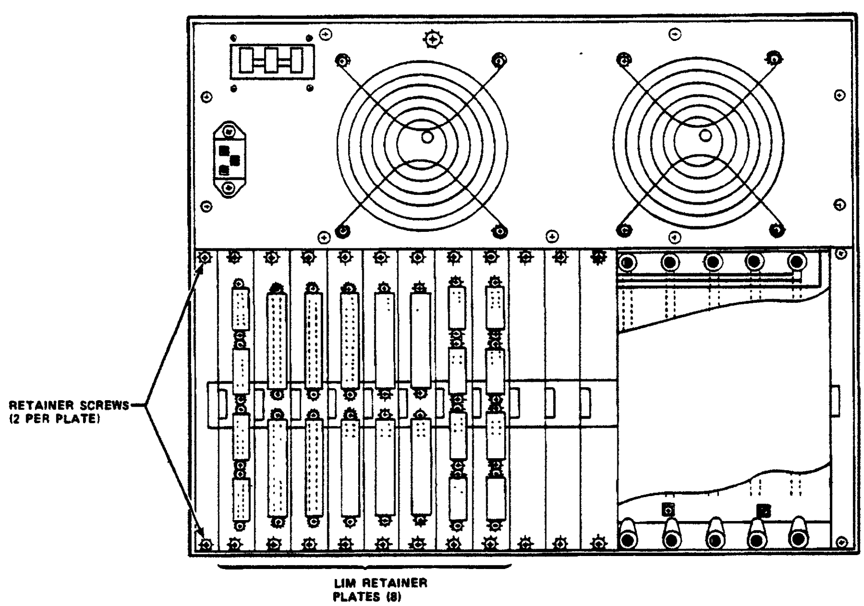


Figure 3-38. Installed LIM Retainer Plates

Installing a Communications Interface Module (CIM)

Equipment Number: DY228-A

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to the lug on power supply as shown in figure 3-1. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D bags when you are not handling them.

There are two main parts to CIM installation. The first is to install the CIM board into the DI cabinet. The second is to connect a cable between the CIM and its associated LIM(s).

Installing CIM Board In DI Cabinet

If you have more than one CIM to install, read through this procedure and the following procedure, Installing Multiple CIM/LIM Cables, before starting the actual installation. You can install up to three CIM boards in a DI.

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Unpack CIM board and CIM/LIM cable assembly (figure 3-39), equipment label, and FCO label.
3. Attach equipment label and FCO label to plastic fold-out holder inside DI door.
4. Install CIM in slot designated on cabinet configuration form (figure 3-2).
5. Proceed to appropriate CIM/LIM cable installation procedure.

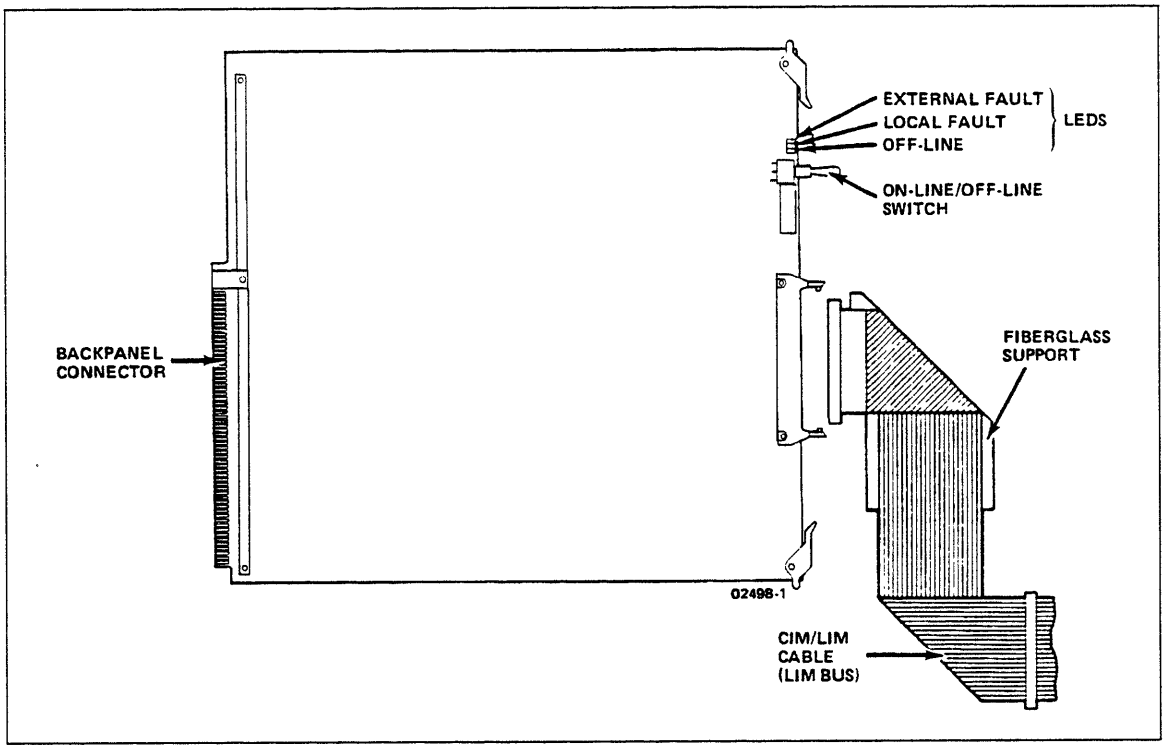


Figure 3-39. CIM Board and CIM/LIM Cable

Installing a Single CIM/LIM Cable

The following describes how to connect the CIM/LIM cable when you have only one CIM installed. If you have more than one CIM installed, go to the next procedure.

Install the CIM/LIM cable assembly from the front of the cabinet. The cable has a single connector on one end that plugs into the CIM, and eight connectors on the other end that can plug into one to eight LIMs (figure 3-40).

1. Hold cable near the CIM connector and position it behind vertical support rod in front-center of cabinet. Fiberglass support should be on the left, facing CIM board. See figure 3-40.

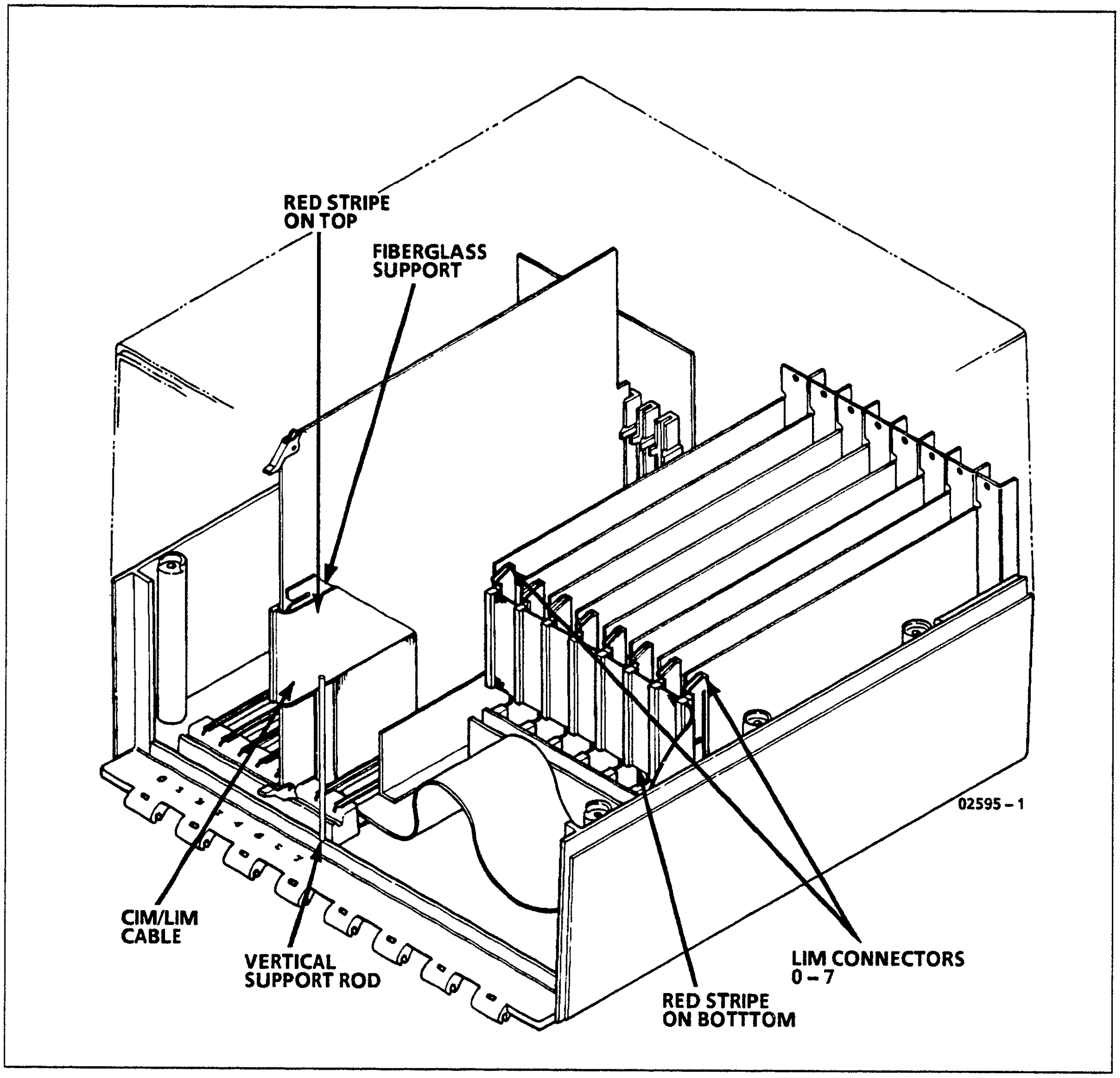


Figure 3-40. Installed CIM/LIM Cable

2. Lift up lower board tracks to the right of the CIM and slide cable under tracks (figure 3-41). For example, if CIM is installed in slot 5, route cable under tracks 6 and 7.

3. Insert bottom edge of fiberglass support into the notches to the right of the CIM's lower board track (figure 3-41).

4. Plug cable connector into CIM receptacle with the red stripe on the edge of the cable on top (figure 3-40). If cable seems too high to plug into board, recheck step 3. Ensure that connector is fully seated.

5. Replace lower board tracks removed in step 2.

6. Connect cable to LIMs, ensuring that red stripe is on the bottom (figure 3-40). This is the only case where the red stripe should be on the bottom.

7. Ensure that cable connectors are fully seated in LIMs.

8. Verify that cable is installed as shown in figure 3-40.

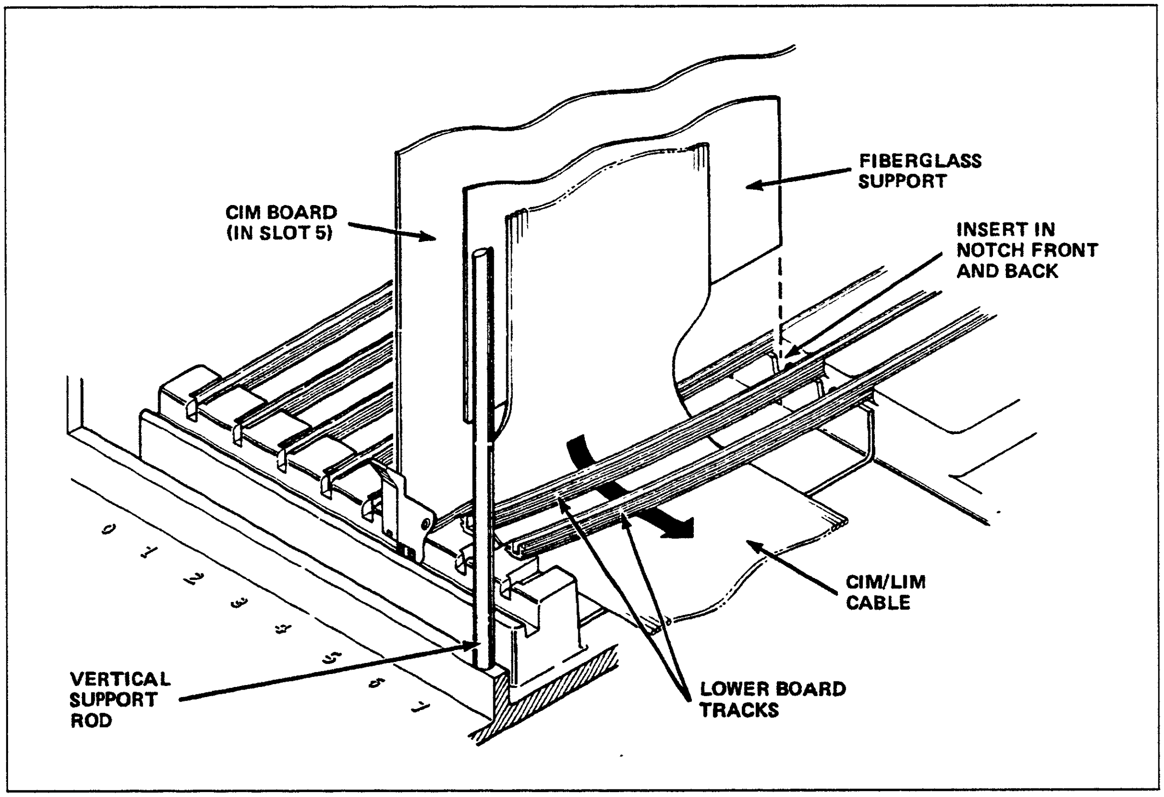


Figure 3-41. CIM/LIM Cable Routing

Installing Multiple CIM/LIM Cables

Install a cable between each CIM board and its associated LIMs. There can be up to three CIMs and eight LIMs with many different possibilities for interconnection. The procedure here assumes three CIMs as shown below.

CIM in slot 4 to LIMs in slots 6,7
CIM in slot 5 to LIMs in slots 3,4
CIM in slot 6 to LIMs in slots 0,1

Refer to the cabinet configuration form (figure 3-2) for the actual CIM/LIM connections for your DI and adapt the following procedure accordingly.

1. Ensure that all LIMs are installed.

2. Install the first CIM in slot 4.

3. Route cable from CIM 4 to LIMs in slots 6 and 7 by performing steps 1 through 5 of Installing a Single CIM/LIM Cable procedure (do not connect to LIMs yet).

4. Connect cable to LIMs 6 and 7 as follows (figure 3-42):

   a. Fold cable back so that red stripe is on bottom and connectors are facing LIM receptacles.

   b. Plug connectors 6 and 7 into LIMs, making sure they are fully seated (the connector on the end of the cable is 0).

   c. Fold excess cable against right side of cabinet.

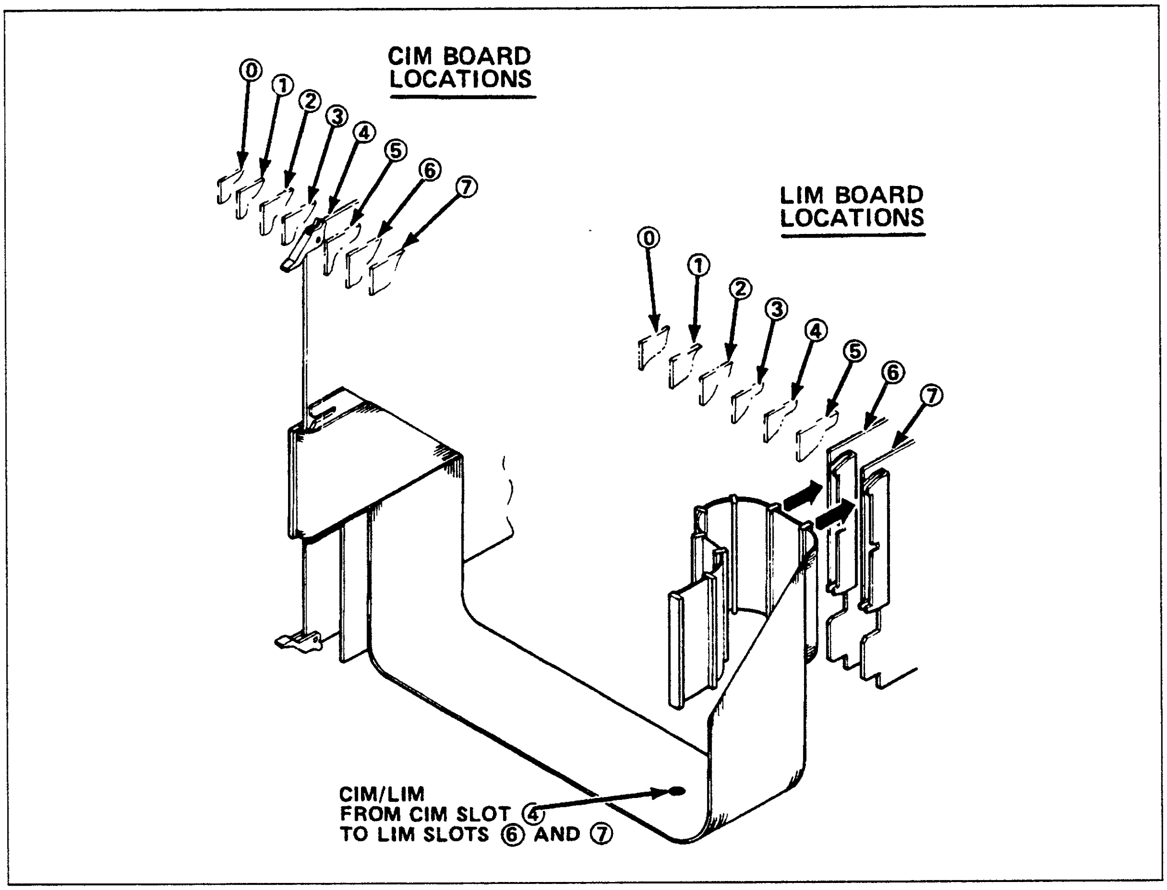


Figure 3-42. Installing First CIM/LIM Cable

5. Install the second CIM in slot 5.

6. Route cable from CIM 5 to LIMs in slots 3 and 4 by performing steps 1 through 5 of Installing a Single CIM/LIM Cable procedure (do not connect to LIMs yet).

7. Connect cable to LIMs 3 and 4 as follows (figure 3-43):

   a. Fold cable back so that red stripe is on bottom and connectors are facing LIM receptacles.

   b. Plug connectors 3 and 4 into LIMs, making sure they are fully seated (the connector on the end of the cable is 0)

   c. Fold excess cable against right side of cabinet.

8. Repeat steps 4, 5, and 6 for the last CIM, except plug the CIM into slot 6 and the cable connectors 0 and 1 into LIMs 0 and 1.

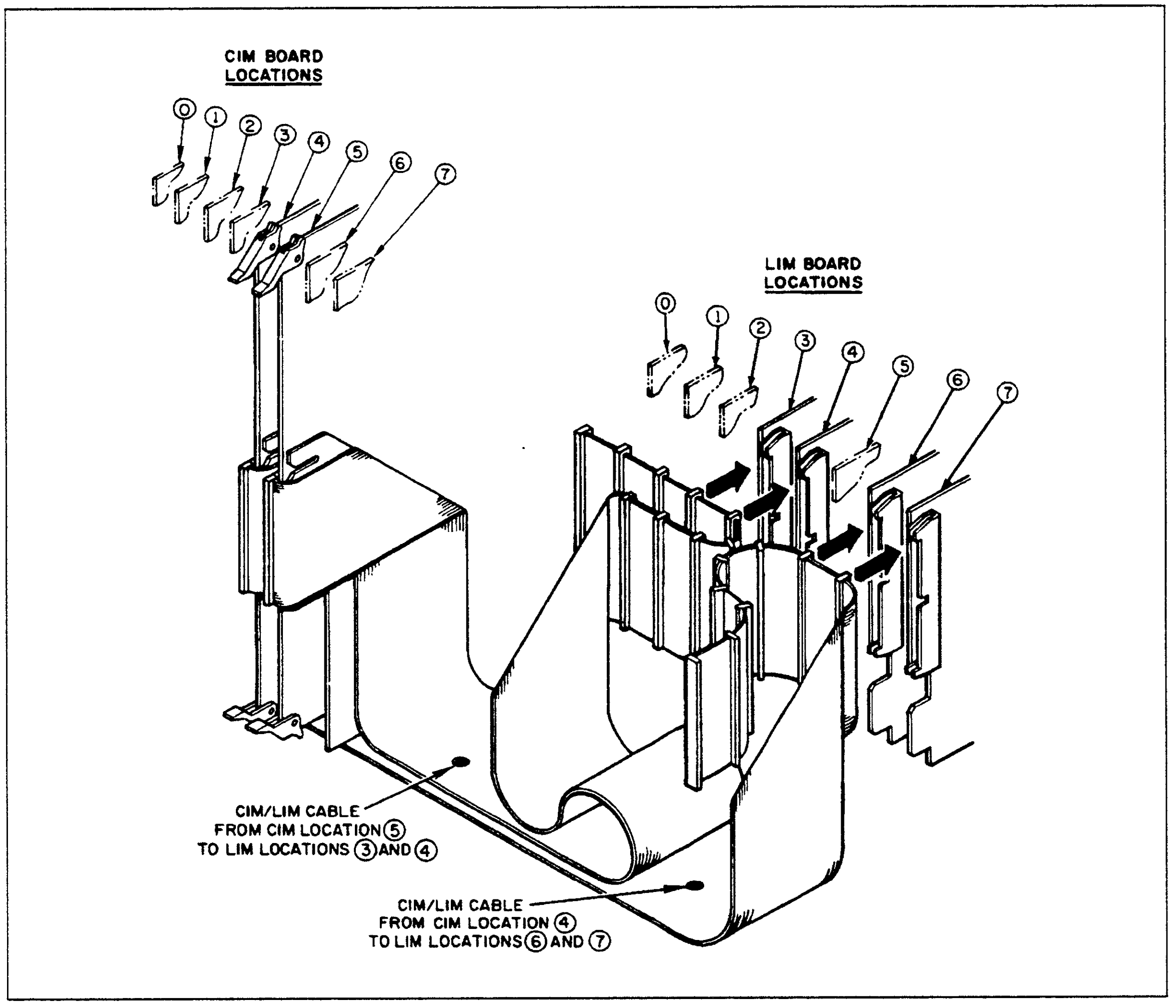


Figure 3-43. Installing Second CIM/LIM Cable

Setting the CIM Switches

The CIM board has a set of ten configuration switches on the front edge of the board. The following describes how to set them.

CAUTION

Do not use a pencil to set the configuration switches. Graphite can damage them. Instead, use a ball-point pen or small tool.

NOTE

If the CIM is selected as a boot source, then FCO CD17983 must be installed (see Verifying FCO Level of Equipment in chapter 10).

---

1. Refer to cabinet configuration form (figure 3-2) to determine if CIM is used as either a primary or secondary boot source.
   - If CIM is not used as a boot source, set all switches to the left (Off) and proceed to step 4.
   - If CIM is used as a boot source, set switch 9 to the right (On) and proceed to step 2.
2. Refer to the cabinet configuration form (figure 3-2) and set the switches accordingly. Switches are shown on figure 3-45 and defined in the following table.

Switch	Description
10	Set switch to the left (Off) if boot trunk speed is 64 kilobits per second or less and to the right (On) if boot trunk speed is greater than 64 kilobits per second.
9	Right (On) if boot is enabled from CIM board.
8	Left (Off).
7 6 5	Set switches 5, 6, and 7 to LIM number (0 through 7) for secondary boot source (bit 5 is least significant bit). Secondary source is used if primary boot source fails to establish a link.
4	Port number (0 or 1) for primary and secondary boot source. If primary and secondary boot source LIMs are the same, the complement of bit 4 is used as the port number for the secondary boot. For example, if both are port 1, port 0 is the secondary source.
3 2 1	Set switches 1, 2, and 3 to LIM number (0 through 7) for primary boot source where switch 1 is the least significant bit).

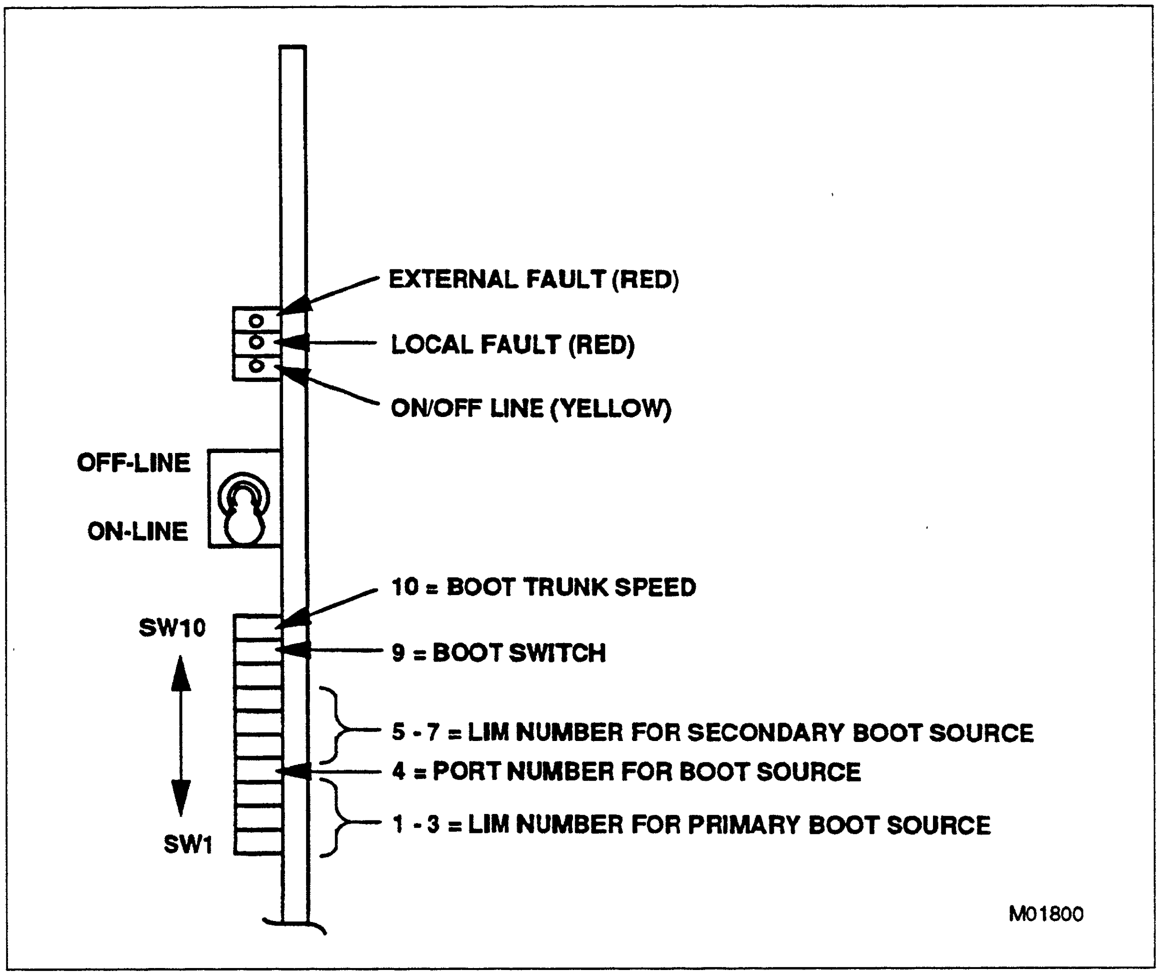


Figure 3-44. CIM Switches

3. If this CIM is designated as the primary boot source, check that MPB switches 3, 2, and 1 are set to show the slot number containing this CIM board (see table below).

Slot Number	3	4	5	6	7
Switch 3	L	R	R	R	R
Switch 2	R	L	L	R	R
Switch 1	R	L	R	L	R

4. Set the Online/Offline toggle switch to Online by pulling out and pressing down on the switch (figure 3-44).

Installing an Ethernet Serial Channel Interface (ESCI)

Equipment Number: DY227-A/B

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to lug on power supply as shown in figure 3-1. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D bags when you are not handling them.

You can install up to three ESCI boards. There are two parts to the procedure. The first is to install the board in the cabinet. The second is to set the switches for proper operation. Both are described in the following procedure.

Installing ESCI Board in DI Cabinet

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.

2. Unpack ESCI boards and ESCI cable (figures 3-45 and 3-46), equipment label, and FCO label.

3. Attach equipment label and FCO label to plastic fold-out holder inside DI door.

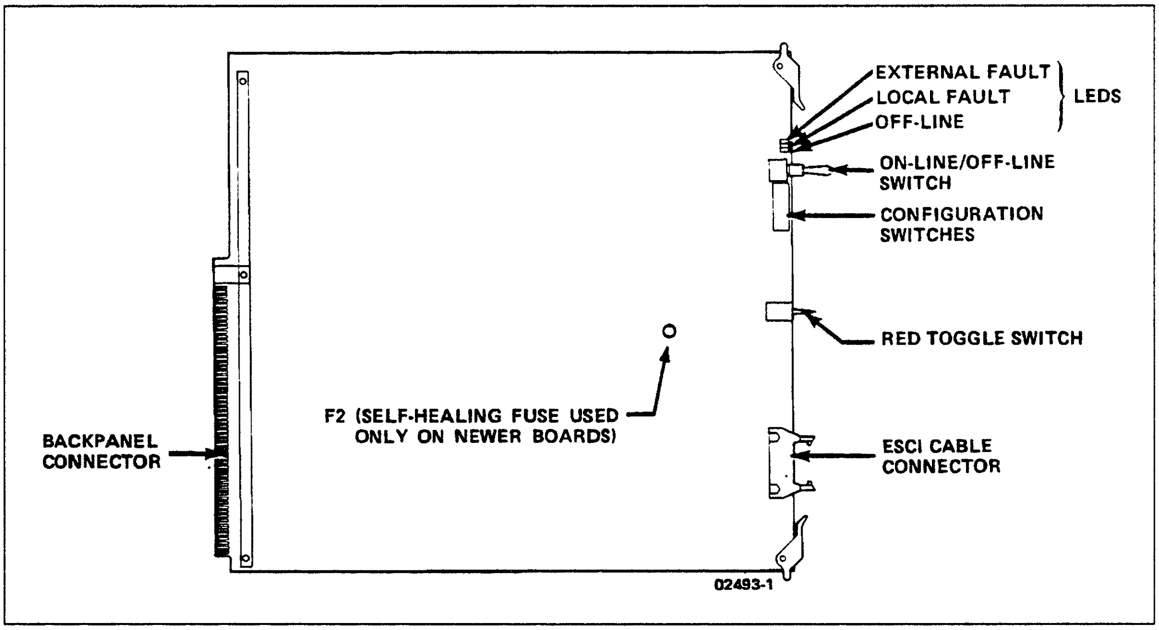


Figure 3-45. ESCI Board

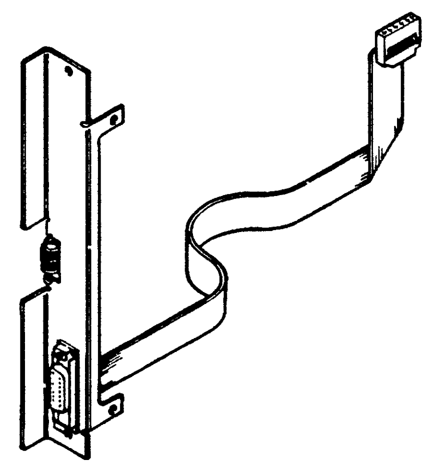


Figure 3-46. ESCI Cable Assembly

4. Install ESCI in slot designated on cabinet configuration form (figure 3-2).

5. Remove filler plate from the back of the cabinet directly behind the ESCI board. Save the screws.

6. Route ESCI cable from back of cabinet, through cable tray, to the front of the cabinet (figure 3-47).

7. Install ESCI cable retainer plate using two screws removed from filler plate.

8. Lift lower board tracks that are to the right of the ESCI slot and route cable under the tracks. If CIM/LIM cables are installed, lay ESCI cable on top of them.

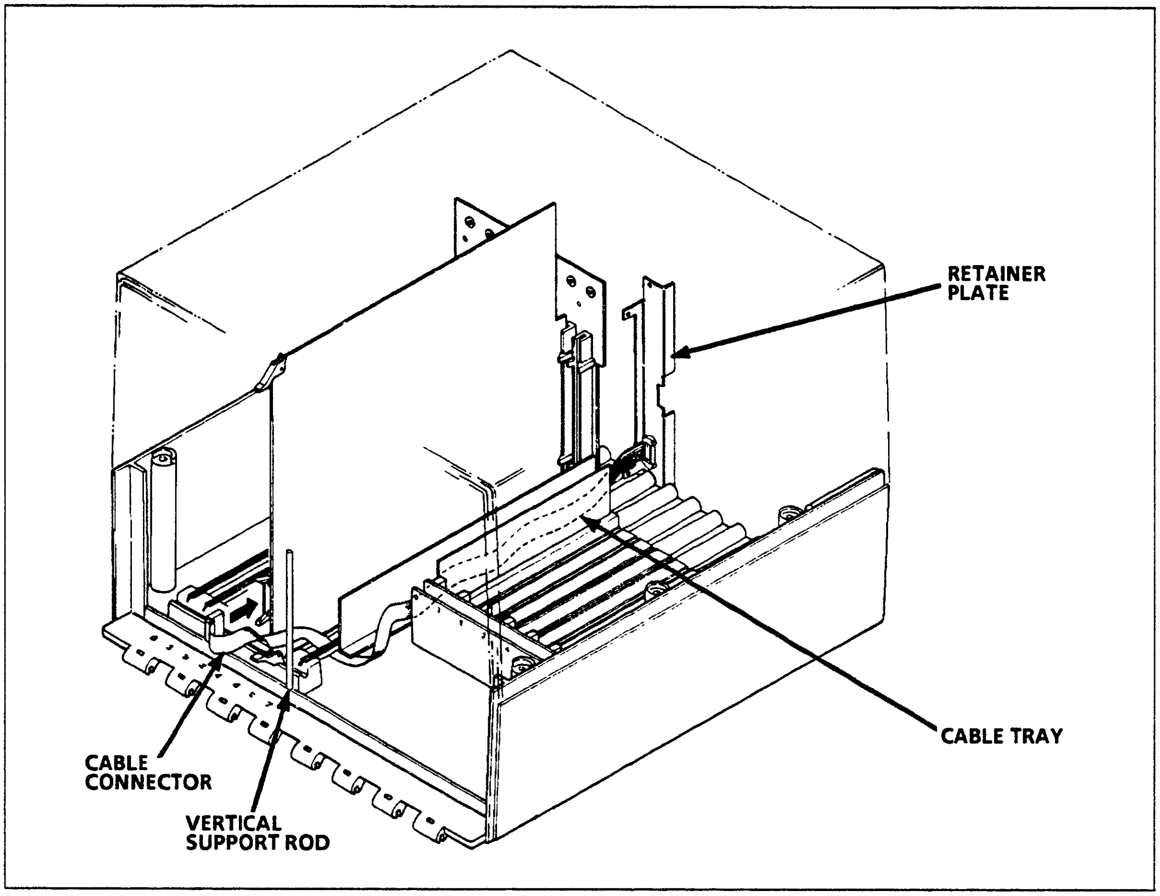


Figure 3-47. ESCI Cable Routing

CAUTION

The ESCI plug is keyed to fit only one way (red stripe up) into the board connector. However, with minimal effort, you can insert some connectors upside-down. Ensure that the plug is inserted into the connector properly, or fuses can be damaged.

9. Route ESCI cable connector behind vertical support rod and plug it into the ESCI board. Ensure that plug is properly connected by checking that keys on connector are aligned with grooves on plug, as is shown in figure 3-48. The red stripe on cable must be on top.

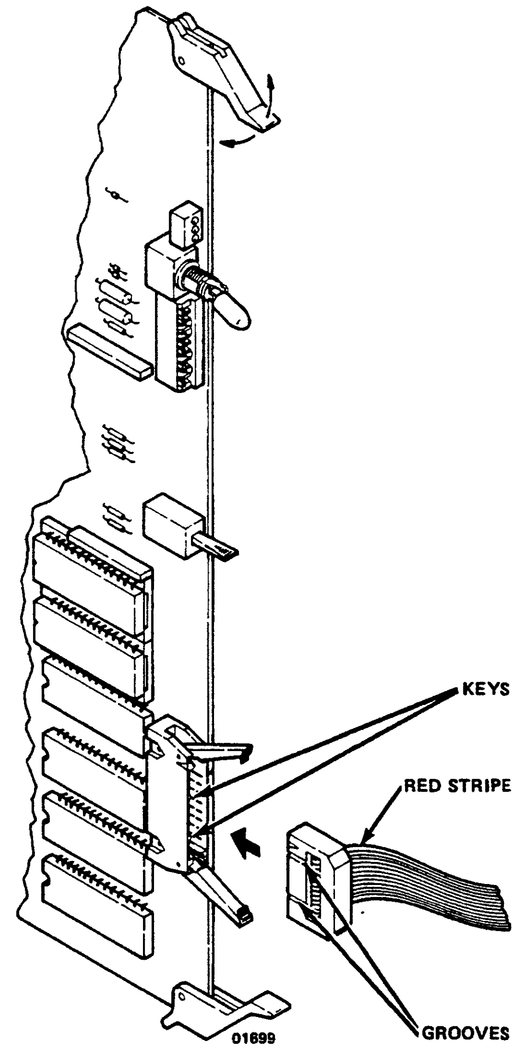


Figure 3-48. ESCI Connector Installation

Setting the ESCI Switches

The ESCI board has a set of ten configuration switches on the front edge of the board. But only switch 9 is used.

CAUTION

Do not use a pencil to set the configuration switches. Graphite can damage the switches. Instead, use a ball-point pen or small tool.

---

1. Set switch 10 and switches 1 through 8 to the left (Off).
2. Refer to cabinet configuration form (figure 3-2) to determine if ESCI is used as a boot source and proceed as follows:
   - If it is used as a primary or a secondary boot source, set switch 9 to the right (On). If board is the primary boot source, check that MPB board switches 3, 2, and 1 (bottom three) are set to show the slot number containing this ESCI board (see table below).

Slot Number	3	4	5	6	7
Switch 3	L	R	R	R	R
Switch 2	R	L	L	R	R
Switch 1	R	L	R	L	R

   - If it is not used as a boot source, set switch 9 to the left (Off).
3. Set Online/Offline toggle switch to Online by pulling out and pressing down on switch (figure 3-49).

NOTE

The red toggle switch in the center of the board is not used and can be set to any position.

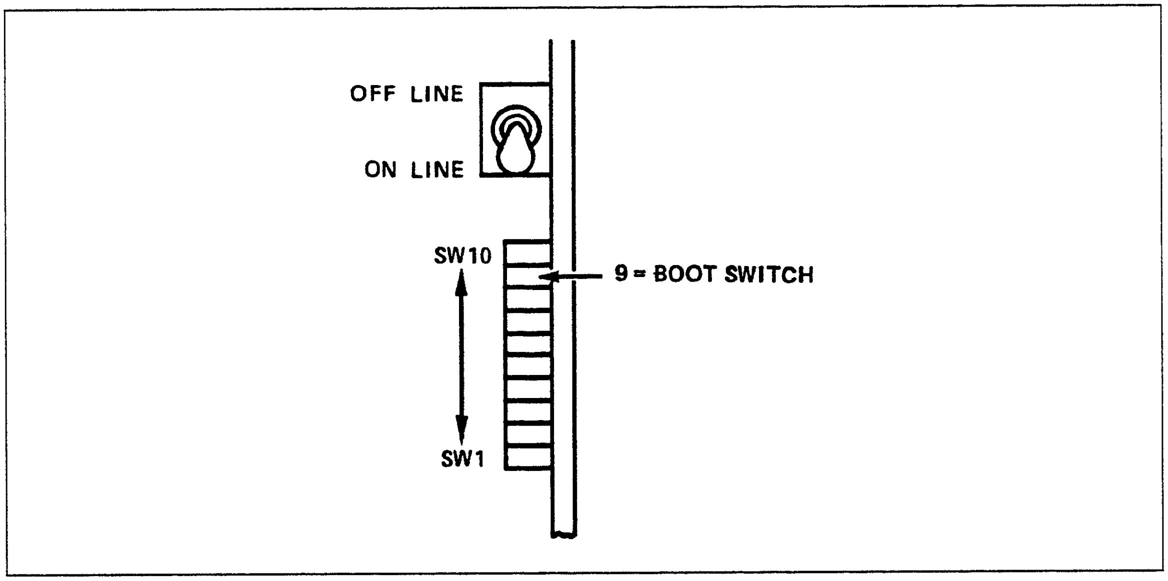


Figure 3-49. ESCI Configuration Switches

Installing a Mainframe Channel Interface (MCI)

Equipment Number: DY226-A (Includes MCI board and cables)

CAUTION

Static electricity can damage logic board circuits. Always wear a static discharge wrist strap when handling logic boards. Ground wrist strap to lug on power supply as shown in figure 3-1. Do not handle boards by the gold backpanel connectors. Always keep boards in E.S.D bags when you are not handling them.

NOTE

If the MCI connects to a NOS/VE peripheral processor via a concurrent input/output channel, ensure that FCO CA49716 is installed in that MCI board (see Verifying FCO Level of Equipment in chapter 10).

You can install either one or two MCI boards in a single DI. But if you install two boards, you must comply with the following rules.

- Both boards can connect to the same NOS host.
- One board can connect to a NOS host and the other to a NOS/VE host.
- Both boards cannot connect to the same NOS/VE host.
- On a dual-state system, the above rules still apply. You can connect both boards to the NOS host or one to NOS and the other to NOS/VE. But you cannot connect both to NOS/VE.

The following procedure is divided into two parts. The first describes how to install the board in the cabinet. The second tells you how to set the switches for proper operation.

Installing the MCI Board In DI Cabinet

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Unpack MCI board, MCI cable assembly, both channel cables, equipment label, and FCO label (board and cables are shown in figures 3-50 and 3-51).
3. Attach equipment label and FCO label to plastic fold-out holder inside DI door.

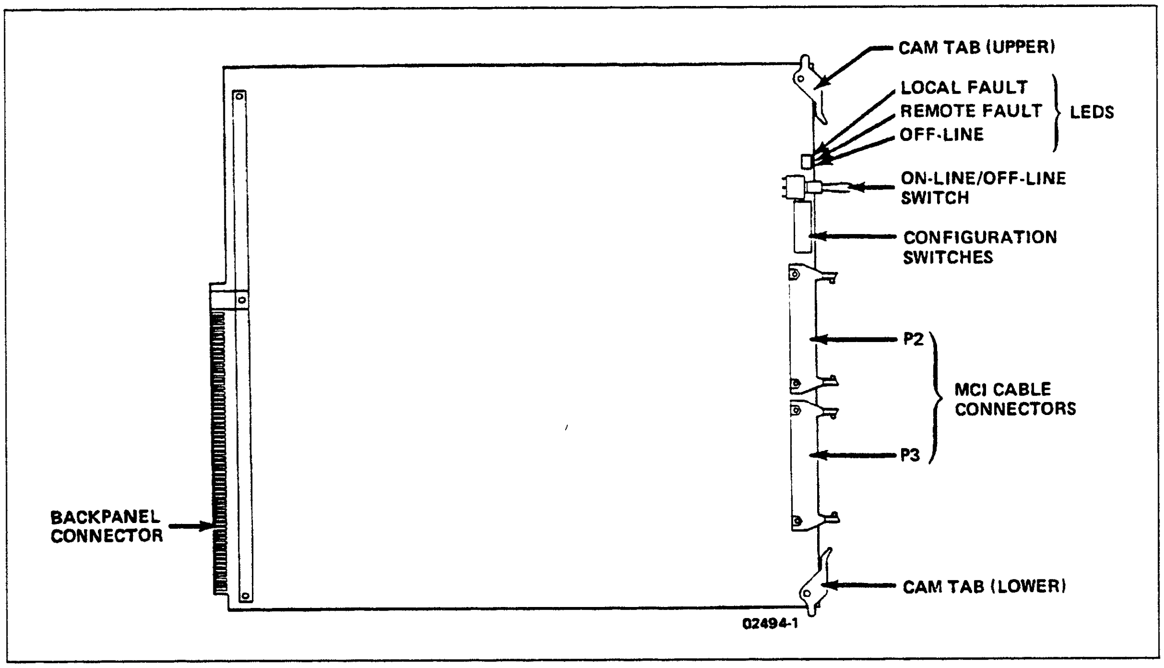


Figure 3-50. MCI Board

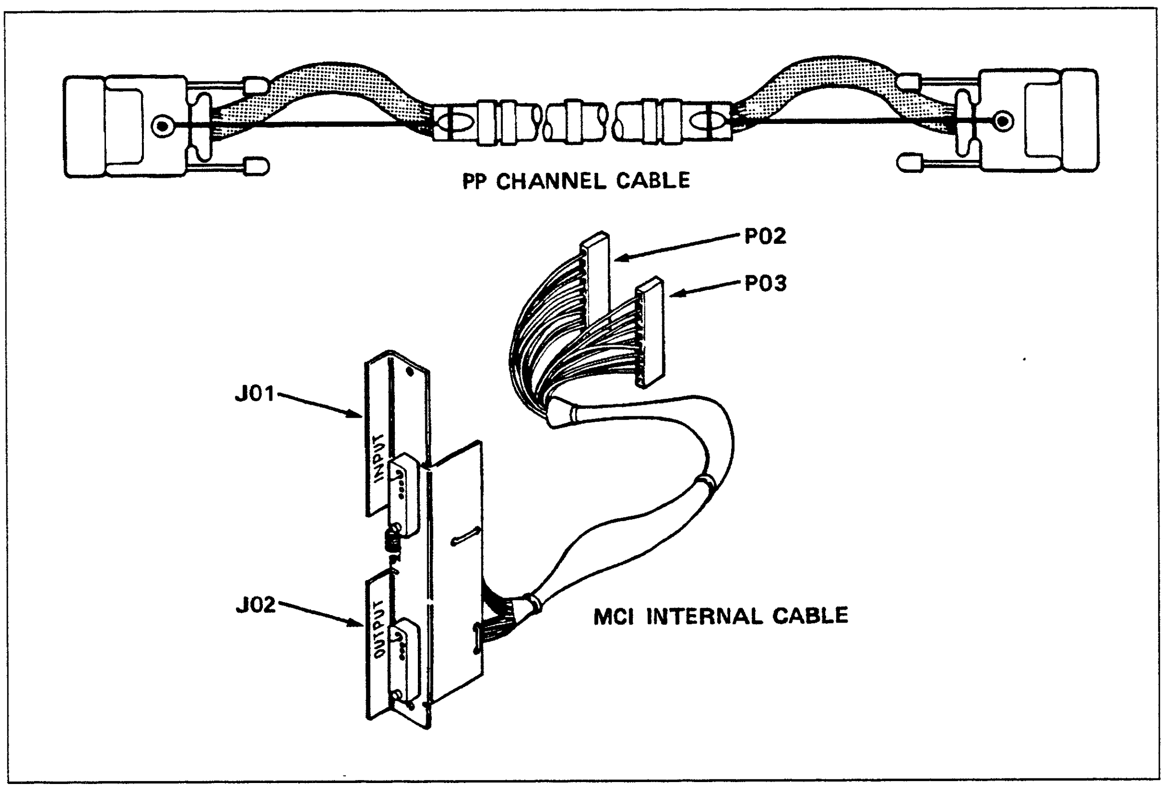


Figure 3-51. MCI Cables

CAUTION

If an ESCI cable has been installed, make sure it is in the cable tray and out of the way before you perform step 4.

4. Install MCI board in slot number indicated on the cabinet configuration form (figure 3-2).

5. Install MCI cable (figure 3-52). One end of the cable has two connectors that plug into the MCI board. The other end has a retainer plate that is installed on the back of the cabinet.

CAUTION

The cable wires are very fragile. Never pull on the wires while installing or removing the connectors. If the cable is difficult to install, remove the MCI board and one or more filler plates (remember to replace plates when you are finished.)

a. Remove filler plate located directly behind the MCI board (save screws).

b. Route MCI cable from back of cabinet, through the cable tray, to the front of the cabinet.

c. Install retainer plate in the back of the cabinet using two screws removed from filler plate.

d. Route cable around the front of the vertical support rod at the front of the cabinet.

NOTE

If P02 and P03 are reversed, the DI cannot communicate with the mainframe.

e. Plug P02 into the top connector on MCI board and P03 into the bottom connector.

f. Attach MCI cable to cable mount on bottom of power supply.

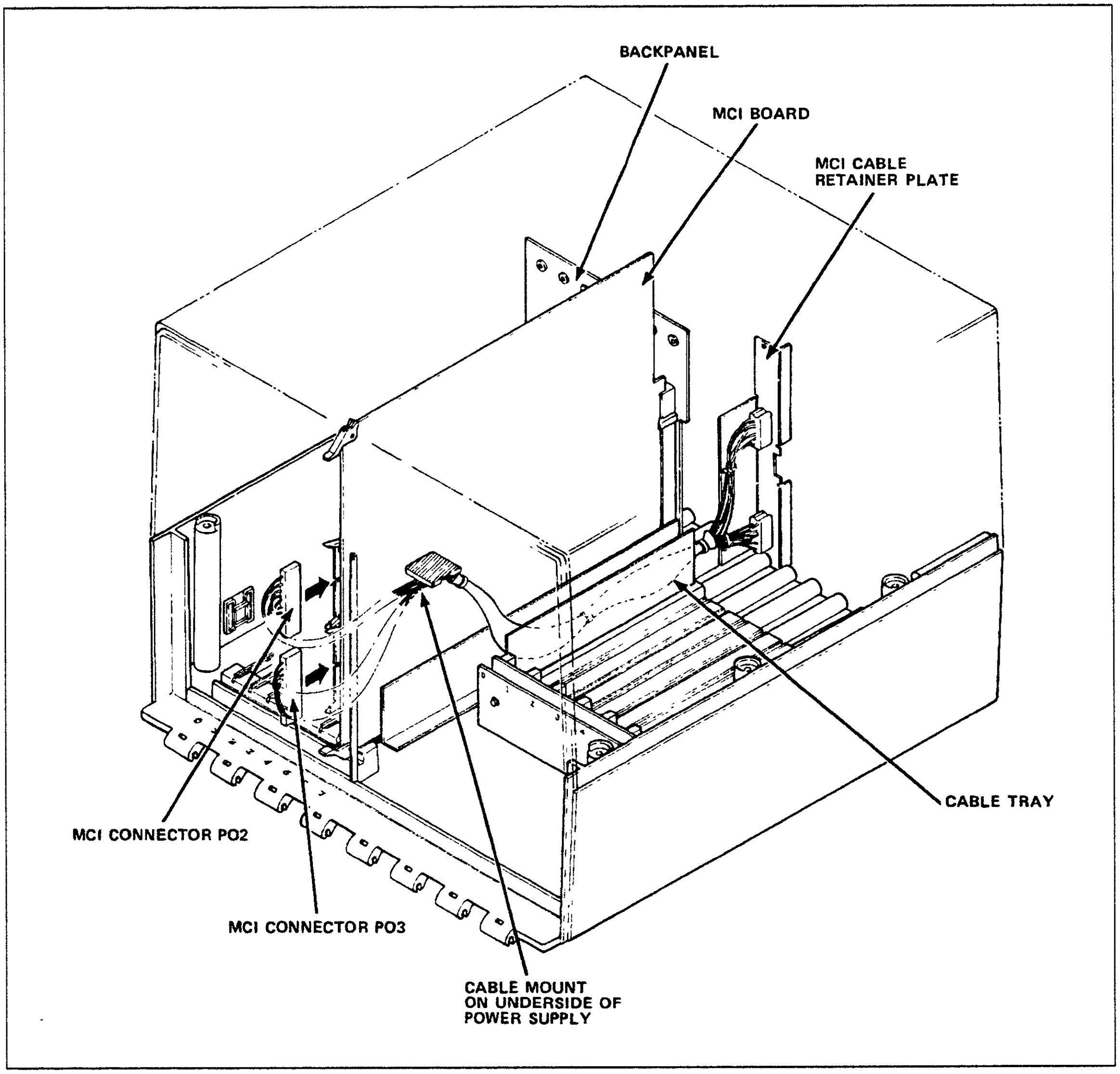


Figure 3-52. MCI Cable Installation

Setting the MCI Switches

The MCI has a set of ten configuration switches on the front edge of the board (figure 3-53). But only switches 9 and 10 are used.

CAUTION

Do not use a pencil to set the configuration switches. Graphite can damage the switches. Instead, use a ball-point pen or small tool.

1. Check system configuration to determine if host peripheral processor channel parity should be enabled or disabled.

   - Set switch 10 to the right (On) to disable channel parity.
   - Set switch 10 to the left (Off) to enable parity.

2. Refer to cabinet configuration form (figure 3-2) to determine if MCI is used as a boot source.

   - Set switch 9 to the right (On) to select the MCI as the boot source. If board is the primary boot source, check that MPB board switches 3, 2, and 1 (bottom three) are set to show the slot number containing this MCI board (see table below).

Slot Number	3	4	5	6	7
Switch 3	L	R	R	R	R
Switch 2	R	L	L	R	R
Switch 1	R	L	R	L	R

   - Set switch 9 to the left (Off) if the board is not to be used as a boot source.

3. Set the Online/Offline toggle switch to Online by pulling out and pressing down on the switch.

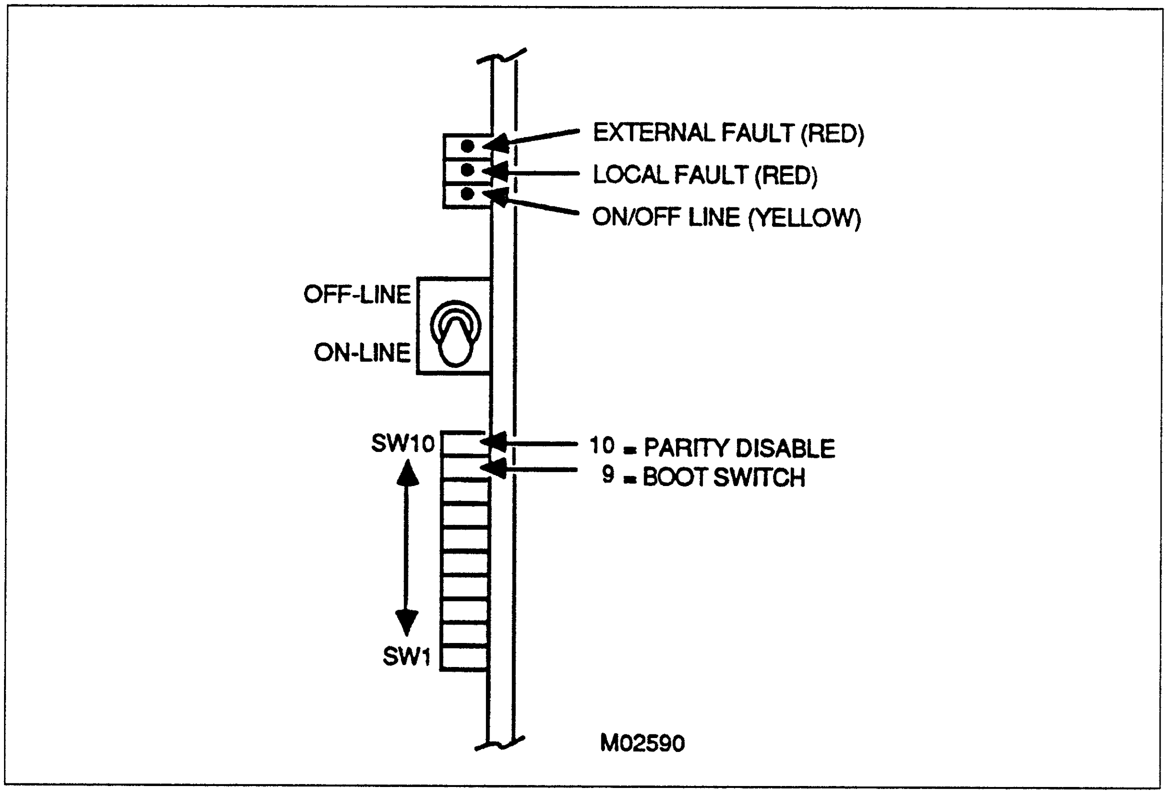


Figure 3-53. MCI Configuration Switches and Indicators

Checking Out the DI Offline with Onboard Diagnostics

This procedure uses the onboard diagnostics to check out the DI before it is installed in the network. Additional information for using the onboard diagnostics may be found in chapter 7 of this manual.

Things To Check Before Starting the Test

Before starting the offline checkout, verify that the following conditions have been met.

1. DI power/cooling fans check OK.
2. Boards and internal cables installed per configuration form.
3. MPB power indicator check OK.
4. System identifier entered and verified.
5. MCI not connected to channel.
6. ESCI not connected to transceiver.
7. LIMs not connected to external devices (terminals and so on).
8. Board switches set as follows:

NOTE

If MPB switch 5 was set to On during board installation, be sure to set it back to On after onboard testing. See setting MPB Switches for Normal Operation for more information on switch 5.

MPB configuration switches:	10 through 4 - Off (left) 3,2,1 - Equal to slot number of primary boot board.
MPB ATTN/RST toggle switch:	Set to the middle position.
MCI, ESCI configuration switches:	1 through 8 - Off 9 - Off (Boot source) 10 - Parity (MCI only)
CIM configuration switches:	10 - Off (left) 9 - Off (Boot source) 8 - Off 7 through 1 - See Setting CIM Switches procedure.
SMM, MCI, ESCI, CIM toggle switch:	Down (online). No effect when DI is not connected to a network.

Test Description

The onboard diagnostic test starts running when the DI power is turned on and continues to run (if the DI is offline) until power is turned off or the test cannot continue. Therefore, you must monitor the indicators on the MPB to follow the progress of the test. It may be helpful to read through the following test summary before turning power on so you will know what to expect.

NOTE

The URI and 8-port LIM boards are not tested by the onboard diagnostics. Therefore, their fault indicators remain on at the completion of the diagnostics. The ESCI external fault indicator remains on if the MCI is not connected to a transceiver cable. The MCI external fault indicator remains on if the MCI is selected as the boot source.

When you are ready to start the test, turn on the DI power and watch the MPB indicators. The key indicators to watch are listed in the following sequence. All times (in parenthesis) are approximate; considerable variations may be expected. Figure 3-54 shows MPB indicators during a normal (no fault) test. For any failure not covered here, refer to the troubleshooting information in this manual, starting with chapter 4.

1. Test Indicators (1 second): Indicators on all boards come on. Replace board if indicator(s) do not light.

2. Test Timeout (10 seconds): MPB indicator 5 (7 is the top indicator) flashes and then goes out. If it does not flash or does not go out, replace MPB. Whenever the MPB is replaced, the system identifier must be reentered.

3. Test MPB (DY245-A - 1 second, AC117-A - 3 seconds): Indicators 2, 1, 0 flash and then go out. When an error occurs at this stage, the remainder of the test will abort. After a 10 second timeout, the test restarts and all indicators come on. If this portion of the test fails and you have verified that the system identifier has been entered, replace the MPB.

4. PMM test (13 seconds): Yellow indicator on MPB and the red cabinet FAULT indicator flash. PMM fault indicator goes out. Replace PMM if indicator does not go out.

5. SMM Test: Yellow indicators on MPB and SMM, and the red cabinet FAULT indicator flash. SMM fault indicator goes out. (SMM boards are checked sequentially in slot number order.) Replace SMM board if fault light does not go out. Time for test varies depending on types of MPB and SMM boards used:

   DY225-A SMM with DY245-A MPB - 96 seconds (62 seconds with E/FCO 47972)
   DY225-A SMM with AC117-A MPB - 37 seconds (17 seconds with E/FCO 47972)
   BS236-A SMM with DY245-A MPB - 86 seconds
   BS236-A SMM with AC117-A MPB - 39 seconds

6. Test MCI, ESCI, CIM, LIM (1 second): All remaining indicators go out except the ESCI external fault (top indicator), 8-port LIM(s), URI fault, and the MCI if it is specified as the boot source.

NOTE

If the MCI is in slot number 7, the lights go out for less than a second, so you must watch closely.

When the MCI is specified as the boot source, its lights go out initially, then come back on when it attempts to communicate over the channel.

Replace any board with a fault. If more than one board has a fault, replace them in slot number order.

7. Initialize Software Download (10 seconds): MPB indicators 6 and 3 should be on because DI cannot find a boot source. After 10 seconds, the test restarts at step 1, skips step 2 and continues through step 7.

8. When testing is complete, check that all switches are set properly. Pay particular attention to switch 9 on MCI, ESCI, and CIM boards if they were changed prior to onboard testing. Also check switch 5 on MPB board (see Setting MPB Switches for Normal Operation).

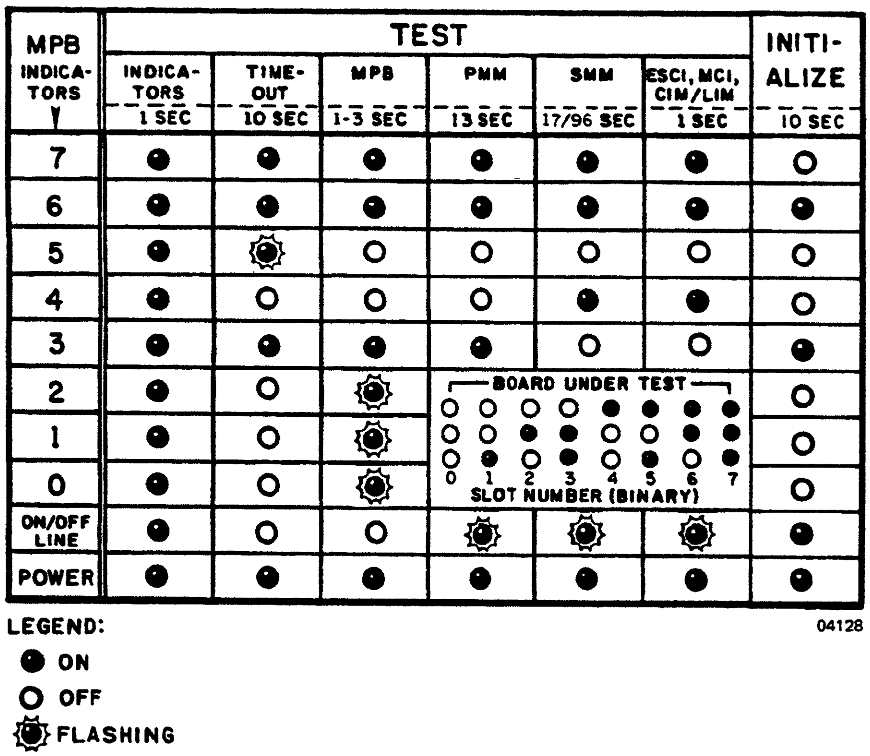


Figure 3-54. Onboard Test Sequence

Installing the DI in a Rack or Enclosure Table

WARNING

Moving an assembled (all boards installed) DI, requires two persons. If you are installing the DI by yourself, remove the boards before moving the unit to its final network location (cabinet or equipment rack).

CAUTION

Remove all logic boards before shipping the DI to another site or building.

When you have checked out the DI offline and it is operating properly, you can install it in a cabinet, equipment rack or other permanent location. Figure 3-55 shows the enclosure table and equipment rack that are available from Control Data. A standard RETMA rack may also be used.

- GH487-A: An enclosure table that holds one DI.
- GH486-A/B: A rack that holds three DIs and has room for modems and a multiplexer. The rack includes power wiring.
  - Model A is for 120 V applications and requires a 20 A facility circuit breaker and a Hubbell 5632, or NEMA 5-20R, or equivalent wall socket.
  - Model B for 240 V applications and requires a 16 A facility circuit breaker and a Siemens 5UB3-210 (part number 94260200) or equivalent 3-pole, 3-wire outlet.

There are no special installation instructions for either the rack or enclosure table.

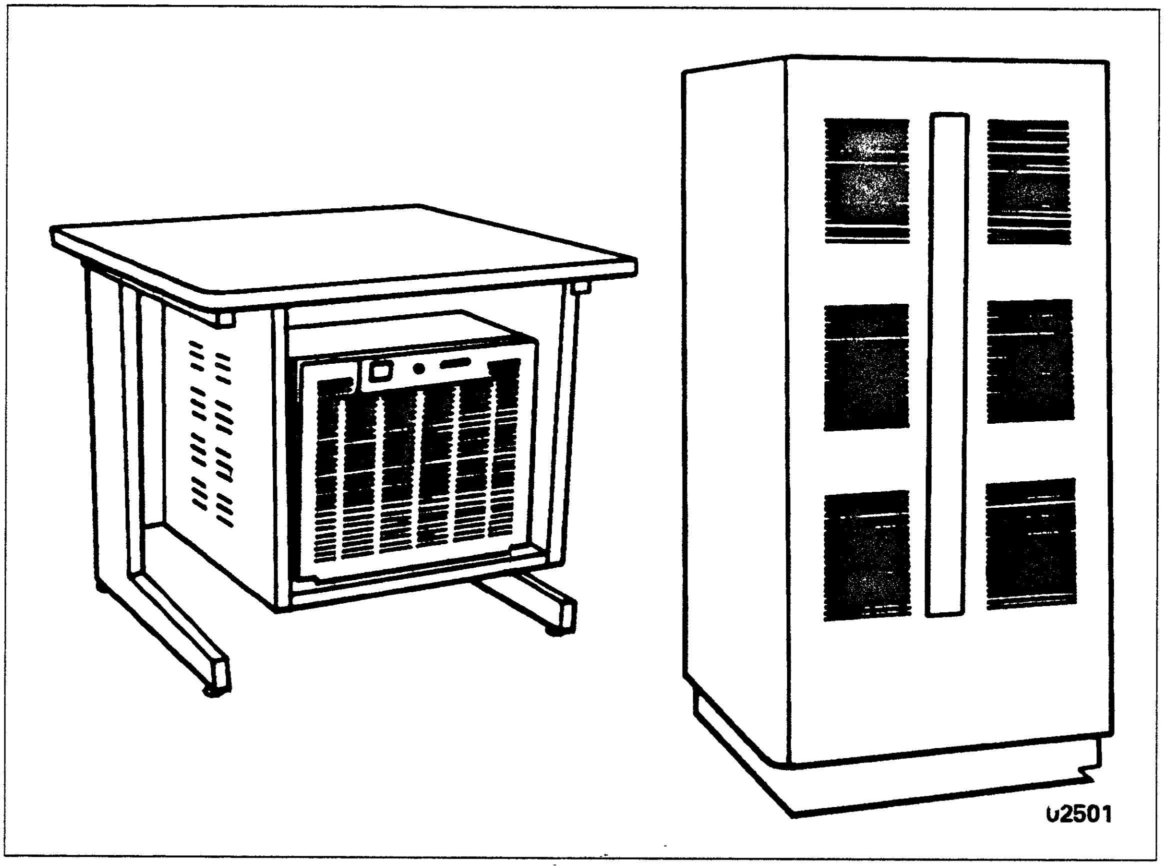


Figure 3-55. DI Enclosure Cabinets

Connecting the DI to the Network

After you have installed the DI at its permanent location, you can connect it to the rest of the network. Connecting the DI involves the following.

- Installing Channel Cables (if required)
- Installing Transceiver Cables
- Installing LIM Cables

Installing Channel Cables

The channel cables connect the MCI board in the DI to the host computer.

1. Refer to cabinet configuration form (figure 3-2) for cable types and destinations. Consult with the network administrator regarding the location of the mainframe/channel and routing of all cables.
2. Tag the cables with destination information. For example, the mainframe serial number, the channel number, input or output, and the location of the mainframe.
3. Connect cables to DI. Plug INPUT cable into the top connector and the OUTPUT cable into the bottom connector (figure 3-56). (Input/Output is relative to the channel.) Tighten the connectors finger-tight or use a screwdriver.
4. Tag and connect cables to channel.

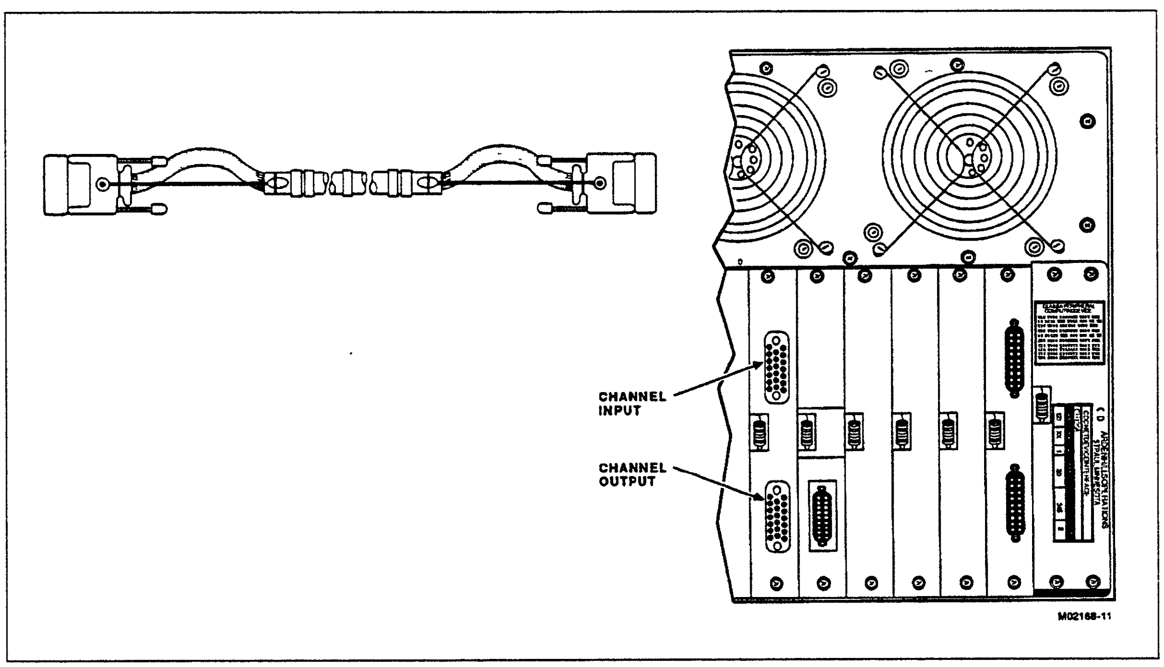


Figure 3-56. Channel Cable and MCI Connectors

Installing Transceiver Interface Cables

A transceiver interface cable (figure 3-57) connects the ESCI board on the DI to a transceiver located on the segment cable or to a multiplexer.

1. Refer to cabinet configuration form (figure 3-2) for cable types and destinations. Consult with the network administrator regarding the location of the transceiver and routing of the cable.
2. Tag cable with destination information. For example, transceiver serial number, trunk number and/or name, and transceiver location.
3. Connect cable to DI. Lock the connector with the slide latch on the DI connector.
4. Tag and connect cable to transceiver.

NOTE

If your responsibilities include transceiver, multiplexer, repeater, or coaxial cable installation, refer to chapter 2, Installing Segment Cable and Components.

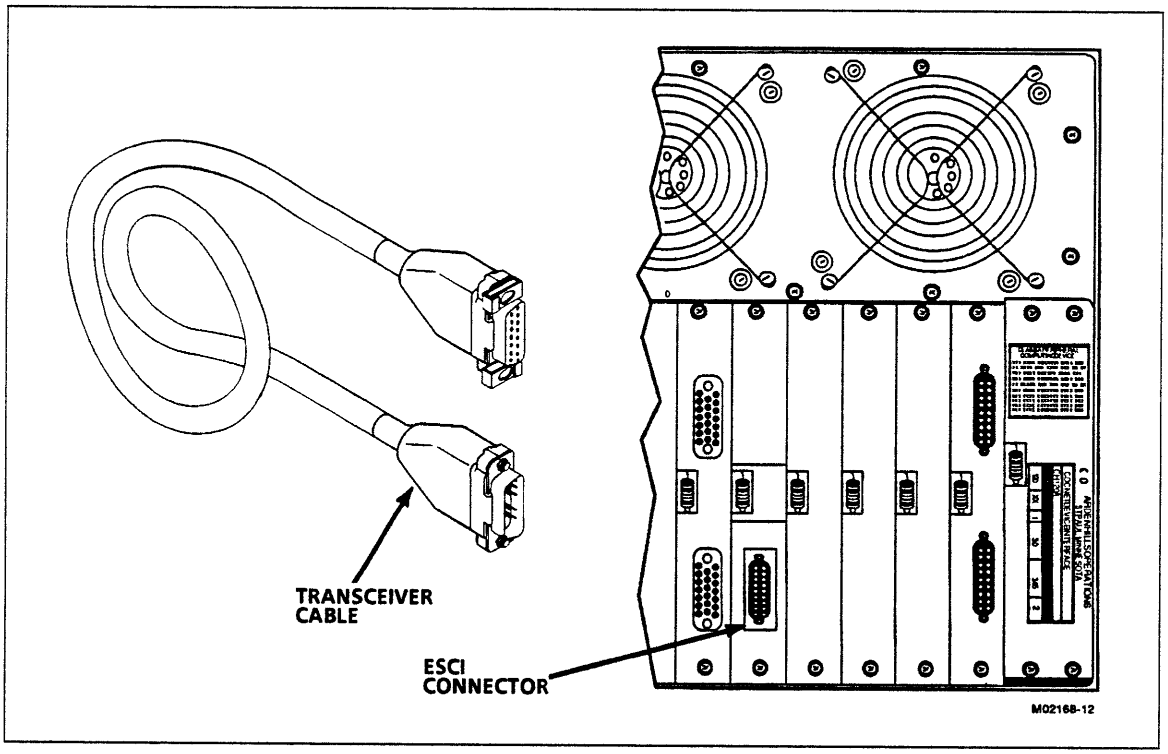


Figure 3-57. Installing Transceiver Interface Cables

Installing LIM Cables

There may be many LIM cables connected to a DI, so it is extremely important to tag each cable carefully with destination information. Include the equipment number of the cable, location, serial number, model number, and any information that may help identify both ends. Also, do not move cables from one port or LIM to another without permission from the network manager.

Refer to the cabinet configuration form (figure 3-2) for cable types and destinations. Consult with the network administrator regarding the location of equipment and routing of cables. Refer to appendix B for additional information on selecting the proper LIM cables for your application.

CAUTION

Make sure all cables connected to the DI are also connected to a terminal device on the other end. Unconnected cables may introduce software and diagnostic failures.

Connecting Cables To RS-232-C, 4-Port LIMs (DY229)

Four cables in any combination can connect to each DY229 LIM. To install the DY229 cables, perform the following steps:

1. Connect the cable(s) to the 4-port LIM connectors shown in figure 3-58. Tighten the locking screws with a straight slot screwdriver.

2. Tag and connect the cables to the terminals, modems, and/or printers. Refer to the specific terminal, printer, or modem manual for instructions on connecting cables to these devices.

Connecting Cables To RS-449 LIMs (DY230)

You can connect two cables to each DY230 LIM. To install the DY230 cables, perform the following steps:

1. Connect the cable(s) to the DI 2-port LIM connectors shown in figure 3-58. Tighten the locking screws with a straight slot screwdriver.

2. Tag and connect the cables to the terminals, modems, and/or printers. Refer to the specific terminal, printer, or modem manual for instructions on connecting cables to these devices.

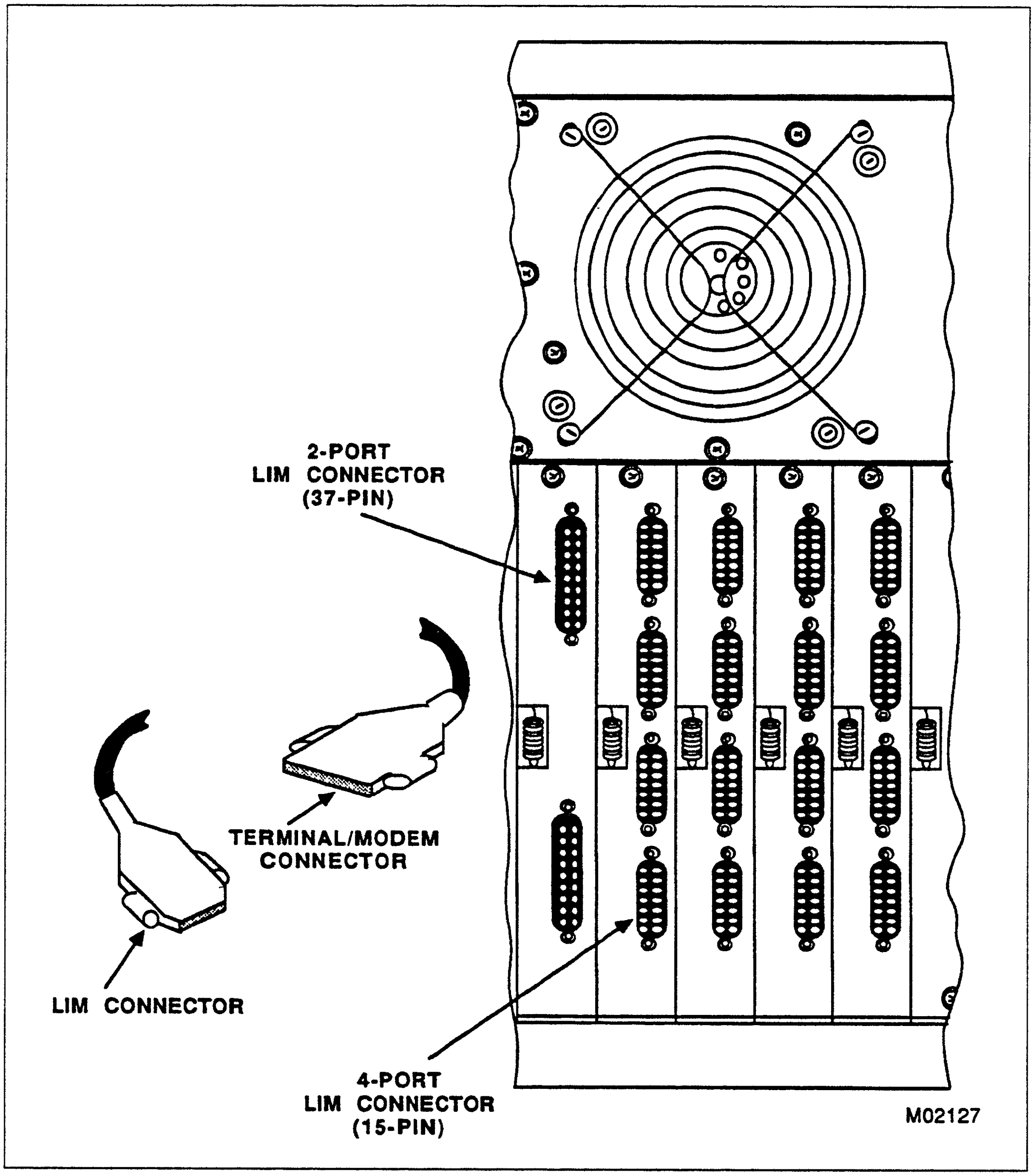


Figure 3-58. Installing RS-449 and 4-Port RS-232 LIM Cables

Connecting Cables To RS-232-C, 8-Port LIMs (DY267)

To install the DY267 cables, perform the following steps:

CAUTION

Damage to the FG pin in the LIM connector may occur when using non-Control Data cables (see Pin Assignments for LIM RJ45 Modular Connector in appendix B).

1. Connect the cable(s) (figure 3-59) to the LIM (figure 3-60).

2. Tag and connect the cables to the appropriate modular adapter (figure 3-59). Connect the modular adapter to the terminal device. Refer to the specific terminal or printer manual for instructions on connecting cables to the terminal or printer.

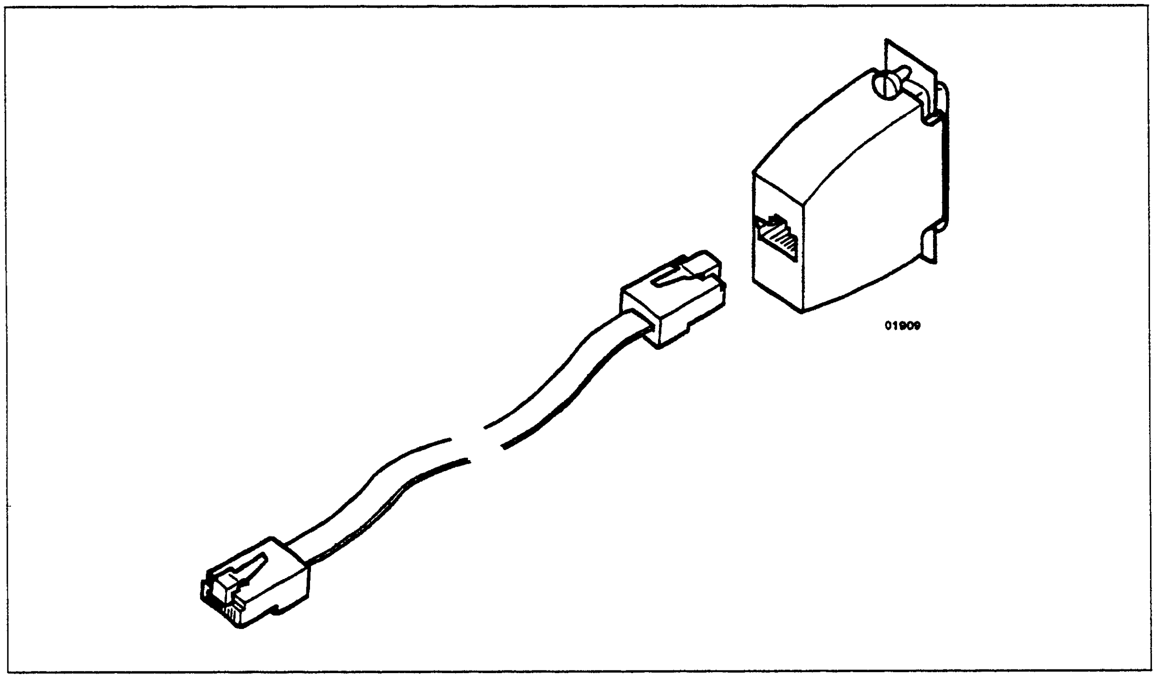


Figure 3-59. DY267, 8-Port LIM Cables (YA333-x) and Modular Adapter (YA324-x)

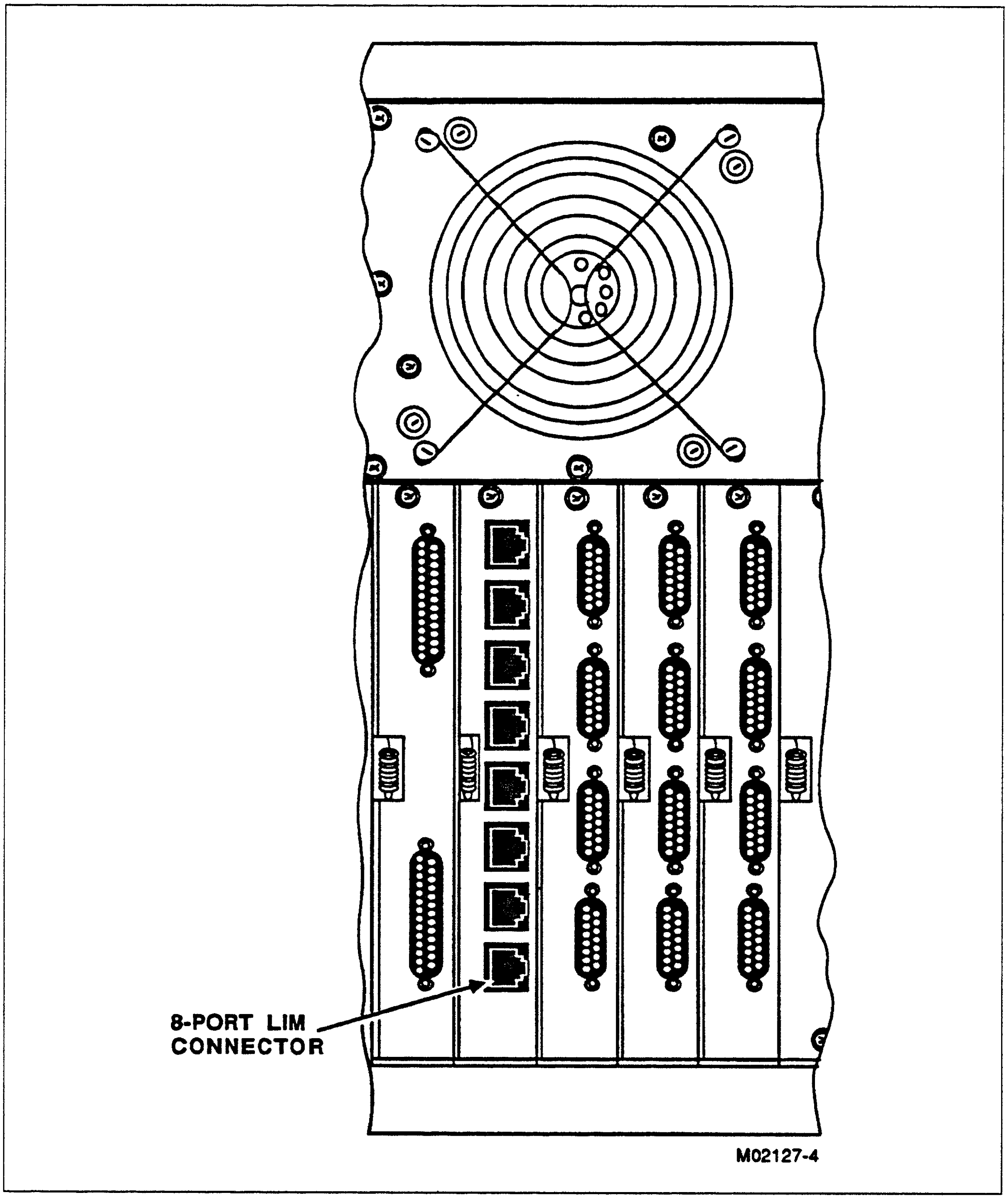


Figure 3-60. Installing RS-232, 8-Port LIM Port Connectors

Connecting Cables To URI LIMs (DY246)

The following describes how to connect cables between the URI and the printer.

1. Connect the cable(s) to the DI. The URI connectors are shown in figure 3-61. Tighten the locking screws with a straight slot screwdriver.
2. Tag and connect the cables to the printers. Refer to the specific printer manual for instructions on connecting cables to the printers.

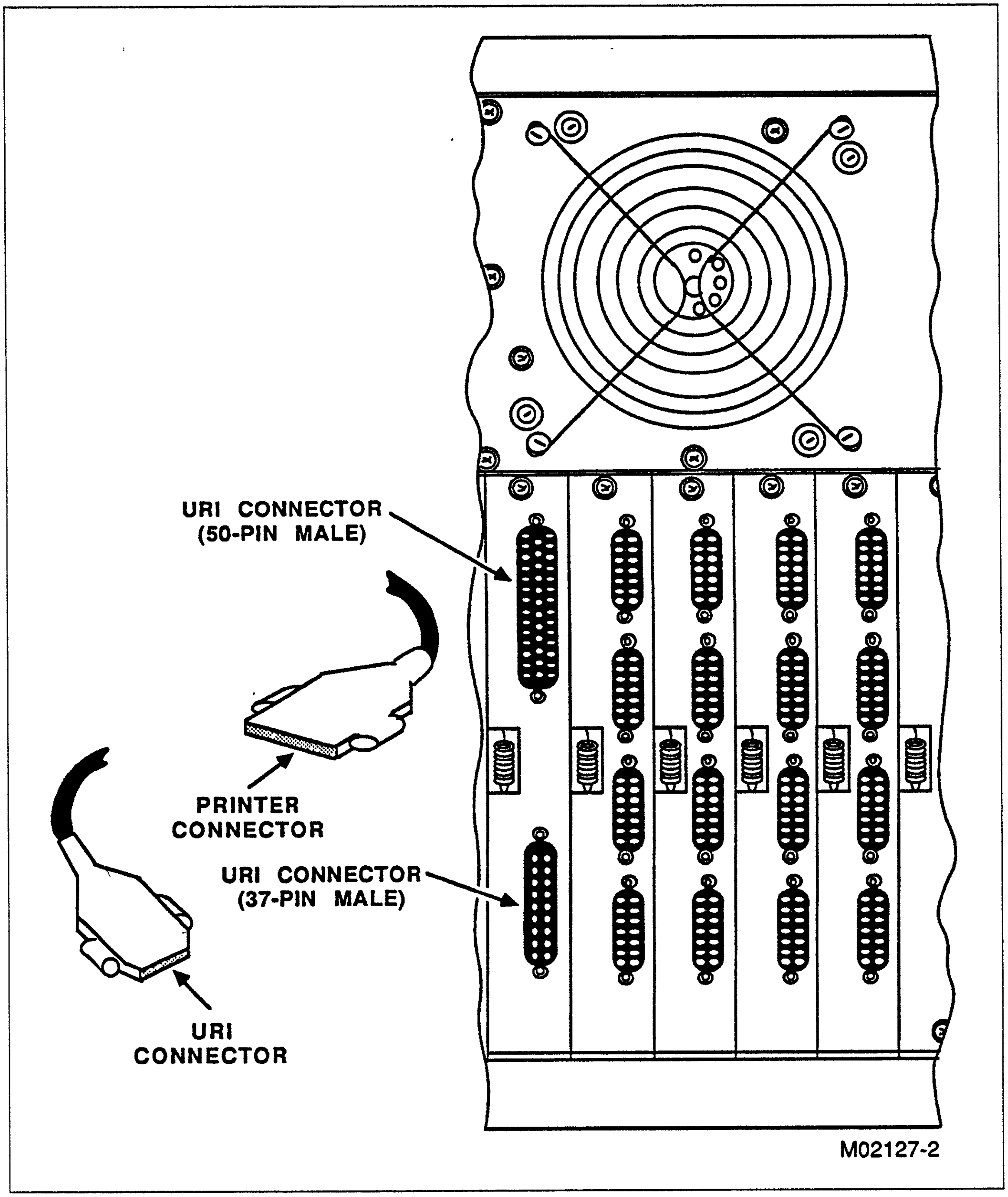


Figure 3-61. Installing URI Cables

Connecting Cables To V.35 LIMs (DY261)

To install the DY261 cables, perform the following steps:

1. Connect the cable(s) to the 2-port LIM connectors shown in figure 3-62. Tighten the locking screws with a straight slot screwdriver.
2. Tag and connect the cables to the terminals, modems, and/or printers. Refer to the specific terminal, printer, or modem manual for instructions on connecting cables to these devices.

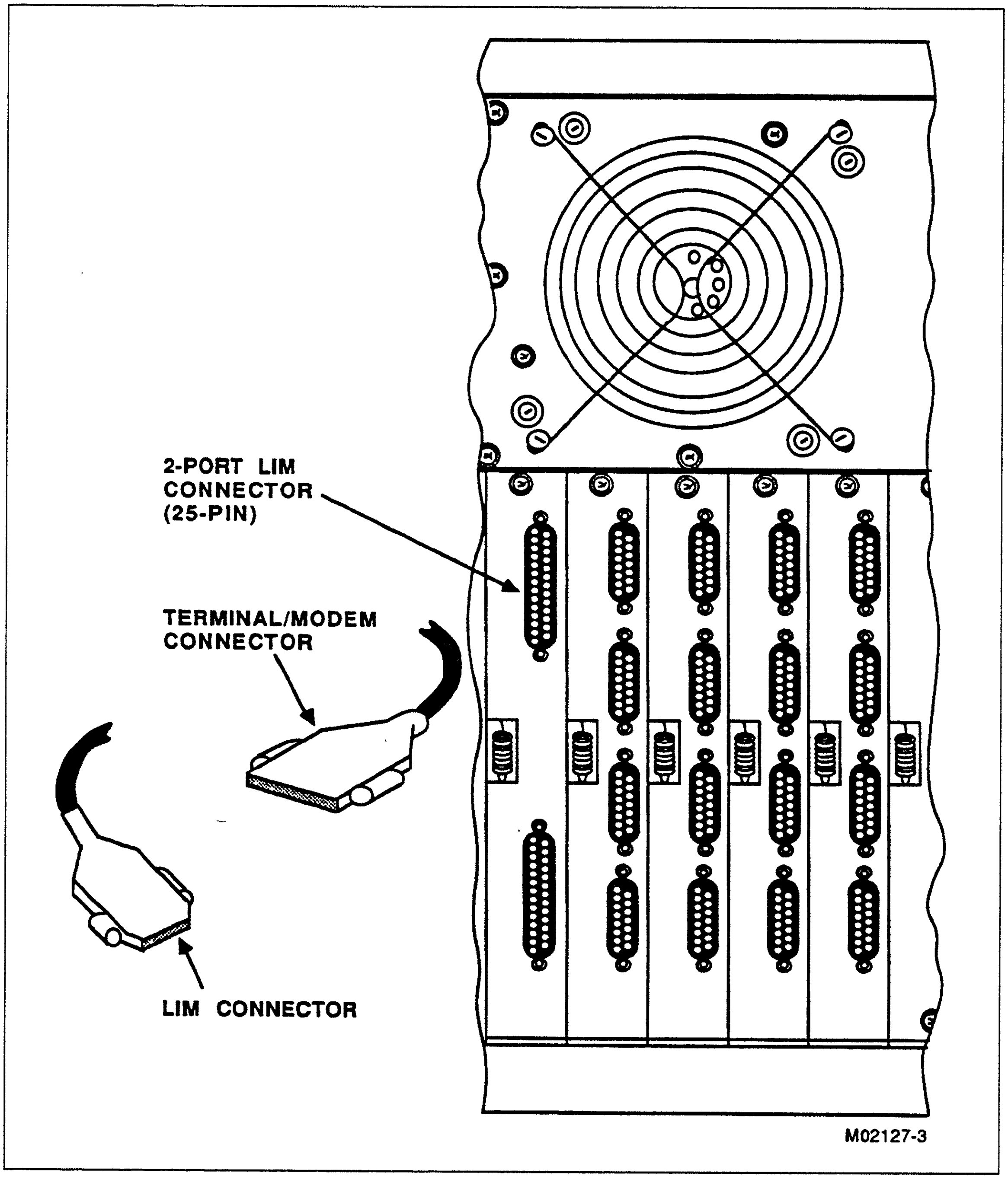


Figure 3-62. Connecting Cables to V.35 LIMs

Connecting Cables To X.24 LIMs (DY234-B)

To install the DY234-B cables, perform the following steps:

1. Connect the cable(s) to the 4-port LIM connectors shown in figure 3-63. Tighten the locking screws with a straight slot screwdriver.

2. Tag and connect the cables to the terminals, modems, and/or printers. Refer to the specific terminal, printer, or modem manual for instructions on connecting cables to these devices.

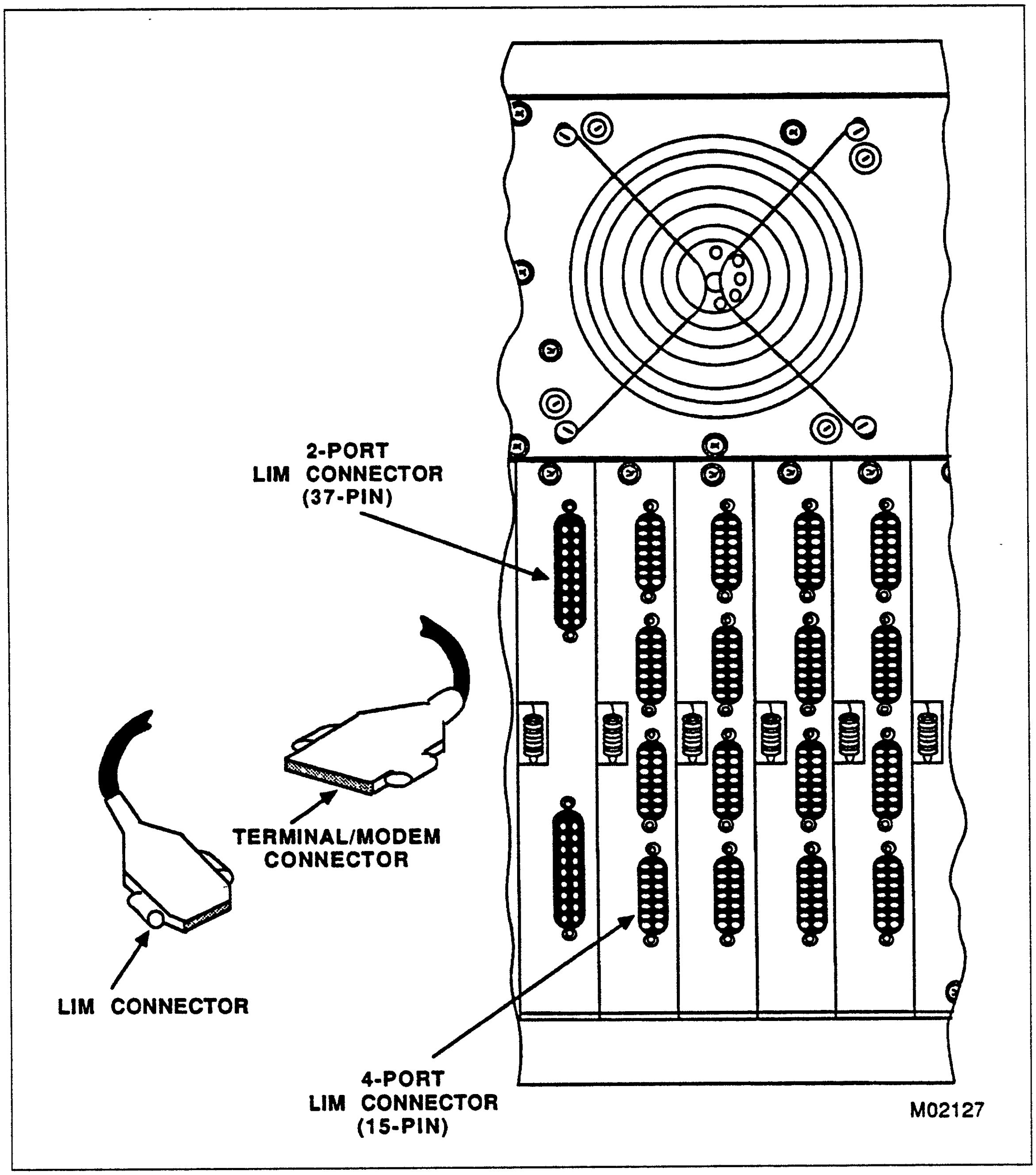


Figure 3-63. Connecting Cables to X.24 LIMs

Checking Out the DI Online with Onboard Diagnostics

Before the DI can be checked out online, the network (or host) operator must enter the DI identification and configuration into the network operating system. The procedures for doing this are included in the Configuration and Site Administration Guide, listed in About This Manual. Also, the procedure for entering the system identifier is described in Entering the System Identifier earlier in this chapter. You can start online checkout after the DI information has been entered into the system.

The online test runs the onboard diagnostics that were run in offline checkout and in addition does the following:

- Checks the ESCI-to-transceiver circuit (turning off the ESCI external fault light).
- Verifies that the network software has been downloaded from the host and that the DI is ready for network operation.

Things to Check Before Starting the Test

1. System Identifier entered and verified.
2. MCI connected to channel.
3. ESCI connected to transceiver.
4. LIMs connected to external devices (terminals and so on).
5. URIs connected to printers.
6. Board switches set as follows:

NOTE

If MPB switch 5 was set to On during board installation, be sure to set it back to On following the online testing. For more information on switch 5, see Setting MPB switches for Normal Operation.

MPB configuration switches:	10 through 4 off (left) 3,2,1 equal to slot number of primary boot board.
MPB ATTN/RST toggle switch:	Set to the middle position.
MCI, ESCI configuration switches:	1 through 8 off; 9 (boot) and 10 (MCI parity) set per system requirements.
CIM configuration switches:	10 - Off (left) 9 - (boot source) set per configuration form (figure 3-2). 8 - Off 7 through 1 - See Setting CIM Switches procedure.
SMM, MCI, ESCI, CIM toggle switch:	Down (online).

Test Sequence

The online checkout test begins when the DI power is turned on. After the onboard diagnostics are successfully run, the DI initiates down-line loading of the network software from the network host. The MPB indicators must be monitored to follow the progress of the test. It may be helpful to read through the following test sequence summary before turning power on so you will know what to expect. Figure 3-64 shows the sequence and timing of all MPB indicators during a normal (no fault) test. All times (in parenthesis) are approximate ; considerable variation can be expected. The first six steps are identical to the offline test sequence.

1. Test Indicators (1 second): Indicators on all boards come on. Replace board if indicator(s) do not light.

2. Test Timeout (10 seconds): MPB indicator 5 (7 is the top indicator) flashes for 10 seconds and then goes out. If it does not flash or does not go out, replace MPB. Whenever the MPB is replaced, the system identifier must be reentered.

3. Test MPB (DY245-A - 1 second, AC117-A - 3 seconds): Indicators 2, 1, 0 flash and then go out. When an error occurs at this stage, the remainder of the test aborts. After a 10-second timeout, the test restarts and all indicators come on. If this portion of the test fails, and you have verified that the System Identifier has been entered, replace the MPB.

4. PMM Test (13 seconds): Yellow indicator on MPB and the red cabinet FAULT indicator flash. PMM fault indicator goes out. Replace PMM if indicator does not go out.

5. SMM Test: Yellow indicators on MPB and SMM, and the red cabinet FAULT indicator flash. SMM fault indicator goes out (SMM boards are checked sequentially in slot number order). Replace SMM board if fault light does not go out. Time for test varies depending on types of MPB and SMM boards used:

   DY225-A SMM with DY245-A MPB - 96 seconds (62 seconds with E/FCO 47972)
   DY225-A SMM with AC117-A MPB - 37 seconds (17 seconds with E/FCO 47972)
   BS236-A SMM with DY245-A MPB - 86 seconds
   BS236-A SMM with AC117-A MPB - 39 seconds

6. Test MCI, ESCI, CIM, LIM (1 second): All remaining indicators go out within 1 second. Replace any board with fault light on. If more than one board has lights on, replace them in slot number order.

   NOTE

   URIs and 8-port RS-232 LIMs are not tested by the onboard diagnostics. Therefore, it is normal for the URI and 8-port RS-232 error LEDs to remain on until the software is loaded. The online diagnostics for the 8-port LIMs and URIs are then automatically run. If software does not load, disregard all URI and 8-port error LEDs.

7. Initialize Software Loading (1 to 2 minutes): Indicator 7 goes out and indicator 5 flashes whenever input is received from the host. The yellow indicator flashes one time per second. After all modules have been loaded, indicators 0 through 5 flash, indicating that module linking is in process.

8. Idle State (variable): If the system is busy or cannot continue the down-line loading at this time, the DI enters the idle state. Indicator 7 comes on and 6 goes out. The yellow indicator continues to flash.

9. Operational state: After the software has completed loading, indicators 7 and 6 both go out. Indicator 5 flashes whenever the DI is busy. All other MPB indicators in the DI should not light.

NOTE

The CDCNET cabinet FAULT light is not turned off by running the onboard diagnostics, but will be turned off after CDCNET software is downloaded.

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10. Inform the network operator that the online checkout is complete. The network operator should then run the online diagnostics tests and use the troubleshooting procedures in chapter 5 to isolate any problems.

11. When all DIs have passed onboard diagnostics and all other equipment is installed, the network is ready for final checkout. Final checkout consists of verifying that data can be transferred successfully between all points in the network. This testing should be done by a support analyst or someone else thoroughly familiar with network configuration. Refer to the troubleshooting chapters in this manual to isolate and correct problems encountered during checkout.

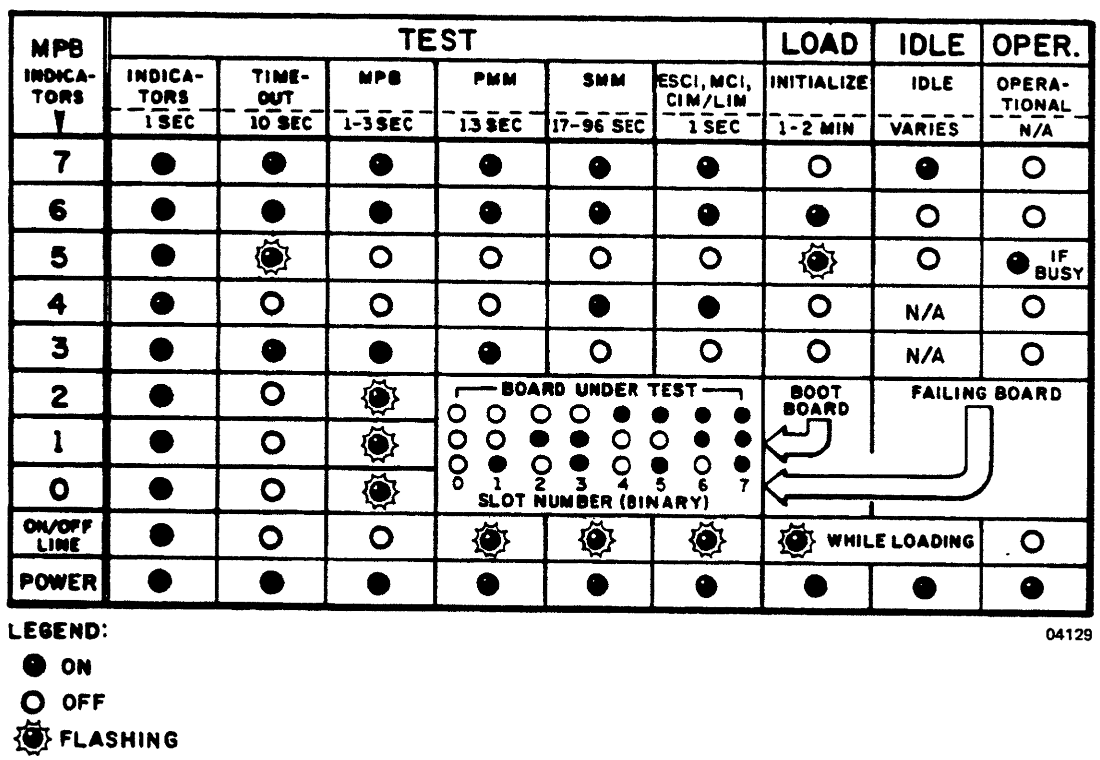


Figure 3-64. Online Test Sequence

Introduction to Troubleshooting 4

Introduction to Troubleshooting 4

This chapter introduces the troubleshooting concepts and troubleshooting tools. It contains the following major topics.

- Overall Troubleshooting Guidelines
- What Troubleshooting Tools are Available
- How to Use CML/VE
- How to Use CMSI
- How to Use NETOU

Overall Troubleshooting Guidelines

Observe the following guidelines when troubleshooting the network.

- Familiarize yourself with the troubleshooting tools described in this and the following chapters. You must be able to use these tools to be effective at troubleshooting the network.
- Ask the network administrator for an up-to-date configuration map of the network. This map should show where DIs, hosts, and so on are located and how they are configured. Also ask for copies of the DI Cabinet Configuration Forms or other documents that show correct board placements, switch settings, and jumper settings for each DI in the network. The configuration map and DI Cabinet Configuration Forms are necessary for isolating problems with the network.
- When a problem is detected, work with the operator and analyst to capture potentially valuable information that may be destroyed once diagnostics are executed. For example, check the LEDs and hardware status. You also may want the operator to do a DI memory dump and generate a Dump Analyzer report (see Dump Analyzer, later in this chapter).
- If you suspect software or configuration problems, ask an analyst for assistance. Troubleshooting procedures in this manual are intended for isolating hardware problems.
- Notify users before running tests or performing repairs on the network.
- During troubleshooting, follow the procedures in this manual, starting with the network troubleshooting procedures in chapter 5.
- Replace all parts according to the procedures in chapter 9.
- Above all, observe safety precautions (see Important Safety Information, in the front of this manual).

What Troubleshooting Tools Are Available?

The following troubleshooting tools are introduced in this chapter.

- CML/VE and CMSI - Provide menus from which to select various maintenance activities. These activities include displaying status, running online and inline diagnostics, and using NPA and HPA.
- Network Operator Utility (NETOU) - Allows you to initiate maintenance activities on the DI using network commands. These activities include displaying status and running the online and inline diagnostics.
- Status Displays - Show you the current status of the DI.
- Network Performance Analyzer (NPA) - Provides statistical and other reports on DI operation.
- Online Tests - Test operation of individual devices within the DI while the DI is connected to the network. During online tests the device being tested is offline but the remainder of the DI remains operational.
- Onboard Tests - Offline tests that verify the operation of DI hardware. The DI does not have to be connected to the network to run onboard tests.
- Inline Tests - Diagnostics that run concurrently with normal system operations.
- Hardware Performance Analyzer (HPA) - Provides statistical reports similar to NPA. This manual includes only a brief introduction to HPA. Refer to the HPA Reference manual for detailed information.
- Dump Analyzer - Provides information on the contents of DI memory at the time of a reset. This information is useful for finding hardware failures. This manual provides only a brief description of the dump analyzer, see the CDCNET Network Operations and Analysis manual for more information.

The following paragraphs provide brief descriptions of the above tools.

CML/VE, CMSI, and NETOU

You must use CML/VE, CMSI, or NETOU in order to perform any inline or online maintenance activity. As shown in figure 4-1, the operating system determines which of the three you can use. CML/VE runs only under NOS/VE and CMSI runs only under NOS. NETOU is available under either NOS or NOS/VE.

CML/VE and CMSI provide a set of menus from which you select desired maintenance tasks. Using the menus you can access NPA, HPA, display status, online diagnostics, and inline diagnostics. You can also do related tasks, such as stopping and starting lines.

NETOU provides a set of commands for initiating maintenance activities. NETOU does most of what CML/VE and CMSI do, plus a few things that those utilities cannot do.

Detailed descriptions of CML/VE, CMSI, and NETOU are given later in this chapter. Appendix G describes the most frequently used NETOU commands.

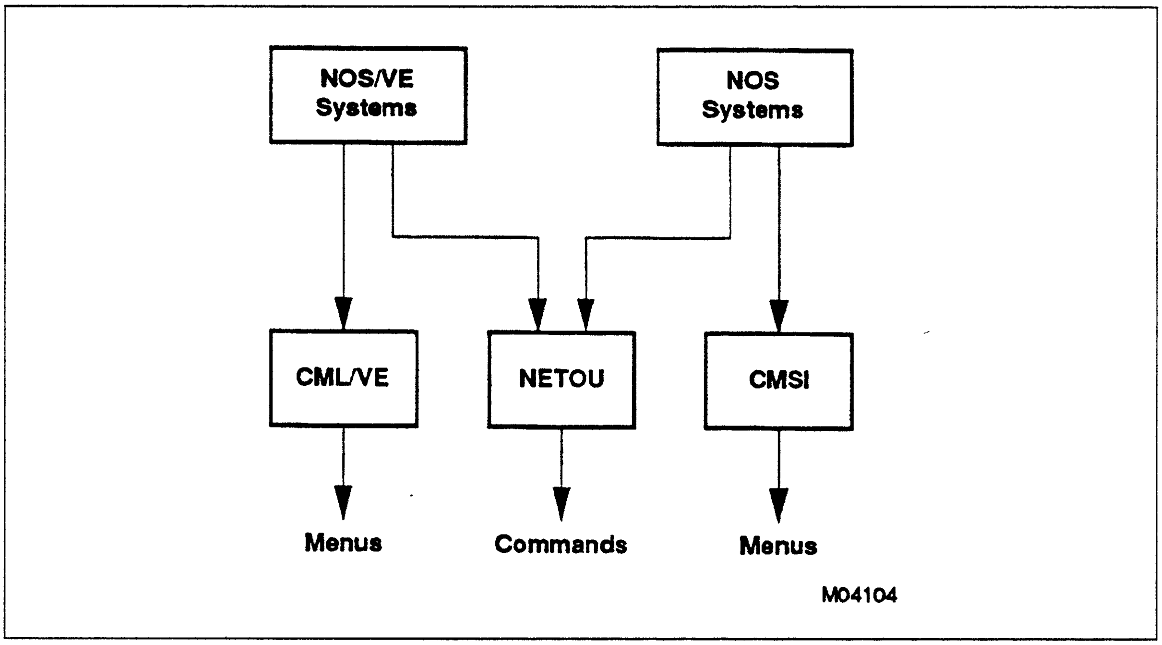


Figure 4-1. CMSI, and NETOU Relationships to NOS and NOS/VE

Status Displays

The status displays provide information about the operational condition of the DI. For example, the hardware status display shows the names and status of devices and ports in a DI.

Knowing how to use and interpret the status displays is essential to troubleshooting. Status indications vary with the configuration of the network. Interpret status according to what is normal for your network.

The status displays are available through CML/VE, CMSI, or NETOU. See the CML/VE and CMSI discussions, later in this chapter, for a description of the menus used to display status. See appendix G for the NETOU display commands.

The displays you will use most frequently are described below. Others exist, but are normally not used during troubleshooting. See the CDCNET Commands Reference manual for descriptions of other status displays.

Network status
: Shows status of network solutions connected to a DI or ICA-II. Displaying network status is useful for verifying that a network solution is operational.

Hardware status
: Shows the status of hardware in a DI or ICA-II. The DI version of the display shows the status of all boards in the DI. The ICA-II version shows the status of the ICA Channel Interface (ICI), ICA Ethernet Interface (IEI), processor, and memory. Displaying hardware status is useful for verifying that a DI or ICA is operational.

System status
: Consists of general information about the operation of a DI or ICA-II. This information includes date and time of the last reload, version of load file used, status of buffers and memory, and CPU usage. The expanded version of this display also includes the network status, hardware status, and line status information. The system status display allows you to get all DI status information by using only one menu selection or command.

Line status
: Shows the operational status of communications and URI lines connected to a DI. Displaying line status is useful for verifying that lines are operational.

Test status
: Shows status of online diagnostics in progress or completion status for the last onboard, online, or inline diagnostics executed on a device. Check this display to view results of online, onboard, or inline diagnostics. For online diagnostics, wait until you get a response to the command that started the test, before checking the display.

Network Performance Analyzer

The Network Performance Analyzer (NPA) produces a variety of reports and log messages that can help you analyze the performance of the network. NPA reports allow you to:

- Identify the configuration of the network
- Identify actual and potential hardware and software failures
- Identify potential congestion on communication lines
- Determine if the network is performing correctly
- Evaluate network utilization
- Follow initialization and configuration activities

The following is an example of an NPA report. Chapter 8 provides a complete list of the NPA reports and an NPA troubleshooting procedure.

```
NETWORK PERFORMANCE ANALYZER                               RUN DATE:   2/19/85
VERSION number                                   84/12/05 0000 - 84/12/05 2400
HRDWRP1 REPORT                                         REPORT DAY:  84/12/05

                            CDCNET HARDWARE MESSAGES
                             SORTED BY DATE AND TIME

  DATE       TIME          DI         LOG ID SEVERITY
======== =========== ============  ====== ============


84/12/05 08.48.00048 080025300021   10219 INFORMATIVE
MPB RAM HAD RECOVERED PARITY ERRORS
DURING ON-BOARD TESTING
ERRORS=  5
FIRST FAILING ADDRESS=  804C

84/12/05 00.18.00026 080025300020   10219 CATASTROPHIC
BOARD FAILED ON-BOARD TESTING
TYPE= PMM
SLOT= 2
STATUS= 0000(16)
```

Online Tests

Online tests provide more thorough testing than onboard diagnostics because they utilize input/output subsystem software while running concurrently with Distributed Communications Network Software (DCNS). The following online diagnostic tests currently exist (chapter 6 explains how to use online diagnostics).

CIMO Diagnostic	Command Description
START_CIM_TEST	Tests the selected communications interface module (CIM), the line interface modules (LIMs), and the unit record interfaces (URIs) connected to the CIM.
START_LIM_TEST	Tests the selected LIM.
START_PORT_TEST	Tests the selected port. Parameters allow you to test the internal, external, and modem loopbacks.
START_URI_TEST	Tests the selected URI. Parameters allow you to test the internal and external loopbacks.

ESCO Diagnostic	Command Description
START_ESCI_TEST	Tests internal loopbacks provided by the Ethernet[1] serial channel interface (ESCI) board and Ethernet transceivers to isolate problems in Ethernet.

MCIO Diagnostic	Command Description
START_MCI_TEST	Tests an inactive mainframe channel interface (MCI) board, the internal control bus (ICB) and internal transfer bus (ITB) interfaces, and the peripheral processor (PP) channel. This test requires an active path to the host other than the MCI board being tested. This path can be another MCI, an ESCI, or a LIM port.

The SENDD command can be used in conjunction with the diagnostics to provide additional capability for testing communications lines. This command allows you to send data through a LIM port and over an asynchronous line to a remote equipment. A typical application is to send data to an intelligent modem. For example, you can put the modem in loopback mode by sending it commands, rather than by manual intervention (such as setting a switch). Once the modem is in loopback mode, you can use the SENDD command to send test data or you can run the START_PORT_TEST diagnostic.

1. Ethernet is a trademark of the Xerox Corporation.

Onboard Tests

The onboard tests are read-only memory (ROM) resident, self-testing, four-stage diagnostics that check the DI hardware for correct operation. Chapter 7 contains the procedures on how to initiate and troubleshoot onboard diagnostics.

The onboard diagnostics consist of the following.

Test Name	Description
MPBB	Always the first test run. It verifies the main processor board (MPB) and private memory module (PMM) board.
SMMB	Verifies system main memory (SMM) boards. This test immediately follows the MPBB.
CIMB	Verifies all CIM and LIM boards (not including URIs or 8-port LIMs).
ESCB	Verifies all ESCI boards and transceivers.
MCIB	Verifies all mainframe channel interface (MCI) boards.
BOOT_DSEQ	Part of the MCIB diagnostic that verifies boot capabilities.

When the onboard diagnostics have completed, the DI attempts to load software across the board selected as the boot source. If the load is successful (certain errors may prohibit the load), the software automatically runs the online diagnostics for the 8-port LIMs and URIs, which are not tested by the onboard diagnostics.

The software also provides further error reporting for the onboard diagnostics with the Diagnostic Initialization Processor (DIP) program. DIP is part of the DMS software that resides in the DI. DIP is activated following completion of the load and start-up of online software. If errors are detected, DIP generates an error message to the log file that isolates the failure.

NOTE

If no errors are detected, no messages are logged and DIP turns the DI cabinet fault indicator off. The following example shows a typical DIP message.

Example:

After onboard diagnostics have completed, the status of all large DI boards is checked. If any large boards failed, the following message is issued. Solid MPB board failures are not included in this process, because a solid MPB failure would preclude entering operational mode.

```
Message number = 337

dip_bd_fail

    Board failed onboard testing.
    type= PMM
    slot number= 1
    status= 0001(16)
```

To receive help on this example, you would enter the following NPA command:

```
    EXPCLM,MN=00337
```

Inline Tests

Inline tests share the DI with non-diagnostic software so the system can continue with normal operations during testing. There are two inline diagnostic tests:

- MCI inline diagnostic - Tests MCI hardware by transmitting and receiving messages across the MCI interface. It can be used to detect transient failures that may not be detected by the onboard diagnostics.

- Network path verification test - Checks the path between two DIs. This test is useful for verifying DIs and other elements in the network path.

Chapter 6 describes how to use the inline diagnostics.

Hardware Performance Analyzer

HPA produces reports similar to those from NPA. Use HPA to find channel-related problems associated with a Mainframe Device Interface (MDI). Appendix F explains how to interpret the detailed status bytes that appear on HPA reports. However, refer to the HPA User Reference manual for complete instructions on generating reports.

Dump Analyzer

NOTE

The dump analyzer is not intended for level 1 users, so this manual does not contain any instructions on its use. However, try to get get a dump analyzer report from an operator before calling the next level of support. It might help them find the problem.

This program resides and runs on the host computer. There are both NOS and NOS/VE versions available. It supports several subcommands that extract and format information in a DI memory dump. The analyzer identifies the events that caused the DI to dump.

For a complete list of the dump analyzer reports, and definitions, refer to the CDCNET Network Operations and Analysis manual. For the commands, refer to the CDCNET Commands Reference Manual.

In the following example, the DISPLAY_EXECUTIVE_ERROR_TABLE (abbreviated DISEET) subcommand indicates there was a bus error prior to reset and reveals the pertinent information, including task identification, access address, and register values.

```
EXECUTIVE ERROR TABLE DISPLAY

Stopped by module EXEC_PMM +  7F8(16), supervisor stack = 3FEC(16)

Error #1:  bus error
Milliseconds since error    =      500
EXEC_PMM                        + 0BFF(16) Task is in user state
Running task identifier     =   103BEE(16) Supervisor stack =     3FFE(16)
Instruction register        =    0B298(16) Access address   =    29646(16)
Error occurred during firewall, firewall procedure address  = FFFF0000(16)

      Registers at time of error

D0-D7 4F564552 464C4F57 0000002C 0000000C 00000000 00000000 00000000 00000015
A0-A7 00029644 000296F0 001072B4 001072B4 000006D4 001072B4 0001DAFA 0001DAFA
```

How To Use CML/VE

This topic describes the Concurrent Maintenance Library/Virtual Environment (CML/VE) as it applies to CDCNET. CML/VE provides a set of menus from which to select various maintenance activities. Those activities include diagnostics testing and using the Network Performance Analyzer (NPA). You can also access NETOU expert (command) mode. The CML/VE Reference manual describes features not covered in this manual.

The descriptions here are intended to explain the overall features and capabilities of CML/VE. Other topics in this manual describe specific applications. For example, chapter 6 shows the sequence of commands or menu selections for online diagnostics.

The remainder of this discussion is divided into four main areas:

- Starting CML/VE - Explains how to get into CML/VE mode.
- Using CML/VE - Describes how to use the CML/VE menus.
- Quitting CML/VE - Explains how to exit CML/VE and return to NOS/VE interactive mode of operation.
- CML/VE menus - Describes each CML/VE menu and its options.

Starting CML/VE

As an interactive NOS/VE user, initiate CML/VE as follows:

1. Log into NOS/VE as described in steps 1 through 3 of Logging Directly in to NETOU through NOS/VE, later in this chapter.

2. Enter CML after the / prompt (you can use the NOS/VE status parameter with the CML command). This starts CML/VE and causes the main menu to appear (figure 4-2).

```
CML_000 - CML/VE MAIN MENU - Version xx

1. MALET/VE (Peripheral Diagnostics)
2. HPA/VE (Hardware Error Reports)
3. DVS (Mainframe Diagnostics)
4. Configuration Utility (Display Hardware/Software Configuration Data)
5. Terminal/User Definition Utility (Display/Alter Terminal/User Definition)
6. NPA (Network Performance Analyzer)
7. CDCNET Utility (Online Diagnostics and Status Displays)
8. CML/VE Toolbox (Site/Local Generated Maintenance Procedures)
9. QUIT/END (Exit CML/VE)

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-2. CML/VE Main Menu

Using CML/VE

Your interactions with CML/VE are limited to the following:

- Selecting menu options
- Entering menu management commands
- Entering NETOU or NPA from main menu
- Obtaining help
- Correcting operator errors

Each of the above are explained in the following paragraphs.

Selecting Menu Options

Each CML/VE menu has a list of options (figure 4-3). To select an option:

1. Enter the desired option number after the CML? prompt.
2. Press the terminal's line termination key (for example, next, return, or enter).

   Selecting a menu option executes the action indicated on the display. Possible actions include:

   - Another menu from which to make a choice.
   - Prompt for more information (for example, a device name).
   - An informational display (for example, device status).
   - An indication that a diagnostic procedure has started.
   - Interactions with NOS/VE (for example, going to NETOU expert mode).

```
CML_200 - HPA/VE MENU } Menu Number and Name

1. Access HPA/VE menus.                                 ┐
2. Change HPA/VE parameters.                            │
3. Initialize HPA/VE parameters.                        ├ Menu
4. Process Current NOS/VE System Engineering Log.       ┘
                                                          Instructions
Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML? } Prompt for user entry
```

Figure 4-3. Typical Menu

Entering Menu Management Commands

The menu management commands can be entered from any menu and allow you to move through the menu tree, obtain help information, or terminate CML/VE. The commands are listed below. Enter them after the `CML?` prompt.

Command Format	Action
HELP or **HEL** or **H** (HELP key on CDC 721)	Accesses the CML/VE Help Facility, which provides information about the NOS/VE maintenance software products (see Obtaining Help, later in this chapter).
BACK or **BAC** or **B** (BACK key on CDC 721)	Moves you back one level in the menu tree.
MAIN_MENU or **MAIN** or **M** (shifted BACK key on CDC 721)	Takes you either: • from any place in CML/VE back to the Main Menu, or • from the Help Facility back to the menu from which you entered HELP.
QUIT or **QUI** or **Q** or **END** (STOP or F6 key on CDC 721)	Terminates execution of CML/VE (this command is available from all CML/VE menus).

Entering NETOU or NPA from Main Menu

In addition to the menu management commands mentioned above, you can also enter NETOU or NPA, from the main menu, by entering the respective command after the `CML?` prompt. The commands are listed below.

Command	Description
NETWORK_ PERFORMANCE_ ANALYZER (NPA)	Calls the Network Performance Analyzer into execution. See chapter 8, How To Use the Network Performance Analyzer (NPA).
NETWORK_OPERATOR_ UTILITY (NETOU)	Calls the Network Operator Utility into execution. See How to Use NETOU, later in this chapter.

Enter `quit` to exit NETOU or NPA and return to the CML/VE main menu.

Obtaining Help

You can obtain the Help Facility Menu (figure 4-4) from any menu in CML/VE, by entering the HELP command (see Entering Menu Management Commands). However, the help menu cannot be obtained while a maintenance software product is executing.

```
CML_002 -  HELP FACILITY MENU

CML/VE is a utility which provides an environment
for the NOS/VE maintenance user to perform tasks
related to the maintenance of the CYBER 180 hardware
and to cause execution of various maintenance software
programs and procedures.

1. MALET/VE Help. . . . . . . . . . . . . Peripheral Diagnostics
2. HPA/VE Help. . . . . . . . . . . . . . Hardware Error Reports
3. DVS Help . . . . . . . . . . . . . . . Mainframe Diagnostics
4. Configuration Help . . . . . . . . . . Hardware Configuration Utility
5. Terminal/User Definition Help. . . . . Terminal/User Definition Utility
6. NPA  . . . . . . . . . . . . . . . . . Network Performance Reports
7. CDCNET Utility . . . . . . . . . . . . CDCNET Diagnostics and Status Display
8. CML/VE Toolbox . . . . . . . . . . . . Site Generated SCL Procedures
9. CML/VE Help. . . . . . . . . . . . . . CML/VE Features and Commands

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-4. Help Facility Menu

Menu Choice	Action
1	Displays the MALET/VE help menu.
2	Displays the HPA/VE help menu.
3	Displays the DVS help menu.
4	Displays the Configuration Utility help menu.
5	Displays the Terminal/User Definition Utility help menu.
6	Displays the NPA help menu.
7	Displays the CDCNET Utility help menu.
8	Displays the site generated SCL procedures.
9	Displays the CML/VE help menu.

A display of the CML/VE menu tree (4-5) is also available through the Help Facility. The menu from which you accessed the Help Facility appears at the bottom of this display as the current frame.

```
CML_004 - CML/VE STRUCTURE DIAGRAM

                                 CML_000
                                Main Menu

  MALET    HPA      DVS      CONFIGR   TERMINL   NPA      CDCNET
  100      200      300       400       500      600       700
   110      250      310       410       520      620        720
   120       251     320        411      530      630         722
    121      252     330        412      540                  723
             253     340       420       550                 730
                       341     450                            732
                     350       460                           740
                               470                            741
                                                              742
                                                             750
                                                              751
           TOOLBOX   OTHERS    QUIT      HELP                 752
            800       900       001      002                 760
             810       910                3-->8              770
             820                         10-->90

Current frame = CML_000
Type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-5. CML/VE Structure Diagram Display

Correcting Operator Errors

If you make an error, CML/VE explains what to do. When CML/VE encounters a menu-related error, the following message appears:

```
Input not understood, please retry or use HELP.

Type a command (BACK / MAIN_MENU / HELP).
CML?
```

Quitting CML/VE

Quit CML/VE in either of two ways.

- Entering QUIT, QUI, Q, or END at the CML? prompt on any menu. On a CDC 721, the STOP or F6 key also takes you out of CML/VE (see Entering Menu Management Commands, earlier in this chapter).
- Choosing option 9 (QUIT/END) from the main menu. You return to the main menu by entering MAIN_MENU, MAIN, or M at the CML? on any menu (see Entering Menu Management Commands, earlier in this chapter).

CML/VE Menus

The following describes CML/VE menus as they relate to CDCNET maintenance software. It starts with figure 4-6, which shows how the menus link together. Figures 4-7 through 4-27 show and describe the individual menus.

The individual menu descriptions include the CDCNET commands on which the entries are based. For example, the RUN CIM TEST option on menu CML_740 does essentially the same thing as the START_CIM_TEST (STACT) command. Usually, the only difference between the menu entry and the command is that the command allows you to vary some parameters, and with the menu entry parameters are preselected and cannot be changed. Using the CIM test as an example, the command allows you to set how many times the test repeats, but the menu version runs it only once.

```
                                   ----------------------------------------
                                   CML_000 - CML/VE MAIN MENU - VERSION XX
                                   ----------------------------------------
                                   1  MALET/VE (PERIPHERAL DIAGNOSTICS)
                                   2. HPA/VE (HARDWARE ERROR REPORTS).
                                   3. DVS (MAINFRAME DIAGNOSTICS).
                                   4. CONFIGURATION UTILITY (DISPLAY HARDWARE/SOFTWARE
                                      CONFIGURATION DATA)
                                   5. TERMINAL/USER DEFINITION UTILITY (DISPLAY/ALTER TERMINAL
                                      USER DEFINITION).
              ____________________[6. NPA (NETWORK PERFORMANCE ANALYZER).
             |                 ___[7. CDCNET UTILITY (ONLINE DIAGNOSTICS AND STATUS DISPLAYS)
             |                |    8. CML/VE TOOLBOX (SITE/LOCAL GENERATED MAINTENANCE PROCEDURES).
             |                |    9. QUIT/END (EXIT CML/VE)
             |                |
             |                ---------------------------------------------------------------------> TO
             |                                                                                      CML_700
             |
     -------------------
     CML_600 - NPA MENU
     -------------------
     1. EXECUTE NPA IN EXPERT (COMMAND MODE).
     2. BUILD AND DISPLAY INDIVIDUAL NPA REPORTS FROM $SYSTEM LOGFILE.
  ___[3. BUILD AND DISPLAY INDIVIDUAL NPA REPORTS FROM EXISTING
 |       NPA DATA_FILES.
 |   4. EXPLAIN CDCNET LOG MESSAGES.
 |
 |
 |____________
             |
             |
     --------------------------
     CML_630 - NPA REPORT MENU
     --------------------------
     1.  BUILD AND DISPLAY MCI STATISTIC REPORT (MCISRP3)
     2.  BUILD AND DISPLAY ESCI STATISTIC REPORT (ETHRRP2).
     3.  BUILD AND DISPLAY HDLC STATISTIC REPORT (HDLCRP3)
     4.  BUILD AND DISPLAY LINE STATISTIC REPORT (TERMRP1).
     5.  BUILD AND DISPLAY HARDWARE ERROR REPORT (HRDWRP2).
     6.  BUILD AND DISPLAY SOFTWARE ERROR REPORT (SFTWRE2).
     7.  BUILD AND DISPLAY EVENT_LOG REPORT FOR TODAY ONLY (EVNTRP2)
     8.  PRINT ALL REPORTS PREVIOUSLY BUILT.
     9.  BUILD AND PRINT ALL CML/VE SUPPORTED NPA REPORTS (EXCEPT EVNTRP2).
     10. SET LOG_CATALOG VALUE FOR DATABASE FILES LOCATION.
```

Figure 4-6. CML/VE Menu Tree

(Continued)

(Continued)

```
                                   FROM CML_000
                                        |
                                        |
                                        |
                              ---------------------
                              CML_700 - CDCNET MENU
                              ---------------------
                               1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
               -------------[2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
              |     --------[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
              |    |       { 4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
              |    |    ==={ 5. VIEW CDCNET STATUS DISPLAYS.
              |    |    |  { 6. MANAGE MESSAGE LOGGING AND ALARMS.
              |    |    |    7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
              |    |    |       CDCNET SYSTEM DI.
              |    |    |
              |    |    |                                                  TO
              |    |    |=============================================[ CML_740
              |    |                                                    CML_750
              |    |_____________________________________________       CML_760
              |                                                  |
              |                                                  |
              |                                                  |
 -------------------------------------       ---------------------------------------
 CML_720 - CDCNET NAMES SELECTION MENU       CML_730 - CDCNET DEVICES/LINE STATE MENU
 -------------------------------------       ---------------------------------------
 1. SELECT A DI CONNECTED TO THIS HOST       1.  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
    FOR SYSTEM/DEVICE NAME.                  2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.
 2. DISPLAY/SELECT AVAILABLE CDCNET          3.  STOP A LINE.
    SYSTEM NAMES.                            4.  START A LINE.
 3  DISPLAY/SELECT AVAILABLE DEVICE HAMES    5   CHANGE ELEMENT STATE TO ON.
 4  SELCT A SPECIFIC CDCNET SYSTEM NAME      6   CHANGE ELEMENT STATE TO DOWN
 5  SELECT A SPECIFIC DEVICE NAME.           7   CHANGE ELEMENT STATE TO OFF
 6. SELECT A SPECIFIC NETWORK NAME.          8.  CANCEL A LINE
 7  SELECT A DEVICE BY LINE NAME             9.  DEFINE A LINE.
 8  PRINT CDCNET NETWORK CONFIGURATION DATA  10. STOP A NETWORK.
                                             11  START A NETWORK.
                                             12  STOP_NP INTERFACE.
                                             13  START_NP INTERFACE.
                                         ____14  MANAGE MULTIPLE LINES.
                                        |    15  DISPLAY_HARDWARE_STATUS
                                        |
                                        |____________________
                                                             |
                                                             |
                                             ---------------------------------------------
                                             CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
                                             ---------------------------------------------
                                             1.  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
                                             2.  STOP ALL LINES EXCEPT ACTIVE LINES.
                                             3.  DOWN ALL STOPPED, CONFIGURED, AND
                                                 UNCONFIGURED LINES.
                                             4   STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
                                             5.  STOP AND DOWN ALL LINES (WARNING, THIS
                                                 INCLUDES  LINES CURRENTLY IN USE).
                                             6   SET ALL PORTS TO ON STATE AND START ALL
                                                 CONFIGURED LINES.
                                             7.  SET ALL LIMS TO DOWN STATE.
                                             8.  SET ALL LIMS TO ON STATE.
                                             9.  DISPLAY_HARDWARE_STATUS.
```

Figure 4-6. CML/VE Menu Tree

(Continued)

(Continued)

FROM
CML_700

CML_730 - CDCNET STATUS DISPLAY MENU

1. SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.
2. DISPLAY_DIRECTORY_STATUS.
3. DISPLAY_DI_SYSTEM_STATUS.
4. DISPLAY_HARDWARE_STATUS.
5 DISPLAY_LINE_STATUS (SUMMARY).
6. DISPLAY_LINE_STATUS (DETAILED).
7 DISPLAY_LINE_STATUS (SINGLE LINE)
8 DISPLAY_LOGICAL_NAMES.
9. DISPLAY_NETWORK_STATUS.
10. DISPLAY_TEST_STATUS.
11. DISPLAY CATNET TOPOGRAPHY CHART.
12. DISPLAY CATNET RESET CHART

CML_740 - CDCNET DIAGNOSTICS MENU

1. SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
2. RUN CIM TEST.
3. RUN ESCI TEST.
4. RUN LIM TEST.
5. RUN MCI INLINE TEST.
6. RUN MCI ONLINE TEST.
7. RUN PORT TEST (INTERNAL LOOPBACK).
8. RUN PORT TEST (EXT MODEM LOOPBACK).
9. RUN URI TEST.
10. PERFORM DI CONFLICT TESTING.
11. PERFORM LIM/PORT CONFLICT TESTING.
12. RUN NETWORK PATH VERIFICATION TEST.
13 EXECUTE A TERMINAL/LINE ECHO TEST.
14. PERFORM INTELLIGENT MODEM TEST.
15 SEND TEST FILE TO PUBLIC PRINTER.
16. SEND TEST FILE TO PRIVATE PRINTER.
17. SEND MESSAGE TO TERMINAL /LIM PORT
18. SEND COMMANDS TO INTELLIGENT MODEM.
19. MANAGE CDCNET ELEMENT STATES.
20. VIEW CDCNET STATUS DISPLAYS.

CML_760 - CDCNET MESSAGE LOGGING AND ALARMS

1. SELECT A SYSTEM/DEVICE/LINE NETWORK NAME.
2. ACTIVATE ALARMS (ALARMS ARE WRITTEN TO FILE $LOCAL.CDCNET_ALARMS.)
3. DEACTIVATE ALARMS.
4. DISPLAY ALARMS RECEIVED (SCU EDITOR WILL BE USED, ENTER QUIT TO EXIT)
5 DISPLAY SOURCE ALARMS MESSAGES.
6. DEFINE SOURCE ALARM MESSAGE.
7. CANCEL SOURCE ALARM MESSAGE.
8. DISPLAY SOURCE LOG MESSAGES.
9. DEFINE SOURCE LOG MESSAGE.
10 CANCEL SOURCE LOG MESSAGE.

Figure 4-6. CML/VE Menu Tree

CML_000 - CML/VE Main Menu

The CML/VE Main Menu is the highest level of the CML/VE menu tree and provides the path to:

- Maintenance software products
- CML/VE utility functions

```
CML_000 - CML/VE MAIN MENU - Version xx

1. MALET/VE (Peripheral Diagnostics)
2. HPA/VE (Hardware Error Reports)
3. DVS (Mainframe Diagnostics)
4. Configuration Utility (Display Hardware/Software Configuration Data)
5. Terminal/User Definition Utility (Display/Alter Terminal/User Definition)
6. NPA (Network Performance Analyzer)
7. CDCNET Utility (Online Diagnostics and Status Displays)
8. CML/VE Toolbox (Site/Local Generated Maintenance Procedures)
9. QUIT/END (Exit CML/VE)

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-7. CML/VE Main Menu

Menu Choice	Action
1	Displays MALET/VE menus.
2	Displays HPA/VE menus.
3	Displays DVS menus.
4	Displays menus from which you manage the NOS/VE hardware configuration.
5	Displays menus from which you can determine the current attributes of your terminal and set new attributes (for example, page width and output device).
6	Displays NPA menus.
7	Displays CDCNET Utility menus.
8	Displays the CML/VE Toolbox menu.
9	Exits CML/VE.

CML_600 - NPA Menu

The NPA Menu allows you to:

- Access NPA in expert (command) mode
- Build and display NPA reports
- Get help information about CDCNET log messages

```
CML_600 - NPA MENU

1. Execute NPA in expert (command) mode.
2. Build and display individual NPA reports from $SYSTEM logfile.
3. Build and display individual NPA reports from existing NPA DATA_FILES.
4. Explain CDCNET log message.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-8. NPA Menu

Menu Choice	Action
1	Initiates NPA in expert (command) mode.
2	Displays a menu of NPA reports (CML_630) which can be built from the $SYSTEM log files. The file used is $SYSTEM.CDCNET.LOG, and option 10 of CML_630 is not displayed. A REFORMAT_CDCNET_LOG_FILE NPA command is performed to extract data from this file.
3	Displays a menu of NPA reports which can be built from the NPA DATA_FILES. The $SYSTEM.CDCNET.ANALYSIS DATA_FILES are used to generate reports, and option 10 on CML_630 is displayed to allow redefinition of the file names for the location of the data files.
4	Displays a prompt for a CDCNET log message number for which a description is desired.

CML_630 - NPA Report Menu

The NPA Report Menu is displayed when you choose either option 2 or 3 from CML_600 and allows you to build and display statistics reports.

```
CML_630 - NPA REPORT MENU
      NPA will use files in $SYSTEM.CDCNET.ANALYSIS to generate reports.

1.  Build and display MCI statistic report (MCISRP3).
2.  Build and display ESCI statistic report (ETHRRP2).
3.  Build and display HDLC statistic report (HDLCRP3).
4.  Build and display line statistic report (TERMRP1).
5.  Build and display hardware error report (HRDWRP2).
6.  Build and display software error report (SFTWRP2).
7.  Build and display Event_Log report for today only (EVNTRP2).
8.  Print all reports previously built.
9.  Build and print all CML/VE supported NPA reports (except EVNTRP2).
10. Set LOG_CATALOG value for database files location.

Enter the name of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-9. NPA Report Menu

Menu Choice	Action
1	Builds and displays a report of error data for the mainframe channel interface (MCI) board.
2	Builds and displays a report of error data for the Ethernet interface (ESCI) board.
3	Builds and displays a report of error data for HDLC lines.
4	Builds and displays a report of error data for all terminals.
5	Builds and displays a report of all messages for CDCNET hardware.
6	Builds and displays a report of all messages for CDCNET software.
7	Builds and displays a report of all entries in the error log.
8	Routes all generated reports to the site default printer.
9	Builds and prints reports for items 1 through 6.
10	Selects a catalog value for the location of the CDCNET log files. (Available only when menu item 3 is selected on menu CML_600.)

CML_700 - CDCNET Menu

The CDCNET Menu is the highest level menu of the CDCNET utility. You branch from this menu to perform CDCNET activities such as managing logic states of devices and lines, displaying status, and running online diagnostics.

The SET_NAME command is available at CML_700 and all other CDCNET utility menus. It can be used to directly set the current system, device, or network name to which the utility is sending commands.

Command Format	Action
SET_NAME or SETN	Sets the CDCNET utility current name for the device indicated by the command parameters.

SYSTEM = name
DEVICE = name
NETWORK = name

Parameter Format	Action
SYSTEM or S	Sets the name of the current CDCNET system (DI).
DEVICE or D	Sets the name of the current device (large board, LIM, or port).
NETWORK or N	Sets the name of the current network.

For example, to select tdi_3 enter (shaded information):

```
CML?setn s=tdi_3
```

All parameters are optional. If the command is entered with no parameters, the system, device, and network names are set to None Selected.

```
  CML_700 - CDCNET MENU

Many of the menu selections in the CDCNET utility require a DI system name.
You may supply this name with the SET_NAME command (SETN n..n where n..n is
a valid DI name) or use menu item 2 for a menu of name selection options.

Menu items 3-7 use the following (Current) CDCNET System and Device Names.
        System Name: $DI_080025300119
        Device Name: $MCI7
        Network Name: ETHERNET_LL

  1. Execute NETOU in expert (command) mode.
  2. Select system/device/line/network names.
  3. Manage CDCNET network, device, and line states.
  4. Execute CDCNET online Diagnostics.
  5. View CDCNET status displays.
  6. Manage message logging and alarms.
  7. Interactively enter commands to the current CDCNET system (DI).

  Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
  CML?
```

Figure 4-10. CDCNET Menu

Menu Choice	Action
1	Initiates the Network Operator Utility (NETOU) in expert (command) mode. To exit NETOU, use the QUIT command. This takes you to the CML/VE main menu.
2	Displays a menu allowing selection of CDCNET names for system, device, line, and network names.
3	Displays a menu for management of the states of CDCNET elements.
4	Displays a menu of CDCNET online diagnostics.
5	Displays a menu of CDCNET status displays.
6	Displays a menu of options for management of CDCNET log messages and NETOU alarms.
7	Displays a prompt for a command to be sent to the currently selected DI. This prompting continues until you enter a BACK, MAIN_MENU, or HELP command.

CML_720 - CDCNET Names Selection Menu

The CDCNET Names Selection Menu allows you to select a set of names (system, device, network, line) to use with the CML/VE CDCNET Utility procedures.

```
CML_720 - CDCNET NAMES SELECTION MENU

Menu item 1-7 select new values for the following names.
      System Name: $DI_080025300119
      Device Name: $MCI7
      Network Name: ETHERNET_LL

1. Select a DI connected to this host for system/device name.
2. Display/select available CDCNET system names.
3. Display/select available device names.
4. Select a specific CDCNET system name.
5. Select a specific device name.
6. Select a specific network name.
7. Select a device by line name.
8. Print CDCNET network configuration data.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-11. CDCNET Names Selection Menu

Menu Choice	Action
1	Selects the name of a DI directly attached to this host as the current system name. An MCI board is selected for the current device name.
2	Generates a menu of currently available system names in the network (CML_722).
3	Generates a menu of devices in the current system (CML_723).
4	Displays a prompt to allow direct entry of a system name.
5	Displays a prompt to allow direct entry of a device name.
6	Displays a prompt to allow direct entry of a network name.
7	Displays a prompt to allow direct entry of a line name. CML/VE translates the line name to a LIM and port number to use as a device name.
8	Prints, on a site default printer, hardware status (expanded) for all DIs in the catenet.

CML_722 - CDCNET System Names Currently Available Menu

This menu displays the names of all CDCNET DIs currently available on the network and allows you to select one for use.

```
CML_722 - CDCNET System Names Currently Available

 1. $DI_0800253000A0        2. $DI_0800253000A4        3. $DI_0800253000CA
 4. $DI_0800253000D9        5. $DI_0800253000DA        6. $DI_0800253000DC
 7. $DI_0800253000EF        8. $DI_0800253000F1        9. $DI_080025300103
10. $DI_080025300105       11. $DI_080025100108       12. $DI_080025300109
13. $DI_08002530010D       14. $DI_080025300110       15. $DI_080025300111
16. $DI_080025300112       17. $DI_080025300113       18. $DI_080025300114
19. $DI_080025300115       20. $DI_080025100117       21. $DI_080025300118

Enter the number of a CDCNET system name to use,
or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-12. CDCNET System Names Currently Available Menu

Menu Choice	Action
All	Selects the indicated system name as the current system name for use by CML/VE.

CML_723 - CDCNET Device Names Currently Available Menu

This menu displays the names of all devices on the currently selected system (DI) and allows the user to select one for use.

```
CML_723 - CDCNET Device Names Currently Available

1.  $MPB0
2.  $PMM1
3.  $SMM2
4.  $SMM3
5.  $MCI4
6.  $ESCI5
7.  $ESCI6
8.  $MCI7

Enter the number of a CDCNET device name to use,
or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-13. CDCNET Device Names Currently Available Menu

Menu Choice	Action
All	Selects the indicated device as the current device name for use by CML/VE.

CML_723 - CDCNET Subdevice Names Currently Available Menu

This menu displays any ports (if appropriate) on the current device and allows the user to select either the device itself or one of the ports as the current device name.

```
CML_723 - CDCNET Subdevice Names Currently Available

1.  $LIM7
2.  $LIM7_PORT0
3.  $LIM7_PORT1
4.  $LIM7_PORT2
5.  $LIM7_PORT3

Enter the number of a CDCNET device name to use,
or type a command (BACK/ MAIN_MENU / HELP).
CML?
```

Figure 4-14. CDCNET Subdevice Names Currently Available Menu

Menu Choice	Action
All	Selects the indicated device as the current device name for use by CML/VE.

CML_730 - CDCNET Device/Line State Menu

The Device/Line State Menu provides options to manage the logical states of elements of a device interface.

```
CML_730 - CDCNET DEVICE/LINE STATE MENU

The menu items 2-9 use the following (current) CDCNET System and Device Names.
      System Name: $DI_080025300119
      Device Name: $MCI7
      Network Name: ETHERNET_LL

1.  Select system/device/line/network names.      10.  Stop a network.
2.  Display status of an individual line/port.    11.  Start a network.
3.  Stop a line.                                  12.  Stop_NP_Interface.
4.  Start a line.                                 13.  Start_NP_Interface.
5.  Change element state to ON.                   14.  Manage multiple lines.
6.  Change element state to DOWN.                 15.  Display_Hardware_Status.
7.  Change element state to OFF.
8.  Cancel a line.
9.  Define a line.


Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-15. CDCNET Device/Line State Menu

Menu Choice	Action
1	Displays a menu of name selection options.
2	Displays status information about a line referenced by the current device name.
3	Stops CDCNET use of a line referenced by the current device name. Related Command: STOP_LINE.
4	Makes a line available for CDCNET use. Related Command: START_LINE.
5	Changes the state of the device referenced by the current device name to ON. Related Command: CHANGE_ELEMENT_STATE.
6	Changes the state of the device referenced by the current device name to DOWN. Related Command: CHANGE_ELEMENT_STATE.
7	Changes the state of the device referenced by the current device name to OFF. Related Command: CHANGE_ELEMENT_STATE.
8	Deletes the definition of a line. Related Command: CANCEL_LINE.
9	Defines a line for use by CDCNET. Related Command: DEFINE_LINE.
10	Stops CDCNET use of a network referenced by the current network name. This requires NOS/VE operator privilege. Related Command: STOP_NETWORK.
11	Starts CDCNET use of a network referenced by the current network name. This requires NOS/VE operator privilege. Related Command: START_NETWORK.
12	Stops a network products interface for the device (MCI) currently selected. Related Command: STOP_NP_INTERFACE.
13	Starts a network products interface for the device (MCI) currently selected. Related Command: START_NP_INTERFACE.
14	Displays a menu of options to manage multiple lines (CML_732).
15	Displays the hardware status of the DI. Related Command: DISPLAY_HARDWARE_STATUS.

CML_732 - CDCNET Multiple Line Management Menu

The CDCNET Multiple Line Management Menu provides selections to change the operational characteristics of multiple lines with one selection.

```
  CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU

Menu items 2-6 use the following (Current) CDCNET System and Device Names.
     System Name:  $DI_080025300119
     Device Name:  $MCI7
     Network Name:  ETHERNET_LL

1.   Select system/device/line/network names.
2.   Stop all lines except Active lines.
3.   Down all Stopped, Configured, and Unconfigured lines.
4.   Stop and DOWN all lines except active lines.
5.   Stop and DOWN all lines.  (Warning, this includes lines currently in use).
6.   Set all Ports to ON state and Start all Configured lines
7.   Set all LIMs to DOWN state.
8.   Set all LIMs to ON state.
9.   Display_Hardware_Status.

If a CIM or LIM is selected for the Current Device name, only Lines for that
device will be affected by these menu selections.  If no CIM or LIM is
selected, all LINES will be affected.  URI LIMs are not affected.

Enter the number of an option, or type a command (BACK / MAIN MENU / HELP).
CML?
```

Figure 4-16. CML_732 - CDCNET Multiple Line Management Menu

Menu Choice	Action
1	Displays a menu of name selection options.
2	Stops all lines that are currently available for use by CDCNET, but are not being used. Related Command: STOP_LINE.
3	Downs all ports that are not available for use. Related Command: CHANGE_ELEMENT_STATE.
4	Stops and downs all lines that are not in use or are not available for use. Related Commands: STOP_LINE, CHANGE_ELEMENT_STATE.
5	Stops and downs all lines. This stops currently active lines. A warning message is sent to the users of currently active lines. Related Commands: STOP_LINE, CHANGE_ELEMENT_STATE.
6	Sets all ports to ON. Related Command: CHANGE_ELEMENT_STATE.
7	Sets all LIMs to DOWN. Related Command: CHANGE_ELEMENT_STATE.
8	Sets all LIMS to ON. Related Command: CHANGE_ELEMENT_STATE.
9	Displays the hardware status of the DI. Related Command: DISPLAY_HARDWARE_STATUS.

CML_740 - CDCNET Diagnostics Menu

The CDCNET Diagnostic Menu provides access to the available diagnostics for a CDCNET network and its elements. The parameters for each test are preselected (see chapter 6 for values assigned to online and inline diagnostics).

```
CML_740 - CDCNET DIAGNOSTICS MENU

Items 2-9, 12-143 and 17-18 use the following (Current) System and Device Names.
      System Name:  $DI_080025300119
      Device Name:  $MCI7
      Network Name: ETHERNET_LL

1.  Select a system/dev/port/network name. 11.  Perform LIM/PORT confict testing.
2.  Run CIM test.                           12.  Run Network Path Verification Test.
3.  Run ESCI test.                          13.  Execute a Terminal/Line echo test.
4.  Run LIM test.                           14.  Perform Intelligent Modem test.
5.  Run MCI inline test.                    15.  Send test file to public printer.
6.  Run MCI online test.                    16.  Send test file to private printer.
7.  Run PORT test (internal loopback).      17.  Send message to terminal/LIM port.
8.  Run PORT test (ext modem loopback).     18.  Send Commands to intelligent modem.
9.  Run URI test.                           19.  Manage CDCNET element states.
10. Perform DI conflict testing             20.  View CDCNET status displays.

 Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
 CML?
```

Figure 4-17. CDCNET Diagnostics Menu

Menu Choice	Action
1	Displays a menu of name selection options.
2	Starts the online test for a CIM board for the current device name. Related Command: START_CIM_TEST.
3	Starts the online test for an ESCI board for the current device name. Related Command: START_ESCI_TEST.
4	Starts the online test for a LIM board for the current device name. Related Command: START_LIM_TEST.
5	Starts the inline test for an MCI board for the current device name. Related Command: START_MCI_INLINE_TEST.
6	Starts the online test for an MCI board for the current device name. Related Command: START_MCI_ONLINE_TEST.
7	Starts the online test for a LIM port for the current device name using internal loopback. Related Command: START_PORT_TEST.
8	Starts the online test for a LIM port for the current device name using external or modem loopback. Related Command: START_PORT_TEST.
9	Starts the online test for a URI LIM board for the current device name. Related Command: START_URI_TEST.
10	Starts the appropriate online diagnostic on all large boards (MCI, CIM, ESCI) in the DI that are not on.
11	Starts the PORT online diagnostic with internal loopback on all ports in the DI, except URI ports, that are not on.
12	Displays the Network Path Verification Test menu (CML_743).
13	Executes a data echo test to a terminal. The user at the terminal is prompted to enter a response.
14	Displays a menu of options for performing and intelligent modem test.
15	Displays a menu of options for printing a test listing at a public batch printer (CML_741).
16	Displays a menu of options for printing a test listing at a private batch printer (CML_742).
17	Sends a test message to the port defined by the current device name.
18	Sends a command to an intelligent modem connected to the current device name. The user is prompted for the modem command.
19	Displays a menu for management of the states of CDCNET elements.
20	Displays a menu of CDCNET status displays.

CML_741 - CML/VE Public Printer Test Menu

The CML/VE Public Printer Test Menu provides selections for the names that control the routing of a test print file for a public printer.

```
CML_741 - PUBLIC PRINTER TEST

The parameters which determine the printer to be the target of this test are:

    Station:    AUTOMATIC
    Device:     AUTOMATIC
    Forms_Code: NORMAL

1. Select a station name.
2. Select a device name.
3. Select a Forms_Code.
4. Execute the printer test.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-18. CML/VE Public Printer Test Menu

Menu Choice	Action
1	Displays a prompt to enter a station name.
2	Displays a prompt to enter a printer device name.
3	Displays a prompt to enter a forms code.
4	Executes the printer test.

CML_742 - CML/VE Private Printer Test Menu

The CML/VE Private Printer Test Menu provides selections for the names that control the routing of a test print file for private printers. Figure 4-20 is an example of a printer test.

```
CML_742 - CML/VE PRIVATE PRINTER TEST

The parameters which determine the printer to be the target of this test are:

    Station:          AUTOMATIC
    Device:           AUTOMATIC
    Forms-Code:       NORMAL
    Station_Operator: None_Assigned

1. Select a station name.
2. Select a device name.
3. Select a Forms_Code.
4. Select a Station_Operator name.
5. Execute the printer test.

Enter the number of an option, or type a command (BACK/ MAIN_MENU / HELP).
CML?
```

Figure 4-19. CML/VE Private Printer Test Menu

Menu Choice	Action
1	Displays a prompt to enter a station name.
2	Displays a prompt to enter a printer device name.
3	Displays a prompt to enter a forms code.
4	Routes a test listing to the printer defined by the current station and printer device name.
5	Executes the printer test.

```
CML/VE Printer Test.
Station: VE_PRINTER_109   Device: PRINTER_3   Forms_Code: NORMAL

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'(
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*
<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,
>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-
?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-.
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0
BCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./01
CDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./012
DEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123
EFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./01234
FGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./012345
GHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456
HIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./01234567
IJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./012345678
JKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789
KLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;
MNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<
NOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=
OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?
QRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@
RSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@A
STUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@AB
TUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABC
UVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCD
VWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDE
WXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEF
XYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFG
YZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGH
Z[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI

(Actual listing is 136 columns wide, only 80 columns shown)
```

Figure 4-20. Sample Output Listing

CML_743 - CDCNET Network Path Verification Menu

The network verification path menu provides options for verifying the network path between device interfaces.

```
CML_743 - CDCNET NETWORK PATH VERIFICATION MENU

Items 4-6 use the following System Names.  Item 5 uses the Subnet Name.

      Source System Name: @system@
      Target System Name: @target@
      Subnet Name:        @subnet@

1. Select a source system name.
2. Select a target system name.
3. Select a subnet name.
4. Run Direct Subnet Connect test.
5. Run Multi-hop Echo test.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-21. Network Path Verification Menu

Menu Choice	Action
1	Select a source system name, the user is prompted for a CDCNET system name. If the name is valid, it replaces the current source system name. Otherwise, no change occurs. The source system is the device interface at which the test originates.
2	Displays a prompt for a CDCNET system name. If the name is valid, it replaces the current target system name. Otherwise, no change occurs. The target system is the device interface at the other end of the path to be tested.
3	Displays a prompt for a CDCNET subnet name. If the name is valid, it replaces the current subnet name. Otherwise, no change occurs. The subnet is the network in which the device interfaces are located.
4	Starts the Direct Subnet Connect test. This test uses the CDCNET commands START_SUBNET_CONNECT_TEST, STOP_SUBNET_CONNECT_TEST, and DISPLAY_TEST_STATUS to verify a directly connected network path. If a subnet name was selected, it is used in the test. If the subnet name shows `None_Selected`, any operational path between the source system and target system results in a PASSED test response. The Direct Subnet Connect test runs only if the selected source and target systems support OSI protocols.
5	Starts the Multi-hop Echo test. This test determines if any operational path exists between the source and target systems. The Multi-hop Echo test runs only if the source system, target system, and all intermediate hops support OSI protocols.

CML_750 - CDCNET Status Display Menu

The CDCNET Status Display Menu provides options to display the available status information for a CDCNET network, device interface (DI), or a device in a DI.

```
CML_750 - CDCNET STATUS DISPLAY MENU

Menu items 2-10 use the following (Current) CDCNET System and Device Names.
      System Name:  $DI_080025300119
      Device Name:  $MCI7
      Network Name: ETHERNET_LL

  1.  Select system/device/line/network names.
  2.  Display_Directory_Status.
  3.  Display_DI_System_Status.
  4.  Display_Hardware_Status.
  5.  Display_Line_Status (summary).
  6.  Display_Line_Status (detailed).
  7.  Display_Line_Status (single line).
  8.  Display_Logical_Names.
  9.  Display_Network_Status.
  10. Display_Test_Status.
  11. Display CATNET Topography Chart.
  12. Display CATNET Reset Chart.

  Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
  CML?
```

Figure 4-22. CDCNET Status Display Menu

Menu Choice	Action
1	Displays a menu of name selection options.
2	Displays the status of the DI directory. Related Command: DISPLAY_ DIRECTORY STATUS.
3	Displays the system status of the DI. Related Command: DISPLAY_DI_ SYSTEM_STATUS.
4	Displays the hardware status of the DI. Related Command: DISPLAY_ HARDWARE_STATUS.
5	Displays the summary status of all lines in a DI. Related Command: DISPLAY_LINE_STATUS.
6	Displays detailed status of all active lines in a DI. Related Command: DISPLAY_LINE_STATUS.
7	Displays the detailed status of the line referenced by the current device name. Related Command: DISPLAY_LINE_STATUS.
8	Displays the logical name in a DI. Related Command: DISPLAY_LOGICAL_ NAMES.
9	Displays the status of all networks attached to a DI. Related Command: DISPLAY_NETWORK_STATUS.
10	Selects a display of the current test execution and results status of the current device. Related Command: DISPLAY_TEST_STATUS.
11	Provides a menu (CML_751) for displaying a chart of all DIs in the CATNET organized by network identifier.
12	Provides a menu (CML_752) for displaying a chart of all DIs in the CATNET showing the last reset date.

CML_751 - CDCNET CATNET Topography Chart Menu

The CDCNET CATNET Topography Data Menu provides selections for display of CDCNET device interface topography. Data for all DIs currently in the CATNET is sorted by network_ID and DI serial number.

```
CML_751 - CDCNET TOPOGRAPHY CHART MENU

Please select an option:

1. Display Topography Data.
2. Print Topography Data.

The requested report will be displayed using the NOS/VE SCU Editor.
The ACTIVATE_SCREEN command may be used to enable full screen editing.
The LIST_LINES,L=AL command may be used to list the report in line mode.
The QUIT command should be used to exit when done with the report.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-23. CDCNET CATNET Topography Data Menu

Menu Choice	Action
1	Displays the CATNET topography data (figure 4-24) using the SCU editor.
2	Prints the CATNET topography data (figure 4-24) on a site default printer.

```
CATNET Topography Chart            Current date/time: 1987-11-11 16:00:10

Network_Id=00000001, Type=ESCI
 DI_System_Name      DI_LOGICAL_NAME  Device_Name  Network_Name
  $DI_080025300117   TDI_117          $ESCI6       NETWORK_1
  $DI_080025300118   TDI_118          $ESCI7       NETWORK_1
  $DI_080025300119   MDI_119          $ESCI5       NETWORK_1
  $DI_08002530034E   NDI_34E          $ESCI6       NETWORK_1

Network_Id=00000002, Type=ESCI
 DI_System_Name      DI_Logical_Name  Device_Name  Network_Name
  $DI_08002510006D   TDI_06D          $ESCI6       NETWORK_2
  $DI_080025100078   TDI_07B          $ESCI6       NETWORK_2
  $DI_08002510008B   TDI_08B          $ESCI7       NETWORK_2
  $DI_08002530009F   TDI_09F          $ESCI4       NETWORK_2
  $DI_08002530034E   NDI_34E          $ESCI7       NETWORK_2

Network_Id=00000003, Type=MCI
 DI_System_Name      DI_Logical_Name  Device_Name  Network_Name
  $DI_080025300119   MDI_119          $MCI4        $NETWORK_3
```

Figure 4-24. Sample CATNET Topography Chart

CML_752 - CDCNET Reset Data Chart Menu

The CDCNET Reset Data Chart Menu provides selections for display of CDCNET device interface reset data. Data for all DIs currently in the CATNET is sorted by serial number. You can get similar information on individual DIs by using the DISPLAY_DI_SYSTEM_STATUS command or related menu selection (CML_750).

```
CML_752 - CDCNET RESET DATA CHART MENU

Please select an option:

1. Display Reset Data.
2. Print Reset Data.

The requested report will be displayed using the NOS/VE SCU Editor.
The ACTIVATE_SCREEN command may be used to enable full screen editing.
The LIST_LINES,L=ALL command may be used to list the report in line mode.
The QUIT command should be used to exit when done with the report.

Enter the number of an option, ort type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-25. CDCNET Reset Data Chart Menu

Menu Choice	Action
1	Displays the reset data (figure 4-26) using the SCU editor.
2	Prints the reset data (figure 4-26) on a site default printer.

```
Status for all DIs in CATNET        Current date/time: 1987-11-11 16:10:40
System_Name        Boot  Sys   Buff  Mem       Last_Reset          Days since Reset

$DI_08002510006D   4006  4006  good  good  87/10/22  01.25.18             18
$DI_080025100078   4006  4006  good  good  87/10/22  01.25.33             18
$DI_08002510008B   4006  4006  good  good  87/10/22  01.25.22             18
$DI_08002530009F   4006  4006  good  good  87/10/22  01.26.01             18
$DI_080025300117   4006  4006  good  good  87/10/22  01.25.09             18
$DI_080025300118   4006  4006  good  good  87/10/22  01.25.11             18
$DI_080025300119   4006  4006  good  good  87/10/22  01.26.07             18
$DI_08002530034E   4006  4006  good  good  87/10/22  01.25.43             18
```

Figure 4-26. Sample Reset Data Display

CML_760 - CDCNET Message Logging and Alarms Menu

The CDCNET Message Logging and Alarms Menu provides options to manage the reception of alarms from a DI, control of message logging by a DI, and display of alarm and message data.

```
CML_760 - CDCNET MESSAGE LOGGING AND ALARMS

Menu items 5-10 use the following (current) CDCNET system and device names.
      System Name:  $DI_080025300119
      Device Name:  $MCI7
      Network Name: ETHERNET_LL
      Alarms on:    FALSE

1.  Select a system/device/line/network name.
2.  Activate alarms (alarms are written to file $LOCAL.CDCNET_ALARMS.)
3.  Deactivate alarms.
4.  Display alarms received.  (SCU editor will be used, enter QUIT to exit.)
5.  Display source alarms messages.
6.  Define source alarm message.
7.  Cancel source alarm message.
8.  Display source log messages.
9.  Define source log message.
10. Cancel source log message.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Figure 4-27. CDCNET Message Logging and Alarms Menu

Menu Choice	Action
1	Selects a system, device, line, or network name.
2	Selects the NETOU option to receive all CDCNET alarms. The alarms are written to a temporary file called $LOCAL.CDCNET_ALARMS. Related Command: ACTIVATE_ALARMS.
3	Deselects the NETOU alarms option. Related Command: DEACTIVATE_ALARMS.
4	Displays the contents of the alarms file using the NOS/VE SCU Editor.
5	Displays the numbers of the CDCNET message, which currently cause an alarm. Related Command: DISPLAY_SOURCE_ALARMS.
6	Displays a prompt requesting the number of a CDCNET message for which an alarm is to be generated. Related Command: DEFINE_SOURCE_ALARMS.
7	Displays a prompt requesting the number of a CDCNET message for which an alarm is not to be generated. Related Command: CANCEL_SOURCE_ALARM_MESSAGES.
8	Displays the number of the CDCNET messages which currently causes a log entry. For log message explanations, use Explain CDCNET Log Message option on NPA menu (CML_600). Related Command: DISPLAY_SOURCE_LOG_GROUP.
9	Displays a prompt requesting the number of a CDCNET message for which a log message is to be generated. For log message explanations, use Explain CDCNET Log Message option on NPA menu (CML_600). Related Command: CHANGE_SOURCE_LOG_GROUP.
10	Displays a prompt requesting the number of a CDCNET message for which a log message is not to be generated. For log message explanations, use Explain CDCNET Log Message option on NPA menu (CML_600). Related Command: CANCEL_SOURCE_LOG_GROUP.

How to Use CMSI

This topic describes the Common Maintenance Software Interface (CMSI) as it applies to CDCNET. CMSI provides a set of menus from which you can select various maintenance activities. Those activities include diagnostics testing and using the network performance analyzer (NPA). You can also access NETOU command mode. The CML Reference manual describes features not covered in this manual.

The descriptions here are intended to explain overall features and capabilities of CMSI. Other topics in this manual describe specific applications. For example, chapter 6 shows the sequence of commands or menu selections for online diagnostics.

The remainder of this discussion is divided into four main areas:

- Starting CMSI - Explains how to get into CMSI mode.
- Using CMSI - Tells you how to use the CMSI menus.
- Quitting CMSI - Explains how to exit CMSI and return to NOS interactive mode of operation.
- CMSI Menus - Describes each CMSI menu and its options.

Starting CMSI

As an interactive NOS user, you enter CMSI in either of two ways depending on how it was installed on the system.

NOTE

- If CMSI is not installed on the system, refer to the CML Reference manual (see Additional Related Manuals) for instructions. If you need special validation to enter CMSI, see the site administrator.
- You cannot execute CMSI from a NOS host console.

Entering CMSI If It Is Installed in Capture Mode

When CMSI is installed in capture mode, user prolog procedures automatically start CMSI at the time you log in. You will recognize capture mode because the main menu (figure 4-28) appears immediately after log in. This mode is used where NOS is used mainly for maintenance or when a user number is dedicated exclusively to CML maintenance activities.

Entering CMSI If It Is Installed in Available Mode

When CMSI is installed in available mode, it does not come up automatically, but can be started as needed. The procedure is as follows:

1. Log in to the NOS system as described in steps 1 through 3 of Logging Directly into NETOU Through NOS, later in this chapter, except enter IAF (interactive application facility) instead of NETOU.
2. Set the terminal characteristics with either the SCREEN or TRMDEF command, as required by the type of terminal you are using. You may use CMSI in either screen or line mode.
3. Enter: BEGIN,CMSI,CMLINST. This starts CMSI and causes the main menu to appear (figure 4-28).

```
     CMSI - COMMON MAINTENANCE SOFTWARE INTERFACE - CMLLEV

  1. ANALYSIS INTERFACE      - HPA/NPA/MTPLOT-DSPLOT
  2. DIAGNOSTICS INTERFACE - MALET/CPU/MST/T10/REGEN/LCN/CDCNET
  3. DUMP INTERFACE          - DSDI/MCDUMP/MCDUMP/ANALDMP
  4. UTILIITIES INTERFACE  - CMLUTIL/EST TABLE/MOD CMLINST
  5. REINITIALIZE CMSI       - RESET ANY CMSI PARAMETERS
  6. EXIT TO NOS             - EXIT TO THE NOS OPERATING SYSTEM
  7. LOGOFF                  - TERMINATE THIS TERMINAL SESSION

CMSI000> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-28. CMSI Main Menu

Using CMSI

Your interactions with CMSI are limited to the following:

- Selecting menu options
- Entering names and parameters
- Obtaining help
- Correcting operator errors

Selecting Menu Options

Each CMSI menu shows a list of options (figure 4-28). To select an option:

1. Enter the desired option number after the ? prompt.
2. Press the terminal's line termination key (for example, next, return, or enter). This manual uses (CR) when referring to the line termination key.

   Selecting the menu option gives you one of the following:

   - Another menu from which to make a choice.
   - A prompt for more information (for example, a device name).
   - An informational display (for example, device status).
   - An indication that a diagnostic procedure has been started.

Entering Names and Parameters

Some menu options prompt you for a device name or other parameter.

- Names - DI and device names follow the same conventions in CMSI as for other CDCNET commands. Check the status displays to find the name for the DI or device you are addressing. The status display also shows the proper format. For example, to find DI names, use the DISPLAY AVAILABLE DI NAMES option on menu CMSI262.
- Parameters - Most parameters are preset. The few that you must enter are explained by the help function.

Obtaining Help

There are three categories of help information.

- General help information on a menu - Type ? followed by (CR).
- Help with a specific numbered selection - Type the number followed by ? and (CR). For example, 2?(CR) gets you help information for option 2.
- Help with a parameter entry - Type ? at the prompt for a parameter.

Correcting Operator Errors

If you make an error, CMSI tells you what to do.

Quitting CMSI

Quit CMSI by choosing option 6 or 7 from the CMSI main menu (figure 4-28). Return to the main menu by using the RETURN TO PREVIOUS CMSI MENU entry to back up through the menu tree. If the terminal is in screen mode, you can go directly back to the CMSI main menu by pressing the QUIT function key (usually F6). If the terminal is in line mode, entering Q takes you back to the main menu.

CMSI Menus

4

The following describes CMSI menus as they relate to CDCNET maintenance software. It starts with figure 4-29, which shows how the menus link together. Figures 4-30 through 4-42 show and describe the individual menus.

The individual menu descriptions include the CDCNET commands on which the entries are based. For example, the RUN CIM TEST option on menu CMSI264 (figure 4-39) does essentially the same thing as the START_CIM_TEST (STACT) command. Usually, the only difference between the menu entry and the command is that the command allows you to vary some parameters, and with the menu entry parameters are preselected and cannot be changed. Using the CIM test as an example, the command allows you to set how many times the test will repeat, but the menu version runs it only once.

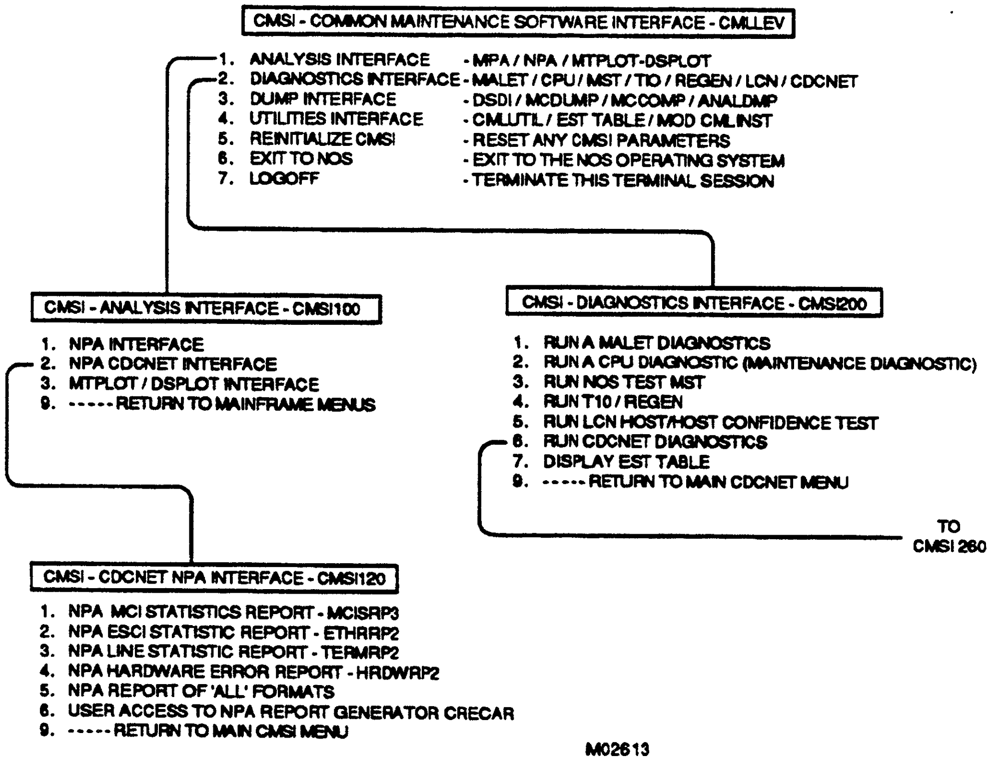


Figure 4-29. CMSI Menu Tree

(Continued)

(Continued)

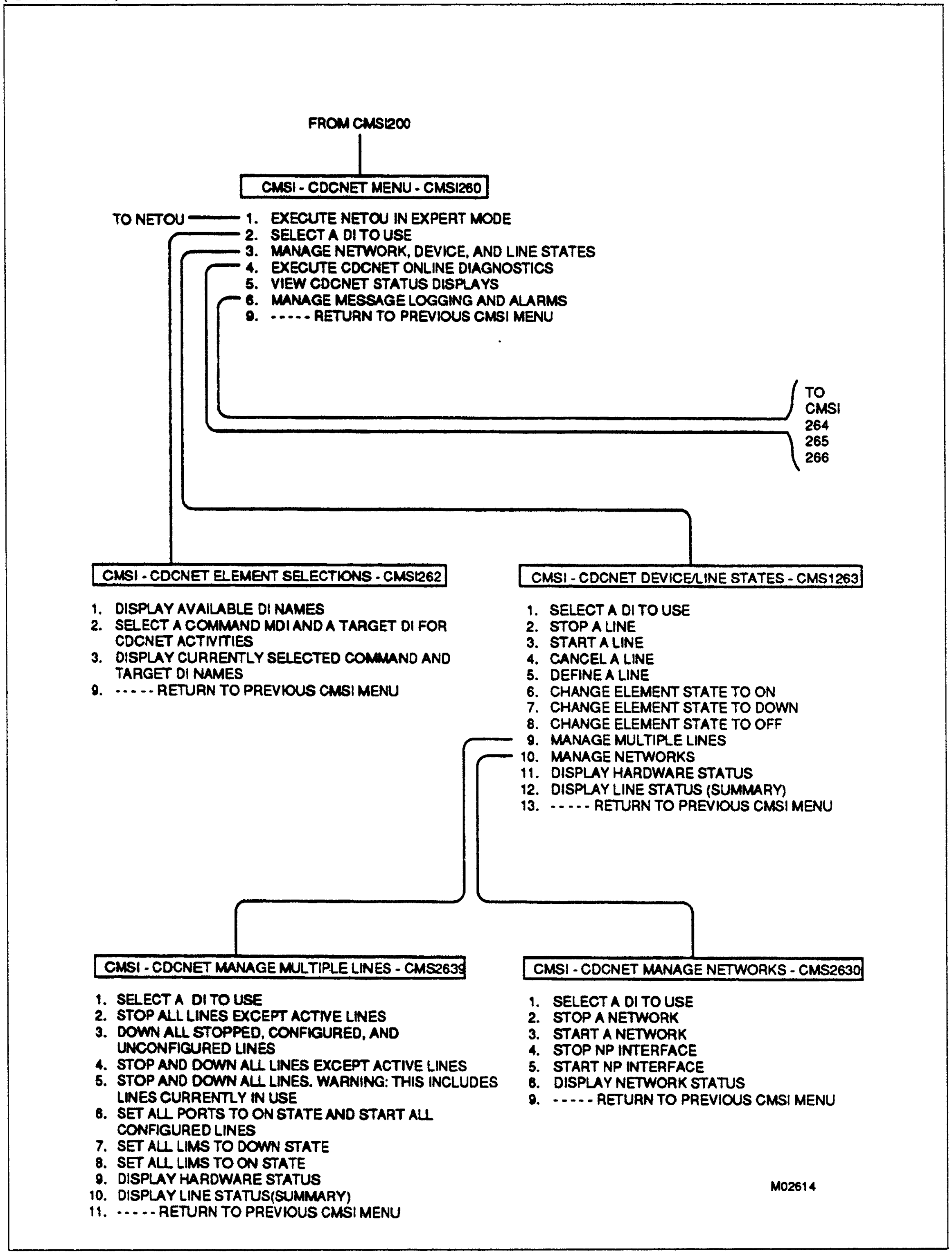


Figure 4-29. CMSI Menu Tree

(Continued)

(Continued)

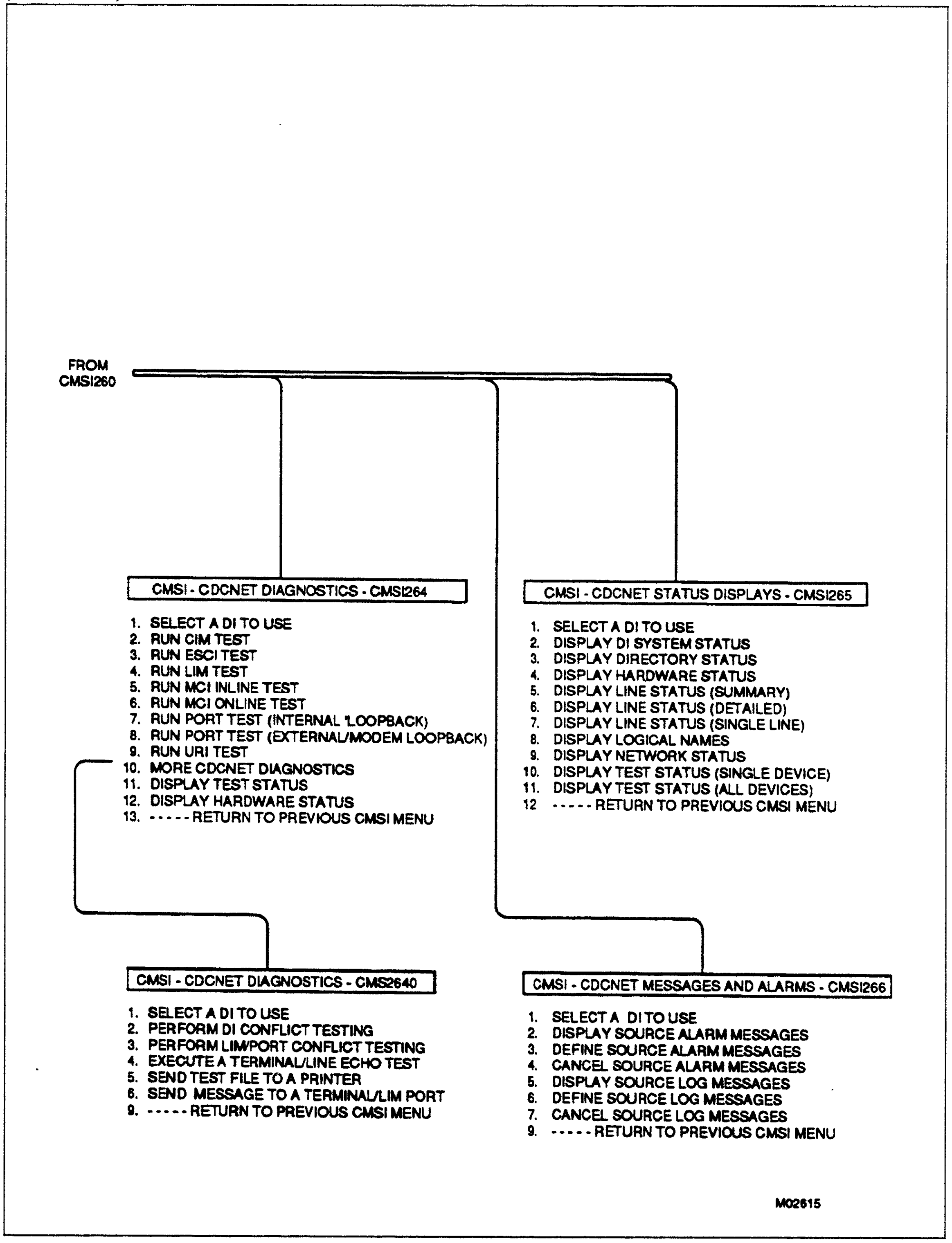


Figure 4-29. CMSI Menu Tree

CMSI000 - Main Menu

The CMSI main menu is the highest level in the CMSI menu tree. The options are explained below.

```
CMSI - COMMON MAINTENANCE SOFTWARE INTERFACE - CMLLEV

 1. ANALYSIS INTERFACE    - HPA/NPA/MTPLOT-DSPLOT
 2. DIAGNOSTICS INTERFACE - MALET/CPU/MST/T10/REGEN/LCN/CDCNET
 3. DUMP INTERFACE        - DSDI/MCDUMP/MCDUMP/ANALDMP
 4. UTILIITIES INTERFACE  - CMLUTIL/EST TABLE/MOD CMLINST
 5. REINITIALIZE CMSI     - RESET ANY CMSI PARAMETERS
 6. EXIT TO NOS           - EXIT TO THE NOS OPERATING SYSTEM
 7. LOGOFF                - TERMINATE THIS TERMINAL SESSION

CMSI000> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-30. CMSI Main Menu

Menu Choice	Action
1	Displays submenus for HPA, NPA, and MTPLOT-DSPLOT. Choose this option to use either NPA (Network Performance Analyzer) or HPA (Hardware Performance Analyzer).
2	Displays menus for various diagnostic software products, including CDCNET. Choose this option to access CDCNET diagnostics.
3	Displays menus for various NOS dump routines. These are not used for CDCNET.
4	Displays menus for various utilities. These are not used for CDCNET.
5	Displays options for reinitializing CMSI parameters. Used when site parameters change or errors are found in existing parameters. See the CML Reference manual for more information.
6	Terminates CMSI and returns you to the NOS interactive facility. You can restart CMSI by entering: BEGIN,CMSI,CMLINST
7	Terminates CMSI by logging you off the NOS system.

CMSI100 - Analysis Interface Menu

This menu allows you to select either HPA (Hardware Performance Analyzer) or NPA (Network Performance Analyzer).

```
CMSI - ANALYSIS INTERFACE - CMSI100

  1. HPA INTERFACE
  2. NPA CDCNET INTERFACE
  3. MTPLOT/DSPLOT INTERFACE
  9. ---------------RETURN TO MAINFRAME MENUS

CMSI100> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-31. Analysis Interface Menu

Menu Choice	Action
1	Displays a menu of choices for the Hardware Performance Analyzer.
2	Displays a menu of Network Performance Analyzer reports.
3	Not used for CDCNET maintenance.
9	Returns you to main CMSI menu (CMSI000).

CMSI120 - CDCNET NPA Interface Menu

The NPA interface menu allows you to build and display statistics reports on CDCNET operation. You can select options to produce any one of four reports individually or combine them all into one report. You can also choose to interact directly with the CDCNET report generator, CRECAR, and thereby select any option available to that program. Refer to the CDCNET Network Operations and Analysis manual for more information.

```
 CMSI - CDCNET NPA INTERFACE - CMSI120

  1. NPA MCI STATISTICS REPORT - MCISRP3
  2. NPA ESCI STATISTIC REPORT - ETHRRP2
  3. NPA LINE STATISTIC REPORT - TERMRP2
  4. NPA HARDWARE ERROR REPORT - HRDWRP2
  5. NPA REPORT OF 'ALL' FORMATS
  6. USER ACCESS TO NPA REPORT GENERATOR CRECAR
  9. ---------------RETURN TO MAIN CMSI MENU

CMSI120> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-32. NPA Interface Menu

Menu Choice	Action
1	Builds and displays a report of error data for the mainframe channel interface (MCI) board.
2	Builds and displays a report of error data for the Ethernet serial interface (ESCI) board.
3	Builds and displays a report of error data for all terminals.
4	Builds and displays a report of error data for all CDCNET hardware.
5	Builds and displays a combined report that contains all of the above reports.
6	Allows you to select any NPA report and enter the desired parameters for that report.
9	Returns you to CMSI main menu (CMSI000).

CMSI200 - CMSI Diagnostic Interface Menu

The CMSI diagnostics interface menu is the primary menu for all CMSI diagnostics. Only entry 6 pertains to CDCNET diagnostics.

```
 CMSI - DIAGNOSTICS INTERFACE - CMSI200

   1. RUN A MALET DIAGNOSTICS
   2. RUN A CPU DIAGNOSTIC (MAINTENANCE DIAGNOSTIC)
   3. RUN NOS TEST MSI
   4. RUN T10/REGEN
   5. RUN LCN HOST/HOST CONFIDENCE TEST
   6. RUN CDCNET DIAGNOSTICS
   7. DISPLAY EST TABLES
   9. ---------------RETURN TO MAIN CMSI MENU

CMSI200> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-33. Diagnostics Interface Menu

Menu Choice	Action
1	Not used for CDCNET maintenance.
2	Not used for CDCNET maintenance.
3	Not used for CDCNET maintenance.
4	Not used for CDCNET maintenance.
5	Not used for CDCNET maintenance.
6	Displays the CDCNET menu. It is through this menu that you access the CDCNET maintenance software.
7	Not used for CDCNET maintenance.
9	Returns you to CMSI main menu (CMSI000).

CMSI260 - CDCNET Menu

The CDCNET menu is the main menu for performing diagnostics and related activities under CMSI. The options are described below.

```
CMSI - CDCNET MENU - CMSI260

 1. EXECUTE NETOU IN EXPERT MODE
 2. SELECT A DI TO USE
 3. MANAGE NETWORK, DEVICE, AND LINE STATES
 4. EXECUTE CDCNET ONLINE DIAGNOSTICS
 5. VIEW CDCNET STATUS DISPLAYS
 6. MANAGE MESSAGE LOGGING AND ALARMS
 9. ---------------RETURN TO PREVIOUS CMSI MENU

CMSI260> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-34. CDCNET Menu

Menu Choice	Action
1	Allows you to enter NETOU (network operator utility) in expert mode. In expert mode you are able to set parameters that are not available in CMSI (see How to Use NETOU, later in this chapter).
2	Displays a menu (CMSI262) for displaying available DI names, selecting a command MDI and target DI, and displaying the names of the currently selected command MDI and target DI.
3	Displays a menu (CMSI263) for managing the states of CDCNET networks, devices, and lines.
4	Displays a menu (CMSI264) for selecting CDCNET online diagnostics tests.
5	Displays a menu (CMSI265) for selecting a CDCNET status display (for example, displaying the status of boards and lines within the selected DI).
6	Displays a menu (CMSI266) of options for management of CDCNET log messages and NETOU alarms.
9	Returns you to the next higher menu in the menu tree.

CMSI262 - CDCNET Element Selections Menu

The CDCNET Element Selections menu allows you to display the names of available DIs and also to select a command MDI and a target DI to use with CMSI procedures.

```
CMSI - CDCNET ELEMENT SELECTIONS - CMSI262

  1. DISPLAY AVAILABLE DI NAMES
  2. SELECT A COMMAND MDI AND A TARGET DI FOR CDCNET ACTIVITIES
  3. DISPLAY CURRENTLY SELECTED COMMAND AND TARGET DI NAMES
  9. ---------------RETURN TO PREVIOUS CMSI MENU

CMSI262> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-35. CDCNET Element Selections Menu

Menu Choice	Action
1	Displays the names of DIs that are currently available in the network.
2	Allows you to select the command MDI through which CMSI can execute and also to select the DI that will be the target of further activities executed under CMSI.
3	Displays the command MDI and the target DI that you selected with option 2 above.
9	Returns you to the next higher menu in the menu tree.

CMSI263 - CDCNET Device/Line States Menu

The CDCNET device and line states menu shows options for controlling the states of devices, lines, and networks for the selected DI.

```
CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263

  1. SELECT A DI TO USE
  2. STOP A LINE
  3. START A LINE
  4. CANCEL A LINE
  5. DEFINE A LINE
  6. CHANGE ELEMENT STATE TO ON
  7. CHANGE ELEMENT STATE TO DOWN
  8. CHANGE ELEMENT STATE TO OFF
  9. MANAGE MULTIPLE LINES
  10. MANAGE NETWORKS
  11. DISPLAY HARDWARE STATUS
  12. DISPLAY LINE STATUS (SUMMARY)
  13. ---------------RETURN TO PREVIOUS CMSI MENU

CMSI263> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-36. CDCNET Device/Line States Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selection menu (CMSI262) so you can select a DI on which to perform CMSI operations.
2	Stops communications on a communications or URI line. Related command: STOP_LINE.
3	Starts communications on a communications or URI line. Related command: START_LINE.
4	Deletes the definition of a communications or URI line. Related command: CANCEL_LINE.
5	Defines a communications or URI line so it can be used by CDCNET. Related command: DEFINE_LINE.
6	Changes the operational state of a board or port to ON. ON is the state required for using the device for CDCNET communications. Related command: CHANGE_ELEMENT_STATE.
7	Changes the operational state of a board or port to DOWN. In this state, the device is available for diagnostics only. Related command: CHANGE_ELEMENT_STATE.
8	Changes the operational state of a board or port to OFF. In this state, the device cannot be used or have commands, except CHANGE_ELEMENT_STATE, sent to it. Related command: CHANGE_ELEMENT_STATE.
9	Displays a menu (CMS2639) of options for managing multiple lines (for example, setting all LIMs in the selected DI to the DOWN state).
10	Displays a menu (CMS2630) of options for managing networks (for example, stopping a network or displaying its status).
11	Displays the status of boards and ports in the DI. If you do not enter a specific board or port to display, you get the status of all boards in the DI. Related command: DISPLAY_HARDWARE_STATUS (expanded).
12	Displays operational status of communications lines and URI lines connected to the DI. You are given options for choosing specific line names, lines controlled by specific terminal interface programs (TIPs), or all lines attached to the selected DI. Related command: DISPLAY_LINE_STATUS (summary).
13	Returns you to the next higher menu in the menu tree.

CMS2630 - Manage Networks Menu

This menu provides options for managing networks connected to the selected DI.

```
 CMSI - CDCNET MANAGE NETWORKS - CMS2630

   1. SELECT A DI TO USE
   2. STOP A NETWORK
   3. START A NETWORK
   4. STOP NP INTERFACE
   5. START NP INTERFACE
   6. DISPLAY NETWORK STATUS
   9. ---------------RETURN TO PREVIOUS CMSI MENU

CMS2630> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-37. Manage Networks Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selections menu (CMSI262) so you can select a DI on which to perform CMSI operations.
2	Stops communications over a network solution connected to the selected DI. Related command: STOP_NETWORK.
3	Starts communications over a network solution connected to the selected DI. Related command: START_NETWORK.
4	Stops the network products protocol over an NOS mainframe channel to an NOS system and stops the underlying channel trunk protocol. Related command: STOP_NP_INTERFACE.
5	Starts the network products protocol over an NOS mainframe channel to an NOS system and also starts the underlying channel trunk protocol, if it has not already been started. Related command: START_NP_INTERFACE.
6	Displays the status of all network solutions connected to the DI. Related command: DISPLAY_NETWORK_STATUS (expanded).
9	Returns you to the next higher menu in the menu tree.

CMS2639 - Manage Multiple Lines Menu

The Manage Multiple Lines menu allows you to manage the operational state of all lines connected to the DI by making only one selection. For example, choice number 5 stops and downs all lines on the selected DI.

```
CMSI - CDCNET MANAGE MULTIPLE LINES - CMS2639

1. SELECT A DI TO USE
2. STOP ALL LINES EXCEPT ACTIVE LINES
3. DOWN ALL STOPPED, CONFIGURED, AND UNCONFIGURED LINES
4. STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES
5. STOP AND DOWN ALL LINES. WARNING: THIS INCLUDES LINES CURRENTLY IN USE
6. SET ALL PORTS TO ON STATE AND START ALL CONFIGURED LINES
7. SET ALL LIMS TO DOWN STATE
8. SET ALL LIMS TO ON STATE
9. DISPLAY HARDWARE STATUS
10. DISPLAY LINE STATUS (SUMMARY)
11. ---------------RETURN TO PREVIOUS CMSI MENU

CMS2639> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-38. CDCNET Manage Multiple Lines Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selections menu (CMSI262) so you can select a DI on which to perform CDCNET operations.
2	Stops communications on all lines except those that are currently being used (active lines). Related command: STOP_LINE.
3	Downs all lines that are not available for use. A line that is active or enabled and ready for use is not affected. Related command: CHANGE_ELEMENT_STATE.
4	Stops communications and downs all lines that are not currently in use (inactive lines). Related commands: STOP_LINE, CHANGE_ELEMENT_STATE.
5	Stops communications and downs all lines including those currently in use. Related commands: STOP_LINE, CHANGE_ELEMENT_STATE.
6	Sets all ports to the ON state and starts communications on all lines that are currently defined for use by CDCNET. Related commands: CHANGE_ELEMENT_STATE, START_LINE.
7	Sets all LIMs to the DOWN state. Related command: CHANGE_ELEMENT_STATE.
8	Sets all LIMs to the ON state. Related command: CHANGE_ELEMENT_STATE.
9	Displays the status of boards and ports in the DI. If you do not enter a specific board or port to display, you get the status of all boards. Related command: DISPLAY_HARDWARE_STATUS (expanded).
10	Displays general operational status of all communications and URI lines. Related command: DISPLAY_LINE_STATUS.
11	Returns you to the next higher menu in the menu tree.

CMSI264 - CDCNET Diagnostics Menu

The CDCNET diagnostics menu allows you to run diagnostics tests on boards or ports within the currently selected DI.

```
 CMSI - CDCNET DIAGNOSTICS - CMSI264

  1. SELECT A DI TO USE
  2. RUN CIM TEST
  3. RUN ESCI TEST
  4. RUN LIM TEST
  5. RUN MCI INLINE TEST
  6. RUN MCI ONLINE TEST
  7. RUN PORT TEST (INTERNAL/LOOPBACK)
  8. RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
  9. RUN URI TEST
  10. MORE CDCNET DIAGNOSTICS
  11. DISPLAY TEST STATUS
  12. DISPLAY HARDWARE STATUS
  13. ---------------RETURN TO PREVIOUS CMSI MENU

CMSI264> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-39. CDCNET Diagnostics Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selections menu (CMSI262) so you can select a DI on which to perform CMSI operations.
2	Runs online diagnostics on a selected CIM board and its associated LIMs and ports. Related command: START_CIM_TEST.
3	Runs online diagnostics on a selected ESCI board. Related command: START_ESCI_TEST.
4	Runs online diagnostics on a selected LIM and its ports. Related command: START_LIM_TEST.
5	Runs inline diagnostics on a selected MCI. Related command: START_MCI_INLINE_TEST.
6	Runs online diagnostics on a selected MCI. Related command: START_MCI_ONLINE_TEST.
7	Runs online diagnostics, in internal loopback mode, on a selected port. Related command: START_PORT_TEST.
8	Runs online diagnostics, in external modem loopback mode, on a selected port. Related command: START_PORT_TEST.
9	Runs online diagnostics, in internal loopback mode, on a selected URI board. Related command: START_URI_TEST.
10	Displays a menu with more CDCNET diagnostics tests you can run.
11	Displays status of tests currently executing or results from tests on the currently selected DI. Related command: DISPLAY_TEST_STATUS (expanded).
12	Displays the status of boards and ports in the DI. If you do not enter a specific board or port to display, you get the status of all boards. Related command: DISPLAY_HARDWARE_STATUS (expanded).
13	Returns you to the next higher menu in the menu tree.

CMS2640 - CDCNET Diagnostics Menu

This is an extension of CMSI264 and provides options for running diagnostics on multiple elements. Only elements in the DOWN state will be tested.

```
 CMSI - CDCNET DIAGNOSTICS - CMS2640

  1. SELECT A DI TO USE
  2. PERFORM DI CONFLICT TESTING
  3. PERFORM LIM/PORT CONFLICT TESTING
  4. EXECUTE A TERMINAL/LINE ECHO TEST
  5. SEND TEST FILE TO A PRINTER
  6. SEND MESSAGE TO A TERMINAL/LIM PORT
  9. ---------------RETURN TO PREVIOUS CMSI MENU

CMS2640> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-40. CDCNET Diagnostics Extended Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selections menu (CMSI262) so you can select a DI on which to perform CMSI operations.
2	Starts the appropriate online diagnostic on all large DI boards (MCI, CIM, ESCI) that are in the DOWN state. When the test is complete you view results either via NPA or display test status. You must execute display test status once for each board.
3	Starts the PORT online diagnostic (START_PORT_TEST) with internal loopback, on all ports in the DI that are in the DOWN state. Note that URI ports are not included. When the test is complete you view results either via NPA or display test status. You must execute display test status once for each port.
4	Not currently supported.
5	Not currently supported.
6	Allows you to send a message by specifying either a terminal name or a LIM port. Related command: WRITE_TERMINAL_MESSAGE.
9	Returns you to the next higher menu in the menu tree.

CMSI265 - CDCNET Status Displays Menu

The CDCNET Status Displays Menu provides options for displaying status information about a DI.

```
CMSI - CDCNET STATUS DISPLAYS - CMSI265

 1. SELECT A DI TO USE
 2. DISPLAY DI SYSTEM STATUS
 3. DISPLAY DIRECTORY STATUS
 4. DISPLAY HARDWARE STATUS
 5. DISPLAY LINE STATUS (SUMMARY)
 6. DISPLAY LINE STATUS (DETAILED)
 7. DISPLAY LINE STATUS (SINGLE LINE)
 8. DISPLAY LOGICAL NAMES
 9. DISPLAY NETWORK STATUS
 10. DISPLAY TEST STATUS (SINGLE DEVICE)
 11. DISPLAY TEST STATUS (ALL DEVICES)
 12. ---------------RETURN TO PREVIOUS CMSI MENU

CMSI265> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-41. CDCNET Status Displays Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selections menu (CMSI262) so you can select a DI on which to perform CMSI operations.
2	Displays general information about the operation of a DI (for example, date and time of last reload, states of buffers and memory). Related command: DISPLAY_SYSTEM_STATUS (expanded).
3	Displays the operating status of the Directory Management Entity (ME) in the DI. Related command: DISPLAY_DIRECTORY_STATUS (expanded).
4	Displays the status of all boards and ports in the DI. Related command: DISPLAY_HARDWARE_STATUS (expanded).
5	Displays general operational status of all comunications and URI lines attached to the DI. Related command: DISPLAY_LINE STATUS (summary).
6	Displays detailed operational status of all communications and URI lines attached to the DI. Related command: DISPLAY_LINE_STATUS (detailed).
7	Displays general operational status of specific lines connected to the DI. Related command: DISPLAY_LINE_STATUS.
8	Displays the logical names for all trunks, network solutions, communications lines, gateways, and so on, for the DI. Related command: DISPLAY_LOGICAL_NAMES (all).
9	Displays the status of all network solutions connected to the DI. Related command: DISPLAY_NETWORK_STATUS.
10	Displays status of tests currently executing, or results from completed tests on a selected device. Related command: DISPLAY_TEST_STATUS (expanded).
11	Displays status of tests currently executing, or results from completed tests for all devices in the currently selected DI. Related command: DISPLAY_TEST_STATUS (expanded).
12	Returns you to the next higher menu in the menu tree.

CMSI266 - CDCNET Messages and Alarms Menu

The CDCNET Messages and Alarms menu provides options for managing the alarms and messages sent and received by the DI.

```
 CMSI - CDCNET MESSAGES AND ALARMS - CMSI266

  1. SELECT A DI TO USE
  2. DISPLAY SOURCE ALARM MESSAGES
  3. DEFINE SOURCE ALARM MESSAGES
  4. CANCEL SOURCE ALARM MESSAGES
  5. DISPLAY SOURCE LOG MESSAGES
  6. DEFINE SOURCE LOG MESSAGES
  7. CANCEL SOURCE LOG MESSAGES
  9. ---------------RETURN TO PREVIOUS CMSI MENU

CMSI266> SELECT BY NUMBER OR TYPE ? FOR HELP.  ?
```

Figure 4-42. CDCNET Messages and Alarms Menu

Menu Choice	Action
1	Takes you to the CDCNET Element Selections menu (CMSI262) so you can select a DI on which to perform CMSI operations.
2	Displays the CDCNET message numbers that the DI can send to the network operator. Related command: DISPLAY_SOURCE_ALARMS.
3	Allows you to define the alarm messages (by number) that the DI can send to the network operator. If no messages are defined, none are sent. Related command: DEFINE_SOURCE ALARM_MESSAGES.
4	Allows you to cancel reporting of specified alarm messages by the DI. You specify the messages by number. Related command: CANCEL_SOURCE_ALARM_MESSAGE.
5	Displays the message numbers for the messages that this DI currently logs. Related command: DISPLAY_SOURCE_LOG_GROUP.
6	Allows you to define the log messages (by number) that cause a log entry by the DI. Related command: CHANGE_SOURCE_LOG_GROUP.
7	Allows you to delete messages from the list that the DI logs. You specify the messages by number. Related command: CANCEL_SOURCE_LOG_GROUP.
9	Returns you to the next higher menu in the menu tree.

How To Use NETOU

In NETOU (Network Operator Utility), you use network commands instead of menu selections to initiate the desired activites. Commands offer more flexibility in that they allow you to vary test parameters. For example, you can set the number of times that a test repeats or the state that a device is left in upon test completion. Appendix G explains the commands commonly used during maintenance.

The following areas are covered here:

- Entering NETOU from CML/VE
- Entering NETOU from CMSI
- Logging directly into NETOU through NOS/VE
- Logging directly into NETOU through NOS
- Logging directly into NETOU from a NOS host console
- Entering network commands

Entering NETOU from CML/VE

You can enter NETOU through CML/VE and execute commands in the same manner as if you had logged in directly. CML/VE has two options for using command mode. Both are entered from the main menu (figure 4-43) and are described below.

- Enter commands in full expert mode (same as if you logged directly into NETOU). This is option 1 on the main menu (CML_700). You can also access expert mode by using the NETOU menu command (see Entering NETOU or NPA from Main Menu, earlier in this chapter).

  1. Enter CML/VE as described under Starting CML/VE, earlier in this chapter.

  2. Choose option 7 from the CML/VE main menu (CML_000). This takes you to CML_700 (CDCNET MENU).

  3. Enter expert mode by choosing option 1 from CML_700 (you could also enter NETOU at the CML? prompt on any menu). This gives you the following prompt:

     ```
     nou/
     ```

  4. Enter desired command after the prompt. For example, to stop line01 on TDI_6 enter (shaded information):

     ```
     nou/senc c='stop_line  line_name=line01',s=tdi_6
     ```

     See Entering Network Commands, later in this chapter, for information on senc command. See related area such as How to Run CIM Online Test, in chapter 6, for information on specific commands.

  5. Enter QUIT to leave expert mode and return to the CML/VE main menu.

- Send commands only to currently selected DI. Here, commands go only to the currently selected DI and you do not have to specify the DI each time. This mode is similar to the SEND_COMMAND_SEQUENCE mode in NOS (see SEND_COMMAND_SEQUENCE command in appendix G).

  1. Enter CML/VE as described under Starting CML/VE, earlier in this chapter.

  2. Choose option 7 from the CML/VE main menu (CML_000). This takes you to CML_700 (CDCNET MENU).

  3. Choose option 7 from CML_700. You are prompted to enter a command.

  4. Enter desired command. For example, to display expanded hardware status for the selected DI enter:

     ```
     dish do=e
     ```

     See related area such as How to Run CIM Online Test, in chapter 6, for information on specific commands.

  5. Enter QUIT to leave expert mode and return to the CML/VE main menu.

```
     -------------------------------------
     CML_000 - CML/VE MAIN MENU - VERSION XX
     -------------------------------------

     1. MALET/VE (PERIPHERAL DIAGNOSTICS).
     2. HPA/VE (HARDWARE ERROR REPORTS).
     3. DVS (MAINFRAME DIAGNOSTICS).
     4. CONFIGURATION UTILITY.
        (DISPLAY HARDWARE/SOFTWARE CONFIGURATION DATA).
     5. TERMINAL/USER DEFINITION UTILITY.
        (DISPLAY/ALTER TERMINAL/USER DEFINITION).
     6. NPA (NETWORK PERFORMANCE ANALYZER.
 ___[7. CDCNET UTILITY (ONLINE DIAGNOSTICS AND STATUS DISPLAYS).
|    8. CML/VE TOOLBOX (SITE/LOCAL GENERATED MAINTENANCE PROCEDURES).
|    9. QUIT/END (EXIT CML/VE).
|
|_____________
              |
              |
              |
     --------------------
     CML_700 - CDCNET MENU
     --------------------

     1. EXECUTE NETOU IN EXPERT (COMMAND) MODE.
     2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
     3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
     4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
     5. VIEW CDCNET STATUS DISPLAYS.
     6. MANAGE MESSAGE LOGGING AND ALARMS.
     7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT CDCNET SYSTEM (DI).
```

Figure 4-43. CML/VE Menus to Enter NETOU Command Mode

Entering NETOU from CMSI

You can enter NETOU through CMSI and execute commands in the same manner as if you had logged in directly. Quitting takes you back to the CMSI main menu. CMSI does not run on a NOS host console, so the K commands do not apply here. Figure 4-44 shows the menus used to access NETOU. The procedure is as follows:

1. Enter CMSI as described under Starting CMSI, earlier in this chapter.

2. Choose option 2 from CMSI main menu. This takes you to CMSI200 (DIAGNOSTICS INTERFACE).

3. Choose option 6 from the DIAGNOSTICS INTERFACE menu. This takes you to CMSI1260 (CDCNET MENU).

4. Choose option 1 from CDCNET MENU to enter NETOU expert (command) mode. You get the following prompt.

   ```
   NOU/
   ```

5. Enter desired command(s) after the prompt. For example: to stop line01 on TDI_6 enter (shaded information):

   ```
   NOU/senc c='stop_line  line_name=line01',s=tdi_6
   ```

   See Entering Network Commands, later in this chapter, for information on senc command. See related area such as How to Run CIM Online Test (chapter 6) for information on specific commands.

6. Enter QUIT to leave expert mode and return to the CMSI main menu.

```
    ---------------------------------------------------
    CMSI - COMMON MAINTENANCE SOFTWARE INTERFACE - CMLLEV
    ---------------------------------------------------

     1. ANALYSIS INTERFACE     - HPA/NPA/MTPLOT-DSPLOT
 ___[2. DIAGNOSTICS INTERFACE  - MALET/CPU/MST/T10/REGEN/LCN/CDCNET
|    3. DUMP INTERFACE         - DSDI/MCDUMP/MCDUMP/ANALDMP
|    4. UTILIITIES INTERFACE   - CMLUTIL/EST TABLE/MOD CMLINST
|    5. REINITIALIZE CMSI      - RESET ANY CMSI PARAMETERS
|    6. EXIT TO NOS            - EXIT TO THE NOS OPERATING SYSTEM
|    7. LOGOFF                 - TERMINATE THIS TERMINAL SESSION
|
|__________________
                   |
                   |
    -------------------------------------
    CMSI - DIAGNOSTICS INTERFACE - CMSI200
    -------------------------------------

     1. RUN A MALET DIAGNOSTICS
     2. RUN A CPU DIAGNOSTIC (MAINTENANCE DIAGNOSTIC)
     3. RUN NOS TEST MSI
     4. RUN T10/REGEN
     5. RUN LCN HOST/HOST CONFIDENCE TEST
 ___[6. RUN CDCNET DIAGNOSTICS
|    7. DISPLAY EST TABLES
|    9. -----RETURN TO MAIN CMSI MENU
|
|__________________
                   |
                   |
    ---------------------------
    CMSI - CDCNET MENU - CMSI260
    ---------------------------

     1. EXECUTE NETOU IN EXPERT MODE
     2. SELECT A DI TO USE
     3. MANAGE NETWORK, DEVICE, AND LINE STATES
     4. EXECUTE CDCNET ONLINE DIAGNOSTICS
     5. VIEW CDCNET STATUS DISPLAYS
     6. MANAGE MESSAGE LOGGING AND ALARMS
     9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 4-44. CMSI Menus to Enter NETOU Command Mode

Logging Directly into NETOU Through NOS/VE

The following describes how to access NETOU and enter network commands from an interactive terminal. It assumes you are validated to use NETOU. Log in procedures vary betweeen sites. If you have problems or need validation, see the network administrator. For more information, see the CDCNET Terminal Interface Usage manual.

NETOU at a terminal uses virtual line mode format (as opposed to full screen mode) for display output. Commands are entered line-by-line and responses are returned line-by-line.

1. Connect to the network by pressing carriage return twice. This gives you a message like the one below.

```
9600 bps ASCII, parity: even

Copyright Control Data Corporation  1985, 1986

DI System Name is 080025100081, TDI_12
Terminal Name is 140000, $CONSOLE_100078_690000
You may enter CDCNET commands.
```

2. Create a connection to the time sharing service by using the CREATE_CONNECTION command. The example below creates a connection to a service named nve.

```
crec nve
```

   You get a message similar to the one below.

```
Connection $A created
user_name:
```

3. Log in to NOS/VE by entering any required user name and password. For example:

```
bss,sunra
```

   You get a message similar to the one below.

```
WELCOME TO THE NOS/VE SOFTWARE SYSTEM
COPYRIGHT CONTROL DATA 1978, 1986
CYBER 930 Class SN200.  NOS/VE 1.2.3 1688
1988-3-10   14:20:10
/
```

4. Enter NETOU by typing netou after the / prompt. The following prompt appears indicating you are in NETOU and can enter commands.

```
nou/
```

5. Enter desired commands as described in Entering Network Commands, later in this chapter. During command entry, you may get the following prompt for NETOU to indicate that the previous line you input was continued to another line.

```
nou../
```

6. Exit NETOU but stay in the timesharing service by entering QUIT. Exit NETOU and timesharing service by entering LOGOUT.

Logging Directly into NETOU Through NOS

The following describes how to access NETOU and enter network commands from an interactive terminal. It assumes you are validated to use NETOU. Log in procedures vary between sites. If you have problems or need validation, see the network administrator. For more information, see the CDCNET Terminal Interface Usage manual.

NETOU at a terminal uses virtual line mode format (as opposed to full screen mode) for display output. Commands are entered line-by-line and responses are returned line-by-line.

Logging In

1. Connect to the network by pressing carriage return twice. This gives you a message like the one below.

```
9600 bps ASCII, parity: even

Copyright Control Data Corporation  1985, 1986

DI System Name is 080025100081, TDI_12
Terminal Name is 140000, $CONSOLE_100078_690000
You may enter CDCNET commands.
```

2. Create a connection to the host system by using the CREATE_CONNECTION command. The example below creates a connection to the host named nos100.

```
crec,nos100
```

   You see a message similar to the one below.

```
Connection $A created
WELCOME TO THE NOS SOFTWARE SYSTEM
COPYRIGHT CONTROL DATA 1978, 1986

88/09/25. 11.23.50. T234903
NETWORK OPERATING SYSTEM. 17.   NOA 2.5.1670/670
FAMILY:
```

3. Log in to NOS and select NETOU application by entering the family, user name, password, and application (in this case, NETOU). For example:

```
nosfam,bss,sunra,netou
```

   If there is more than one MDI available in your system, you may be prompted to select an MDI. This is covered in the next topic. After the MDI is selected, the following prompt appears indicating you are in NETOU and can enter commands.

```
NETOU/
```

4. Enter desired commands as described in Entering Network Commands, later in this chapter.

5. Exit as described under Logout, later in this chapter.

Selecting an MDI or MTI

NOTE

This section applies to site configurations that have more than one MDI connected to a single host. MDIs that share only a single NOS host are considered separate catenets.

When you log in to NETOU, your job's connection is switched to NETOU. NETOU responds by connecting your terminal to the default MDI or MTI to receive your network commands and route them through the network. If there is more than one MDI or MTI available for you to select for an operations session, NETOU responds in one of two ways.

- NETOU automatically selects an MDI/MTI for you.
- NETOU prompts you to select an MDI or MTI.

You must also select an MDI if the currently selected MDI breaks its connection with NETOU.

Until an MDI becomes available and you select one, you may only enter the following commands (all other commands are ignored):

- DISPLAY_CONNECTED_MDI
- DISPLAY_ALARM_HISTORY
- ROUTE_ALARM
- ROUTE_COMMAND_RESPONSE
- SET_COMMAND_MDI
- DISPLAY_COMMAND_LIST
- DISPLAY_COMMAND_LIST_ENTRY
- HELP
- DISPLAY_COMMAND_INFORMATION
- QUIT
- LOGOUT
- BYE
- GOODBYE
- HELLO
- LOGIN

If more than one MDI or MTI is connected to NETOU, you receive a message listing all the MDIs which you can select to connect with the network. The display you receive depends on the number of MDIs and/or MTIs defined at your site. The following is an example of such a message:

```
  STATUS OF CONNECTED MDIs
  NODE    CURRENT    SYSTEM
NUMBER     STATE     TITLE

  043    AVAILABLE   MDI_8A
  044    AVAILABLE   MDI_85
```

If more than one MDI has established a connection with NETOU, as in the example above, you also receive the following message:

```
More than one MDI available.
Please select an MDI by the following command:
SETCM [MDI=<name>]
Parameter is optional, if omitted,
then default MDI = <default MDI title>
```

The command you enter is called SET_COMMAND_MDI (SETCM). The value of <default MDI title> is the default MDI to which you are connected if you do not specifically select an MDI. The default MDI is the first MDI in the list that is in the AVAILABLE state. If you only enter SETCM with no parameter, then the first AVAILABLE MDI in the list is selected.

The default MDI is defined in the job statement for NETOU in a host file called NAMSTRT. If the connection with this default MDI is broken, NETOU reselects the default MDI. Unless there is more than one MDI at your site, or if you plan to switch between MDIs, you can use the default MDI.

Once you have selected an MDI for communication with the network, you receive that MDI's title in a message sent from that MDI. If you need to check which MDI or MTI you have currently selected, enter the DISPLAY_CONNECTED_MDI (DISCM) command.

NOTE

You receive alarms that are sent through the selected MDI or MTI. If you want alarms from another catenet, select a different MDI using the SETCM command.

Logout

To log out from the NETOU application (and optionally log in to another application, such as IAF), enter one of the following commands.

HELLO,application

BYE

LOGOUT

LOGIN,application

GOODBYE

QUIT

Examples:

The following example logs an operator out of the NETOU application and selects the IAF application.

```
hello,iaf
```

The following example logs an operator out of the current NETOU session. It also begins a new NETOU session unless NETOU has been entered while in IAF using an APPSW command. In this case, control is returned to the IAF session.

```
hello,netou
```

Logging Directly into NETOU from a NOS Host Console

At a NOS host computer console (a CC545 console or a 721 terminal), your interface to CDCNET is through the standard Network Access Method (NAM) host operator interface, the NAM K display. This section focuses on using the NAM K display to access and use the Network Operator Utility (NETOU). For background information on host console operations and K displays, refer to the NOS 2 Analysis handbook.

Login

Use the following procedure to log in to NOS and select NETOU from a host console.

1. To access the NAM K display from the host console, enter the following.

```
K,NAM.
```

2. Select NETOU:

```
K.AP=NETOU
```

3. The NETOU application responds by clearing the left data area and sending the following prompt:

```
READY..
PLEASE ENTER *USERNAME,PASSWORD*,
ENTER VALUES IN ONE LINE, SEPARATED BY COMMAS.
READY..
```

Enter your user name and password.

```
user name,password
```

Your user name must be a member of the operating system's default family. For a valid login (a login that is known to the operating system and authorized for CDCNET control access), NETOU responds by sending the following message:

```
USER VALIDATION SUCCESSFUL,UN=<user_name>
```

NETOU then connects your session to the default MDI or MTI to receive your network commands and routes them through the network. If there is more than one MDI or MTI available for connecting to the network, you are prompted (if your site selected the prompting option) to select the MDI or MTI to be used for your operations session. If login is invalid, NETOU reissues the prompt for a valid login.

4. If more than one MDI is available, you receive the status of connected MDIs at your site, and a prompt to choose an MDI.

```
  STATUS OF CONNECTED MDIs
  NODE     CURRENT      SYSTEM
NUMBER      STATE       TITLE

  043      AVAILABLE    MDI_8A
  044      AVAILABLE    MDI_85
```

   If more than one MDI has established a connection with NETOU, as in the example above, you also receive the following message:

```
More than one MDI available.
Please select an MDI by the following command:
SETCM [MDI=<name>]
Parameter is optional, if omitted,
then default MDI = <default MDI title>
```

5. Enter SET_COMMAND_MDI (SETCM). The value of <default MDI title> is the default MDI to which you are connected if you do not specifically select an MDI. The default MDI is the first MDI listed. If you enter only SETCM with no parameter, then the first DI in the list is selected.

   You receive a message showing the current user name in effect when the K display is reassigned after you have logged in.

```
YOU ARE CURRENTLY LOGGED IN AS UN=user_name
```

Logout

To log out from NETOU, enter any of the following logout commands:

K.LOGIN

K.LOGOUT

K.GOODBYE

K.BYE

K.QUIT

K.HELLO

K.LOGIN performs two actions: it terminates the current session and begins a new session.

After logout, a login prompt is displayed. You must type K.* to return the K display to NAM control. Once you log out, alarms issued by the network are discarded. Any commands you sent before the logout might or might not complete, but you do not receive responses to these commands.

K-Display Console Entry Restrictions

All commands at the K display are entered as follows:

```
K.command
```

The K. prefix is required. The syntax used for the command portion is the same as that used at an interactive terminal.

Normally, once the K display is active, the K. is automatically generated each time you enter a command. If you cancel the automatic feature by pressing the erase (left blank) key on the system console, you can restart the automatic process again by reentering the K. before the next command. Enter a carriage return to indicate the end of a command.

Entering Characters Not Supported at a NOS Host Console

NETOU commands use a subset of the syntax for NOS/VE SCL commands. SCL uses the ASCII character set, which has characters the NOS host console (CC545 and 721) does not support. On the NOS host console, you must type two characters, or an escape sequence, to designate the ASCII characters not supported on the console.

On the NOS host console screen, unsupported ASCII characters are designated by other characters. For a character that represents more than one ASCII character when displayed, such as the asterisk (*), the only way to know which ASCII character it represents is by the display's context. Table 4-1 shows escape sequences for unsupported ASCII characters and how these characters are represented on the console screen.

The following example compares command entries made at a terminal that supports the full ASCII character set with the same entries made at a NOS host console using the escape sequences. In this example, the hyphen is used rather than the /0 sequence to represent the underscore character.

ASCII terminal entry:

```
send_command command='display_hardware_status',system=north_tdi_1
```

System display console entry:

```
SEND-COMMAND COMMAND=/*DISPLAY-HARDWARE-STATUS/*,SYSTEM=NORTH-TDI-1
```

Table 4-1. NOS Host Console Escape Sequences and Displays

Character	Name	Escape Sequence On Keyboard	Displayed On Screen As:
^	Circumflex	/1	/1
"	Quotation Marks	/2	/2
#	Number Sign	/3	/3
$	Dollar Sign	/4	/4
@	Commercial At	/5	/5
;	Semicolon	/6	/6
?	Question Mark	/7	/7
{	Opening Brace	/8	/8
}	Closing Brace	/9	/9
_	Underline	Hyphen (-) or /0	-
[	Opening Bracket	/(	/(
]	Closing Bracket	/)	/)
>	Greater Than	/+	/+
<	Less Than	/=	/=
'	Apostrophe	/*	/*
/	Slant	//	/
!	Exclamation Point	None	.
%	Percent Sign	None	*
&	Ampersand	None	+
\	Reverse Slant	None	*
`	Grave Accent	None	*
|	Vertical Line	None	*
~	Tilde	None	*
:	Colon	/,	.
-	Minus, Hyphen	/-	-
a..z	Lowercase	/A../Z	A..Z

Entering Network Commands

Network commands are valid only within a NETOU session. The session begins when you enter the NETOU command to invoke NETOU. The session ends when you log out of NETOU.

With both NOS and NOS/VE you must use the SEND_COMMAND (SENC) command to send network commands to the appropriate destination. NOS also has a variation called SEND_COMMAND_SEQUENCE (SENCS). See appendix G for information on the SENC and SENCS commands.

If the command you are sending contains any apostrophes, you must use two consecutive apostrophes for the embedded apostrophe character to be recognized. Otherwise, NETOU assumes the embedded apostrophe signals the end of the NETOU command, and errors could result.

For example, the following command contains an embedded apostrophe in the message being transmitted to all terminals connected to TDI1.

```
send_command c='write_terminal_message,..
m=''ENGINEERING''''s network down until 10:00''',..
s=tdi1
```

Refer to the CDCNET Network Operations and Analysis manual for more information on using network commands.

Overall Network Troubleshooting 5

Overall Network Troubleshooting 5

This chapter contains the overall procedures to follow when looking for the cause of a network failure. The actual procedure you use will vary with the configuration of the network and the type of failure that occurs.

Network failures may be due to problems with software, hardware, or both. This manual concentrates on hardware problems. If you suspect software or configuration problems, ask the network administrator or analyst for assistance.

Most of the procedures here use display status commands or menu selections to determine if a suspect network or device is operating normally. However, status indications vary with the configuration of the network and its DIs, so a definition of normal status for every case is not possible. You must interpret status according to what is normal for your network. Work with a network analyst if you have problems. Also, refer to the configuration map of the network and to display status commands in appendix G.

This chapter contains the following topics.

- Starting to Troubleshoot the Network - First steps in the troubleshooting process. Branches off to other topics as appropriate.
- Troubleshooting Network Solutions - How to proceed if you suspect the problem is due to a bad network solution.
- Troubleshooting Device Interfaces (DIs) - Overall procedure for troubleshooting a device interface. Branches to other procedures, such as voltage checks, to solve specific problems.
- Troubleshooting Communications Lines - Procedure for isolating problems with communications lines.
- Troubleshooting Intermittent Failures - How to proceed if you encounter intermittent problems.
- Troubleshooting Network Components - Information on isolating problems with multiplexers, transceivers, repeaters, and segment cable.
- Troubleshooting DI Voltages - Procedures for detecting and eliminating DI power supply problems.
- Network Troubleshooting Examples - Examples of how to use the procedures to isolate typical problems.

Starting to Troubleshoot the Network

Figure 5-1 shows where to start the troubleshooting process. Perform this procedure first.

CAUTION

To prevent possible loss of customer data, notify all users before taking any actions that affect the operation of the network. Be sure to include users on the other side of HDLC and X.25 lines.

NOTE

- Some networks contain CYBER 930 hosts. These hosts connect to the Ethernet cable via an Integrated Communications Adapter (ICA). If you suspect problems with the CYBER 930 or its ICA, refer to the CYBER 930 Computer System Maintenance Guide for troubleshooting procedures.

- If you reset the ICA-II, use the NETOU KILL_SYSTEM command or the reset switch on the ICA-II board. This produces support materials, such as a memory dump, that can be analyzed later.

```
                                        Preliminary Troubleshooting Sheet 1

 1    Ask network administrator for the following:

      -  Configuration map of network

      -  DI Cabinet Configuration Form
       |
       |
       V
 2    Was any new hardware installed?
       N     Y
       |     |
       |     |
       |     V
 3     |    Check to ensure everything is installed  properly.  If problems
       |    are found, correct them and retest system.  Otherwise proceed to
       |    step 4.
       |
       |
       V
 4    Was any new software installed?
       N     Y
       |     |
       |     |
       |     V
 5     |    Have network administrator or analyst verify that all configuration
       |    files and other features are ok. If problems are found, have them
       |    corrected and retest system.  Otherwise proceed to step 6.
       |
       |
       V
 6    Is the entire network down?
       N     Y
       |     |
       |     |
       |     V
 7     |    Check that the host mainframe and MDI (or ICA) are operational.
       |     |
       |_____|           NOTE: See CYBER 930 Computer System Maintenance Guide
       |                 for information on troubleshooting an ICA.
       |
       |
       V
 8    Do you suspect which device is failing?
       N     Y
       |     |
       |     |
       V     V
   To A and B on Sheet 2
```

Figure 5-1. Starting to Troubleshoot

(Continued)

(Continued)

```
                                          Preliminary Troubleshooting Sheet 2

 From A and B on Sheet 1
      |     |
      |     |
      |     V
 9    |    Proceed as follows:
      |
      |    -  For network solution, use Troubleshooting Network Solutions
      |       procedures, later in this chapter.
      |
      |    -  For DI, use Troubleshooting a DI procedure, later in this chapter.
      |
      |    -  For communications line, use Troubleshooting Communications
      |        Lines procedures, later in this chapter.
      |
      |    -  For transceivers, repeaters, multiplexers, and segment cable,
      |       use Troubleshooting Network Components procedures,
      |       later in this chapter.
      |
      |    - For terminals or other devices, see manuals for those devices.
      |
      |
      V
 10   Is it practical to check error LEDs on all DIs?
      N     Y
      |     |
      |     |
      |     V
 11   |    If any error LEDs are on, interpret them and take corrective  actions
      |    as described in the How to Troubleshoot with Onboard Diagnostics
      |    procedure in chapter 7.  If no LEDs are on, proceed to step 12.
      |
      |
      V
 12   Start CML/VE, CMSI, or NETOU session (see chapter 4).
      |
      |
      V
 13   When you are not certain which device is failing, check the entire network
      by performing the procedures in this chapter as follows:

      a. Check each network solution as described in Troubleshooting Network
         Solutions.

      b. Check each DI as described in troubleshooting a Device Interface.

      c. Check each communications line as described in Troubleshooting
         Communications Lines.  If you do not find the problem, call next
         level of support.
```

Figure 5-1. Starting to Troubleshoot

Troubleshooting Network Solutions

Figures 5-2 and 5-3 show how to troubleshoot network solutions. This procedure assumes that you have completed the preliminary checks given in the previous topic, Starting to Troubleshoot the Network.

Troubleshooting network solutions, as described here, is divided into two parts:

- Troubleshooting Ethernet Network Solutions (figure 5-2)
- Troubleshooting X.25 or HDLC Network Solutions (figure 5-3)

Use the procedure that is appropriate for the problem.

```
                              Troubleshooting Ethernet Network Solutions Sheet 1

 1    Check status of suspect Ethernet network solution(s) using
      DISPLAY_NETWORK_STATUS command or menu selection.
       |
       |
       V
 2    Can you connect to MDI(s) or ICA-IIs for hosts providing boot and file
      service to the suspect networks?  If you cannot connect, you see the
      message --ERROR-- SYSTEM XXXXXX IS UNKNOWN.
       N     Y
       |     |
       |     |
       |     V
 3     |    Is network status ACTIVE?   NOTE: Status must be active to receive
       |     Y     N                    a response, unless there is more than
       |     |     |                    one path to the MDI.
       |     |     |
       |     |     V
 4     |     |    Indicates problem unless network has been stopped for some
       |     |    reason. If you suspect a hardware problem, proceed to step 6.
       |     |
       |     |
       |     V
 5     |    Network solution is ok: check suspect DIs using Troubleshooting
       |    a DI procedure.
       |
       |
       V
 6    Check suspect MDI(s) using Troubleshooting a DI procedure.
      For an ICA, see CYBER 930 Computer System Maintenance Guide.
       |
       |
--------------------------------------------------------------------------------
NOTE: If you reset an ICA-II, use the NETOU KILL_SYSTEM command or the reset
      switch on the ICA-II board.  This produces support materials, such as
      a memory dump, that can be analyzed later.
--------------------------------------------------------------------------------
       |
       |
       V
 7    Is MDI (ICA) ok?
       Y     N
       |     |
       |     |
       |     V
 8     |    Take recommended actions and retry normal network communication.
       |
       |
       V
     To A on Sheet 2
```

Figure 5-2. Troubleshooting Ethernet Network Solutions

(Continued)

(Continued)

```
                              Troubleshooting Ethernet Network Solutions Sheet 2

  From A on Sheet 1
       |
       |
       V
 9     Check the following:

       -  Power to DIs and other components (see Troubleshooting DI Power
          Problems)

       -  Time Domain Reflectometer readings (see Testing with a Time
          Domain Reflectometer in chapter 2)

       -  Transceivers, repeaters, multiplexers, and segment cable
          (see Troubleshooting Network Components)

       -  Bad segment cable (shorted, open, no ground, extra ground)

       -  N-connectors (open, shorted)

       -  Terminators (missing, open, shorted)

       -  Is there interference from arc welders, generators, or other
          source of high-energy emissions

       -  If several DIs are failing and connect via a common repeater,
          replace the repeater
```

Figure 5-2. Troubleshooting Ethernet Network Solutions

```
                                                   Troubleshooting X.25 or HDLC
                                                     Network Solutions Sheet 1

1    Check status of NDI on other side of link using DISPLAY_DI_SYSTEM_STATUS
     command or menu selection.
      |
      |
      |              --     -----            -----         ------
      |     Other     |    |     |   X.25   |     |  |    | your |
      |     Network   |----|NDI 2|---  or  ---|NDI 1|---|----|  DI  |
      |              __|    |_____|   HDLC   |_____|  |    |______|
      |                               Link              |    _________
      |                                |                |   |         |
      |                                |                |___|  Your   |
      |                                |                    |  Host   |
      |                             Suspect                 |_________|
      |                             Network
      |
      V
2    Can you connect to NDI on other side of link (NDI 2)?
      N   Y
      |   |
      |   |
      |   V
3     |   Is all status normal for configuration of that NDI and network
      |   (see display status commands in appendix G)?
      |   Y   N
      |   |   |
      |   |   |
      |   |   V
4     |   |   Go to Troubleshooting a DI procedure.
      |   |
      |   |
      |   V
      |   Network solution is ok.
      |
      |
      V
5    Can you connect to the NDI on your side of the link (NDI 1)?
      Y   N
      |   |
      |   |
      |   V
6     |   NDI is not operational.  Go to Troubleshooting a DI Procedure.
      |
      V
Go to A on Sheet 2
```

Figure 5-3. Troubleshooting X.25 or HDLC Network Solutions
(Continued)

(Continued)

```
                                                 Troubleshooting X.25 or HDLC
                                                   Network Solutions Sheet 2

  From A on Sheet 1
      |
      |
      V
 7    Is all status normal for configuration of this NDI and network (see
      display status commands in appendix G).
      Y    N
      |    |
      |    |
      |    V
 8    |    Go to Troubleshooting a DI procedure.
      |
      |
      V
 9    NDI on your side of the link appears to be OK, but run port online test
      (see chapter 6) to check LIM, modems, and phone line if applicable.
      |
      |
-----------------------------------------------------------------------------
NOTE:  If necessary, have someone on the other side of the link perform
       actions on that NDI.
-----------------------------------------------------------------------------
      |
      |
      V
 10   Check out NDI on the other side of link in steps 11 through 19.
      |
      |
      V
 11   Is there an alternative path or host to run onlines on NDI located on other
      side of link?
      Y    N
      |    |
      |    |
      |    V
 12   |    Are any NDI error LEDs on?
      |    N    Y
      |    |    |
      |    |    |
      |    |    V
 13   |    |    Interpret the LEDs and take corrective actions as described in
      |    |    the How to Troubleshoot with Onboard Diagnostics procedure in
      |    |    chapter 7.
      |    |
      |    |
      V    V
   To B and C on Sheet 3
```

Figure 5-3. Troubleshooting X.25 or HDLC Network Solutions
(Continued)

(Continued)

```
                                                    Troubleshooting X.25 or HDLC
                                                      Network Solutions Sheet 3
 From B and C on Sheet 2
     |    |
     |    |
     |    V
14   |   Complete preliminary checklist (table 5-1).  If problem still exists,
     |   proceed with step 15.
     |    |
     |    |
     |    V
15   |   Run onboard diagnostics on NDI.
     |    |
     |    |
     |    V
16   |   Did the NDI pass onboard diagnostics?
     |    Y    N
     |    |    |
     |    |    |
     |    |    V
17   |    |   Take recommended corrective actions, then retry normal network
     |    |   communications over the network solution.
     |    |
     |    |
     |    V
18   |   Check phone or X.25 line.
     |
     |
     V
19   Check NDI per Troubleshooting a DI procedure. If there are no problems,
     check the phone or X.25 line.
```

Figure 5-3. Troubleshooting X.25 or HDLC Network Solutions

Troubleshooting a Device Interface (DI)

Figure 5-4 shows how to troubleshoot a device interface. This procedure assumes that you have completed the Preliminary Troubleshooting procedure. Table 5-1 is a preliminary checklist to complete before performing any other troubleshooting activities on a device interface (the checklist is referred to at the proper point in the procedure).

NOTE

This manual pertains only to device interfaces (DIs), refer to the CYBER 930 Computer System Maintenance Guide for information on troubleshooting an ICA.

Table 5-1. DI Preliminary Checklist

___ 1. Verify that all applicable field change orders are installed (see Verifying FCO Level of Equipment, in chapter 10) and that all boards are at the proper part number level (see Logic Board Interchangeability in chapter 10).

___ 2. Verify that all switch settings are set as shown in chapter 3 (use the site configuration map if it is available).

___ 3. Verify that all boards are in the correct slots and seated properly.

___ 4. Ensure that all internal cables are installed properly.

___ 5. Ensure that all external cables are connected (channel, transceiver, and terminal/modem). Disconnect external LIM cables that do not connect to external devices. Unterminated LIM cables may cause system and diagnostic failures.

___ 6. With the PWR DISCONNECT circuit breaker in the up position, check both cooling fans in back of the DI. If only one is not working, replace the fan assembly. If both fans are not working or the circuit breaker trips, proceed to Troubleshooting DI Power Problems, later in this chapter.

___ 7. Verify that power is applied to all boards by checking the green light-emitting diode (LED) on the front of the DI cabinet (±5 V) and the green LED on the MPB board (±12 V and -5 V). Both LEDs should be On. If either is Off, proceed to Troubleshooting DI Power Problems, later in this chapter.

```
                                              Troubleshooting a DI Sheet 1

1    Complete preliminary troubleshooting procedure.
      |
      |
      V
2    Check status of suspect DI using DISPLAY_DI_SYSTEM_STATUS
     command or menu selection.
      |
      |
      V
3    Can you connect to DI? If you cannot connect, you see
     --ERROR-- SYSTEM XXXXXX IS UNKNOWN message.
      N     Y
      |     |
      |     |
      |     V
4     |    Check date and time of last reset to ensure that DI wasn't in the
      |    process of loading software when problem occurred.  If this was the
      |    problem, retry normal communications with the DI.  Otherwise proceed
      |    with step 5.
      |     |
      |     |
      |     V
5     |    Does status indicate POOR or CONGESTED memory or buffer state?
      |     N     Y
      |     |     |
      |     |     |
      |     |     V
6     |     |    Indicates hardware, software, or configuration problem.  Check
      |     |    hardware by completing this procedure, starting with step 7
      |     |    below. If results do not reveal a problem, ask network analyst
      |     |    or next level of support for assistance.
      |     |
      |     |
      |     V
7     |    Is other status normal for configuration of that DI and network (see
      |    display status commands in appendix G)?
      |     N     Y
      |     |     |
      |     |     |
      |     |     V
8     |     |    DI appears ok. If you still suspect problems, check hardware
      |     |    by completing this procedure, starting with step 9.
      |     |
      |     |
      V     V
    To A and B on Sheet 2
```

Figure 5-4. Troubleshooting a Device Interface

(Continued)

(Continued)

```
                                              Troubleshooting a DI Sheet 2

  From A and B on Sheet 1
        |    |
        |    |
        |    V
 9      |   Are any DI error LEDs on?
        |    N     Y
        |    |     |
        |    |     |
        |    |     V
 10     |    |    Interpret LEDs and take corrective actions described in the How
        |    |    to Troubleshoot with Onboard Diagnostics procedure in chapter 7.
        |    |
        |    |
        |    V
 11     |   Complete preliminary checklist (table 5-1). If problem still exists,
        |   proceed with step 12.
        |    |
        |    |
        |    V
 12     |   Did response indicate a communications line problem (for
        |   example, a line is disabled), or did original problem involve
        |   communications lines (other than X.25 or HDLC)?
        |    N     Y
        |    |     |
        |    |     |
        |    |     V
 13     |    |    Check lines per Troubleshooting Communications Lines procedure.
        |    |    If no problems are found, proceed with next step.
        |    |
        |    |
        |    V
 14     |   Run online diagnostics on the DI.
        |    |
        |    |
        |    V
 15     |   Did DI pass the online diagnostics?
        |    Y     N
        |    |     |
        |    |     |
        |    |     V
 16     |    |    Take recommended corrective actions, then retry normal
        |    |    communications with the DI.
        |    |
        |    |
        V    V
    To C and D on Sheet 3
```

Figure 5-4. Troubleshooting a Device Interface

(Continued)

(Continued)

```
                                                  Troubleshooting a DI Sheet 3
  From C and D on Sheet 2
       |     |
       |     |
       |     V
 17    |    Proceed to step 28.
       |
       |
       V
 18   Does failing DI connect through a multiplexer or repeater?
       N     Y
       |     |
       |     |
       |     V
 19    |    Can you connect to other DIs connected through that multiplexer
       |    or repeater?
       |     Y     N
       |     |     |
       |_____|     |
       |           V
 20    |          Run onboards on failing DI(s)(see chapter 7).
       |           |
       |           |
       |           V
 21    |          Did DI(s) pass onboards?
       |           Y     N
       |           |     |
       |           |     |
       |           |     V
 22    |           |    Take corrective actions per chapter 7.
       |           |
       |           |
       |           V
 23    |          Replace multiplexer or repeater.
       |
       |
       V
 24   Are any DI error LEDs on?
       N     Y
       |     |
       |     |
       |     V
 25    |    Take actions recommended in chapter 7.
       |
       |
       V
 To E on Sheet 4
```

Figure 5-4. Troubleshooting a Device Interface

(Continued)

(Continued)

```
                                                Troubleshooting a DI Sheet 4

 From E on Sheet 3
      |
      |
      V
26    Ensure that DI wasn't in the process of loading software when problem
      occurred.  DISPLAY_DI_SYSTEM_STATUS gives time of last reset and
      subsequent reload.  If this was the problem, retry normal communications
      with the DI.  Otherwise, proceed to step 27.
      |
      |
      V
27    Complete preliminary checklist (table 5-1).  If problem still exists,
      proceed with step 28.
      |
      |
      V
28    Reset DI to run onboard diagnostics (see chapter 7).
      |
      |
      V
29    Did DI pass onboards?
      Y     N
      |     |
      |     |
      |     V
30    |     Take corrective actions per chapter 7.
      |
      |
      V
31    Did resetting DI restore it to normal operation?
      N     Y
      |     |
      |     |
      |     V
32    |     A dump analysis and NPA analysis is needed to determine
      |     cause of original problem (see analyst for assistance).
      |
      |
      V
To F on Sheet 5
```

Figure 5-4. Troubleshooting a Device Interface

(Continued)

(Continued)

```
                                          Troubleshooting a DI Sheet 5

  From F on Sheet 4
       |
       |
       V
 33   Is this an MDI or MTI?
       N     Y
       |     |
       |     |
       |     V
 34    |     Is channel parity for MCI board and host channel enabled?
       |     Y     N
       |     |     |
       |     |     |
       |     |     V
 35    |     |     Enable channel parity and retest.
       |     |     |
       |     |_____|
       |     |
       |     |
       |     V
 36    |     Run host diagnostics to verify channel logic (see maintenance
       |     manual for host). If you do not resolve problem, proceed to
       |     step 37.
       |     |
       |_____|
       |
       |
       V
 37   Run NPA reports and save for next level of support.
```

Figure 5-4. Troubleshooting a Device Interface

Troubleshooting Communications Lines

Figures 5-5 and 5-6 describe how to troubleshoot communications lines. These procedures assume that you have completed the Troubleshooting a DI procedure.

There are two procedures for troubleshooting communications lines:

- Troubleshooting Problems with One Line (figure 5-5)
- Troubleshooting Problems with More Than One Line (figure 5-6)

Use the procedure appropriate for the situation. Also, note that these procedures do not apply to X.25 or HDLC lines. For problems with those types of lines, use the procedures described in Troubleshooting Network Solutions, earlier in this chapter.

```
                                    Troubleshooting Problems with One Line Sheet 1

1.   Perform Troubleshooting a DI procedure before proceeding.
      |
      |
      V
2    Check status of suspect communications line using DISPLAY_LINE_STATUS
     command or menu selection.
      |
      |
      V
3    Did you get a response from the suspect line when you sent the
     DISPLAY_LINE_STATUS command?
      Y     N
      |     |
      |     |
      |     V
4     |    Use DISPLAY_HARDWARE_STATUS command or menu selection to
      |    check element state of associated CIM, LIM, or URI.
      |     |
      |     |
      |     V
5     |    Are devices associated with suspect line in ON state?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
6     |     |    Change their state to ON using CHANGE_ELEMENT_STATE command or
      |     |    menu selection.  Retry normal communications over the line.
      |     |
      |     |
      |     V
7     |    Isolate problem to port, cable, or device as follows:
      |
      |    a. Test port by running online diagnostics on the port using
      |       both internal and external loopback (and modem loopback
      |       if applicable).  If problem still exists, proceed to step b.
      |
      |    b. Test cable by switching cables with another port. If problem
      |       still exists, proceed to step c.
      |
      |    c. Test terminal by switching terminals (if possible).  If problem
      |       still exists, proceed to step 19.
      |
      |
      V
   To A on Sheet 2
```

Figure 5-5. Troubleshooting Problems with One Line

(Continued)

(Continued)

```
                                   Troubleshooting Problems with One Line Sheet 2

 From A on Sheet 1
      |
      |
      V
8     Is line state ACTIVE?
      N     Y
      |     |
      |     |
      |     V
9     |     Line operating OK.  If you still suspect problems with the line,
      |     run online CIM, LIM, and port tests.
      |
      |
      V
10    Is line state ENABLED?
      N     Y
      |     |
      |     |
      |     V
11    |     Line is probably OK and just waiting for connection from other end.
      |     If you suspect problems, check both sides of link.
      |
      |
      V
12    Is line state DISABLED?
      N     Y
      |     |
      |     |
      |     V
13    |     Try to enable line by using the START_LINE command or menu
      |     selection.  If line state changes to ENABLED, retry communications
      |     on the line.  If line cannot be enabled or problem still exists,
      |     proceed to step 14.
      |      |
      |      |
      |      V
14    |     Check hardware status of CIMs and LIMs common to the failing line.
      |      |
      |      |
      V      V
   To B and C on Sheet 3
```

Figure 5-5. Troubleshooting Problems with One Line

(Continued)

(Continued)

```
                                        Troubleshooting Problems with One Line Sheet 3

 From B and C on Sheet 2
      |     |
      |     |
      |     V
15    |    Are devices associated with failing lines in ON state?
      |     Y    N
      |     |    |
      |     |    |
      |     |    V
16    |     |    Set devices to ON state using CHANGE_ELEMENT_STATE command or
      |     |    menu selection, then retry communication over the lines.
      |     |    If problem still exists, proceed to step 19.
      |     |
      |     |
      |     V
17    |    Proceed to step 19.
      |
      |
      V
18    Interpret other status per DISPLAY_LINE_STATUS explanations in appendix G.
      Work with analyst to eliminate any problems and retry normal
      communications over the line. If problems still exist, proceed to
      step 19.
      |
      |
      V
19    Check last NPA reports generated to help isolate the failure.  If you
      cannot determine problem from NPA reports, save the reports for next
      line of support and proceed to step 20.
      |
      |
      V
20    Run online CIM, LIM, and URI tests as appropriate (see chapter 6).
      If you do not find problem, call next level of support.
```

Figure 5-5. Troubleshooting Problems with One Line

```
                     Troubleshooting Problems with More than One Line Sheet 1

 1   Perform Troubleshooting a DI procedure before proceeding.
      |
      |
      V
 2   Check status of suspect communications lines using DISPLAY_LINE_STATUS
     command or menu selection.
      |
      |
      V
 3   Did you get a response from the suspect lines when you sent the display
     line status command?
      N     Y
      |     |
      |     |
      |     V
 4    |    Use DISPLAY_HARDWARE_STATUS command or menu selection to
      |    check element state of associated CIMs and LIMs.
      |     |
      |     |
      |     V
 5    |    Are CIMs and LIMs in ON state?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
 6    |     |    Change their state to ON using CHANGE_ELEMENT_STATE command or
      |     |    menu selection.  Retry normal communications over the line.
      |     |
      |     |
      |     V
 7    |    Is line state ACTIVE?
      |     N     Y
      |     |     |
      |     |     |
      |     |     V
 8    |     |    Lines operating OK.  If you still suspect problems with the
      |     |    line, run online CIM, LIM, and port tests.
      |     |
      |     |
      |     V
   To A and B on Sheet 2
```

Figure 5-6. Troubleshooting Problems with More than One Line

(Continued)

(Continued)

```
                              Troubleshooting Problems with More than one Line Sheet 2

   From A and B on Sheet 1
        |     |
        |     |
        V     V
  9     |    Is line state ENABLED?
        |     N     Y
        |     |     |
        |     |     |
        |     |     V
  10    |     |     Line is probably OK and just waiting for connection from other
        |     |     end.  If you suspect problems with the line, run online CIM,
        |     |     LIM, and port tests.
        |     |
        |     |
        |     V
  11    |    Is line state DISABLED?
        |     N     Y
        |     |     |
        |     |     |
        |     |     V
  12    |     |     Try to enable line by using the START_LINE command or menu
        |     |     selection.  If line state changes to ENABLED, retry communications
        |     |     on the line.  If line cannot be enabled, proceed to step 14.
        |     |
        |     |
        |     V
  13    |    Interpret other status per DISPLAY_LINE_STATUS explanations in
        |    appendix G.  Work with analyst to eliminate any problems and retry
        |    normal communications over the line. If problems still exist, proceed
        |    to step 14.
        |     |
        |_____|
        |
        |
        V
     To C on Sheet 3
```

Figure 5-6. Troubleshooting Problems with More than One Line
(Continued)

(Continued)

```
                         Troubleshooting Problems with More than One Line Sheet 3

 From C on Sheet 2
      |
      |
      V
14    Check hardware status of CIMs and LIMs common to the failing lines.
      |
      |
      V
15    Are devices associated with failing lines in ON state?
      Y     N
      |     |
      |     |
      |     V
16    |     Set devices to ON state using CHANGE_ELEMENT_STATE command or menu
      |     selection, then retry communication over the lines.  If problem still
      |     exists, proceed to step 17.
      |
      |
      V
17    Check last NPA reports generated to help isolate the failure.  If you
      cannot determine problem from NPA reports, save the reports for next
      line of support and proceed to step 18.
      |
      |
      V
18    Are all failing lines on same LIM?
      N     Y
      |     |
      |     |
      |     V
19    |     Run LIM tests as described in chapter 6.
      |     |
      |_____|
      |
      |
      V
20    Run CIM tests on affected CIMs as described in chapter 6.
      If you do not find problem, call next level of support.
```

Figure 5-6. Troubleshooting Problems with More than One Line

Troubleshooting Intermittent Failures

The following guidelines can help to isolate intermittent failures. The steps you take depend on the type of failure.

- For high data-error rate, retransmission (NPA file), or high collision rate (NPA file), check to see if you have YA303 or YA304 Ethernet coaxial cables. If so, check for faulty assembly of the N-connectors. Some of these connectors have been assembled incorrectly (refer to chapter 2 for assembly procedures).

- Be aware of alarms, which can point to developing problems. With NOS, check the alarm history buffer using the DISPLAY_ALARM_HISTORY command (refer to appendix G).

- Run the recommended NPA reports as outlined in chapter 8. If you were generating NPA reports daily, start generating them hourly until the failure is isolated. Have a system analyst help you interpret these reports.

- If you suspect MCI problems, run the MCI inline diagnostic. The hardware performance analyzer (HPA) also provides error information concerning the MCI to channel interface (see NOS or NOS/VE HPA manual).

- If you suspect line problems, try running the online port diagnostics on more than one port at the same time (see How to Run Online Conflict Tests, in chapter 6).

- Use the Dump Analyzer to help determine the error. For example, the DISPLAY_EXECUTIVE_ERROR_TABLE command can give additional information relative to why a DI reset (see CDCNET Network Operations and Analysis manual).

- Display DI system status using CML/VE, CMSI, or the command. DI system status provides general information about the operation of a DI and resource usage in the DI, such as date and time of the the last reload, version of load file used, states of buffers and memory, and CPU usage. Check the buffer state and memory state in the response. A buffer state of POOR or CONGESTED is a likely reason network traffic is not able to move through this DI. A POOR or CONGESTED state could be caused by hardware, software, or configuration problems. If the hardware availability is normal, then a dump analysis is needed to continue troubleshooting (see CDCNET Network Operations and Analysis manual).

- For lost connections or inability to connect, use DISPLAY_DI_SYSTEM_STATUS to check the date and time of the last DI reset (use CML/VE, CMSI, or command). Resetting the DI breaks existing connections and prevents making new connections until after software is reloaded.

Troubleshooting Network Components

The following provides information on testing and troubleshooting transceivers, repeaters, multiplexers, and segment cable.

Testing Transceivers

You can verify transceivers and transceiver cables by transferring data between two DIs. The initial test should be carried out on the transceiver interface cables located at both extremities of the segment cable. After verifying the functionality of the overall network, the test can then be carried out on the remaining transceiver installations.

The TN111B transceiver has LEDs that assist in troubleshooting the network. When power is applied to the transceiver through its associated network device, the LEDs should indicate as follows (figure 5-7).

LED	Indication	Condition
PWR	On	Power is on.
SQE	On Off	SQE is enabled (DIs, ICA, Multiplexer). SQE is disabled (repeater).
XMT	Off	No packets being transmitted.
RCV	Off	No packets being received.
CP	Off	No collisions occurring.

When packets are being transferred, the XMT and RCV LEDs should flash. The CP LED flashes when XMT flashes and when collisions occur on the network.

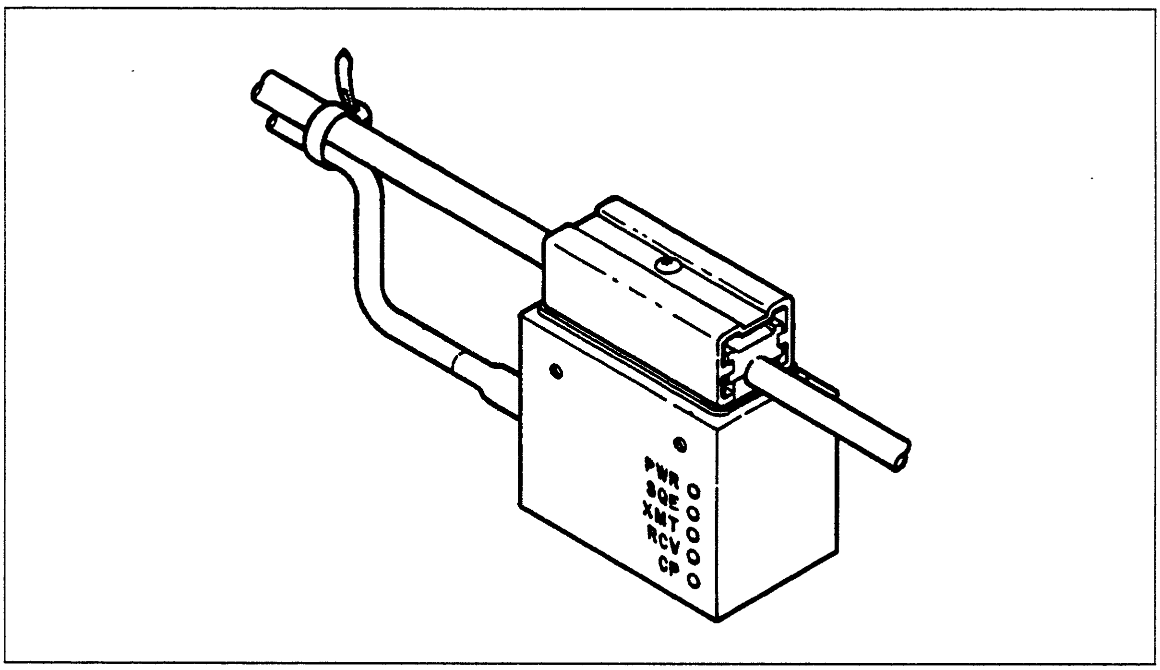


Figure 5-7. Transceiver Indicators

Testing Repeaters

Test a repeater by transferring data packets between DIs on each of the two cable segments that are connected by the repeater under test. Look for the following indications as packets are transferred (figure 5-8).

- PACKET LED on the front panel of the repeater flashes.
- PARTN1 and PARTN2 LEDs do not light. If one of these LEDs does light, there is a problem with the segment cable attached to that port and the port is partitioned from the network. To repair the cable, refer to Verifying Cable and Component Installation in chapter 2 and Replacing Segment Cable in chapter 9.
- SQE LEDs on attached transceivers do not light. If SQE lights, it means SQE is enabled and you must turn it off at the transceiver (refer to transceiver installation procedures in chapter 2). Note that the repeater must connect to a TN111B or other 802.3 transceiver on which SQE can be disabled.

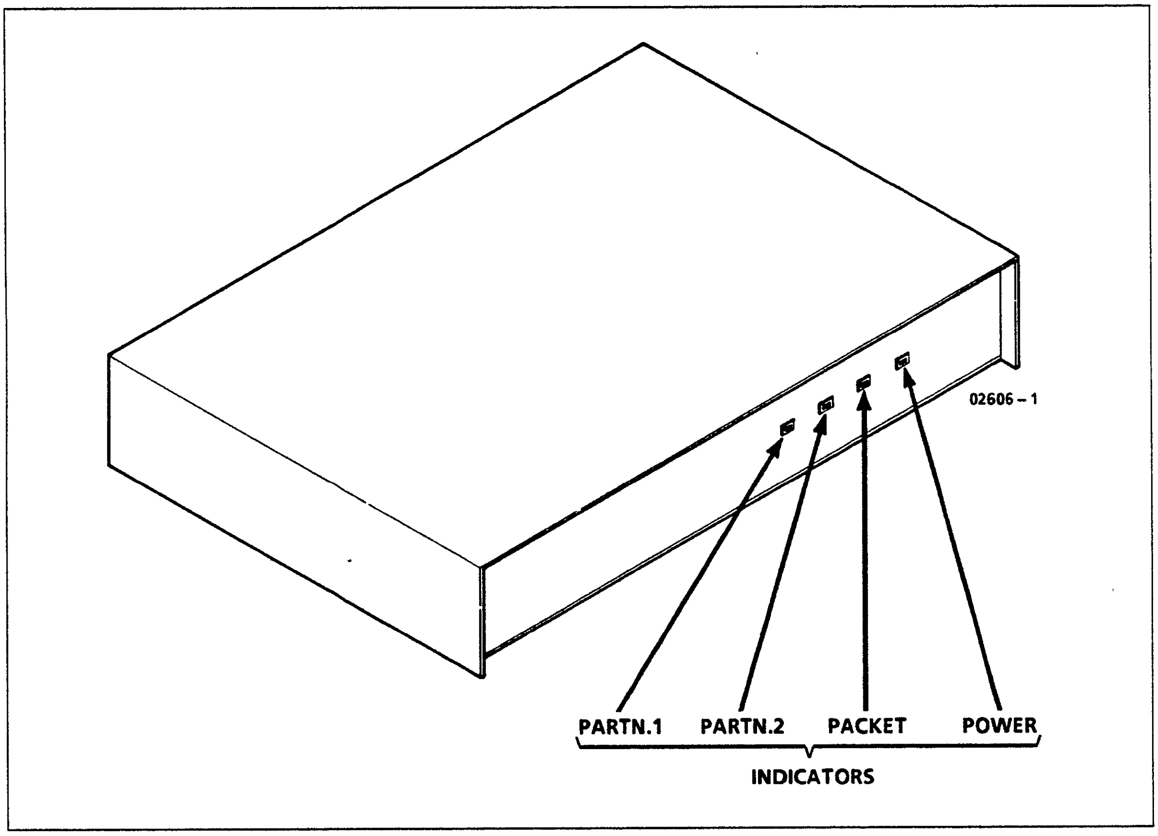


Figure 5-8. Repeater Indicators

Testing Multiplexers

Test multiplexers by connecting one DI to a transceiver on the segment cable and the other to the desired output connector of the multiplexer port to be tested. Transfer packets between the two DIs and look for the following indications as packets are transferred (figure 5-9).

- PACKET LED on the front panel of the multiplexer flashes.
- LOOPBACK LED lights if the multiplexer is configured in a cableless or standalone network.
- SQE LED on the attached transceivers light to show that SQE is enabled at the transceivers. If SQE does not light, you must enable it at the transceiver (refer to transceiver installation procedures in chapter 2).

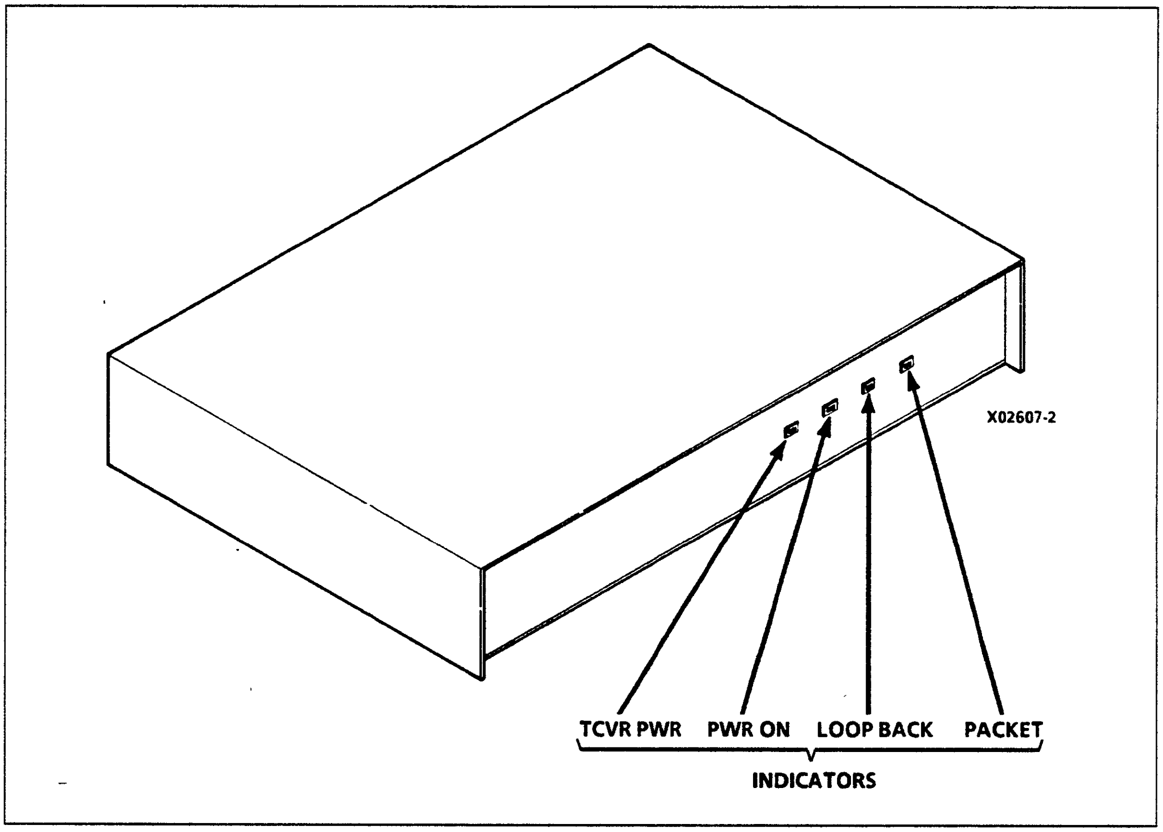


Figure 5-9. Multiplexer Indicators

Testing Segment Cable

The following describes four ways to check the integrity of the segment cable. Consider them in the order given.

- Data transfer check
- Time Domain Reflectometer (TDR) check
- Continuity check
- Visual check

Data Transfer Check

A simple data transfer consists of sending a command between the DIs at opposite ends of the suspect cable (figure 5-10). If there is a response, the cable is probably OK. You can also use the Network Path Verification test described in chapter 6.

TDR Check

If the data transfer is unsuccessful, or you still suspect a problem, try a TDR check (if a TDR is available). Refer to the manufacturers instructions and to chapter 2 of this manual, for information on using a TDR.

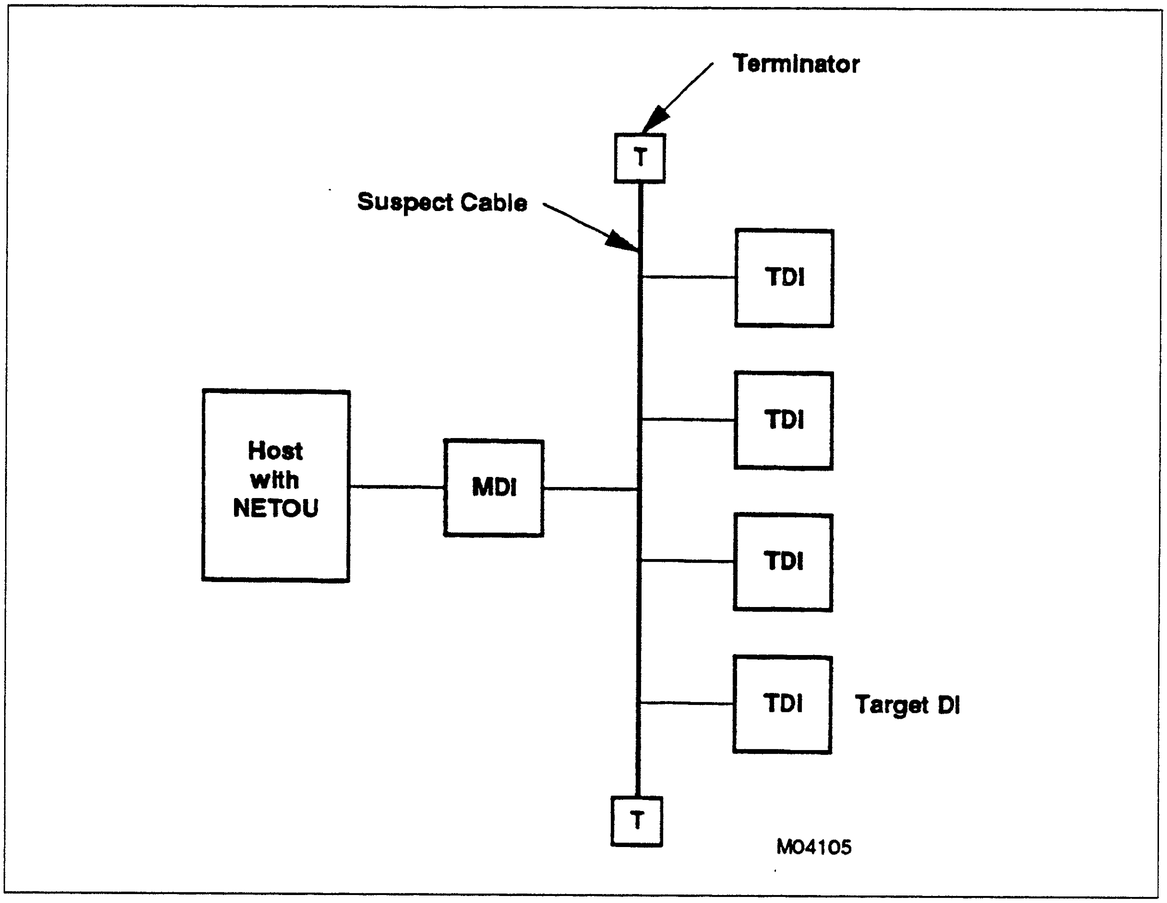


Figure 5-10. Data Transfer Check on Segment Cable

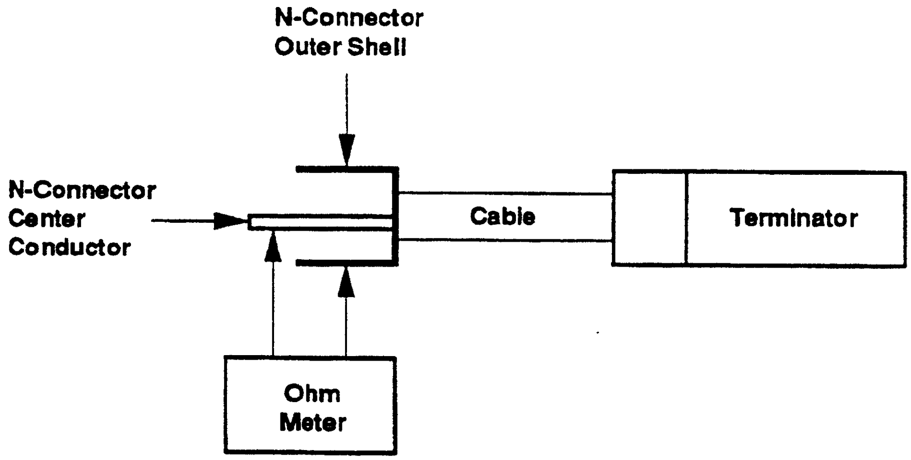
Continuity Check

To perform a continuity check on the segment cable, measure resistance between the center conductor of the cable and ground (or cable shield). The procedure is as follows:

1. Disconnect all transceiver cables from the segment cable to be tested. Unplug them either at the transceiver or DI, whichever is more convenient.
2. Observing all warnings, remove terminator from one end of the cable as described in Replacing N-Connectors procedure in chapter 9.
3. Measure resistance between center pin and shell of N-connector.
4. Interpret reading according to the table in figure 5-11.

Visual Check

During a visual check, inspect the cable for physical damage and also ensure that the cable is routed and installed according to the guidelines given in chapters 1 and 2. For example, if the cable is routed too close to a source of high energy emissions (such as an arc welder), that could be the source of the problem.



Reading	Interpretation
50 Ohms	OK
oo	Open terminator, cable, or N-connector.
0	Short between center conductor and shield. Check terminator, N-connectors, transceiver connections.

M04106

Figure 5-11. Continuity Check on Segment Cable

Troubleshooting DI Power Problems

The following describes how to isolate and correct problems with DI power. Table 5-2 shows where the various voltages are used within the DI. Figure 5-12 shows the location of the voltage checkpoints on the LIM backpanel. Figure 5-13 is a procedure outlining the steps to follow when troubleshooting a power problem.

Table 5-2. DI Power Supply Voltages

Voltage	Specification	Used By
±5 V	±4.82 to ±5.2 V	All boards
-5 V	-4.82 to -5.2 V	RS-449 LIM, V.35 LIM, MCI
±12 V	±11.6 to ±12.5 V	MPB (battery backed RAM, real time clock, serial port), ESCI transceivers, V.35 LIMs, and RS-232 LIMs
-12 V	-11.6 to -12.5 V	MPB serial port, V.35 LIMs, and RS-232 LIMs

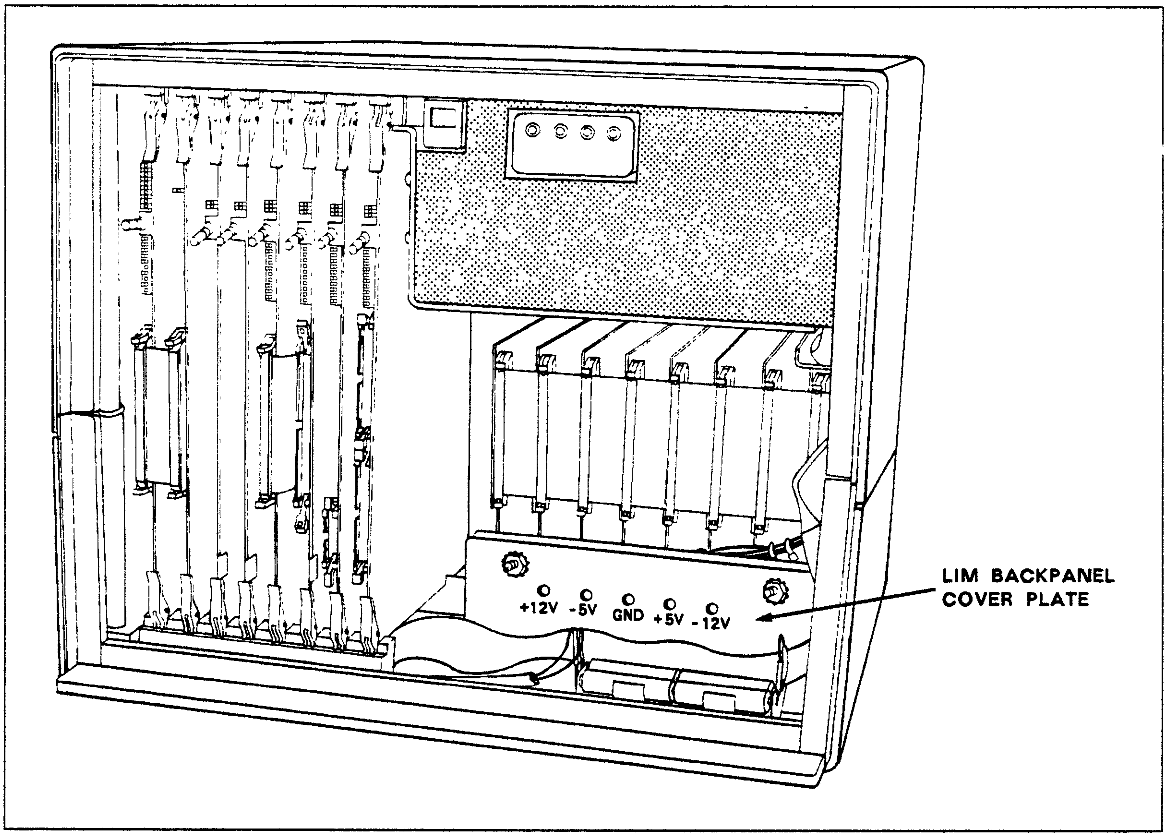


Figure 5-12. LIM Backpanel Voltage Check Points

```
                                   Troubleshooting DI Power Problems Sheet 1

 1    Set PWR DISCONNECT circuit breaker to up (On) position.
       |
       |
       V
 2    Is red LED on DI front panel On?
       N    Y
       |    |
       |    |
       |    V
 3     |    Cabinet temperature exceeds 50° C (a warning message is also sent to
       |    the processor).  When temperature exceeds 55° C, an auxiliary
       |    contact on the PWR DISCONNECT circuit breaker trips to remove power
       |    from DI cabinet.  Proceed to step 4.
       |     |
       |     |
       |     V
 4     |    Does room temperature exceed specifications for DI (see Environmental
       |    (see Specifications of Network Components in chapter 1)?
       |     N    Y
       |     |    |
       |     |    |
       |     |    V
 5     |     |    Correct problem with temperature.
       |     |
       |     |
       |     V
 6     |    Ensure that fans are operating properly and remove any obstructions
       |    to air flow in or around the DI cabinet.
       |
       |
       V
 7    Are green LED on front of DI and green LED on MPB board both On?
       N    Y
       |    |
       |    |
       |    V
       |    Power supply is operating correctly.
       |
       V
 8    Are both fans working?
       Y    N
       |    |
       |    |
       V    V
     To A and B on Sheet 2
```

Figure 5-13. Troubleshooting DI Power Problems

(Continued)

(Continued)

```
                                        Troubleshooting DI Power Problems Sheet 2
 From A and B on Sheet 1
     |   |
     |   |
     |   V
9    |   Does one of the fans work?
     |    N   Y
     |    |   |
     |    |   |
     |    |   V
10   |    |   Replace fan assembly using Replacing Fan Assembly procedure
     |    |   in chapter 9.
     |    |
     |    |
     |    V
11   |   Both fans off can indicate a problem with input power to the DI.
     |   Try another electrical outlet.  If fans still don't work, measure
     |   input voltage.  If voltage is ok, proceed to step 12.
     |    |
     |    |
     |    V
12   |   Replace fan assembly.  If that does not correct the problem, see
     |   Replacing DI Power Supply in chapter 9.
     |
-----------------------------------WARNING------------------------------------
 To avoid electrical shock, use extreme caution when measuring voltages on the
 LIM backpanel.  Current levels on the backpanel are high enough to cause
 severe injury.
------------------------------------------------------------------------------
     |
     V
13   Check voltages at the test points located on the LIM backpanel
     (figure 5-12).
     |
     |
     V
14   Are all voltages within limits specified in table 5-7?
     N    Y
     |    |
     |    |
     |    V
15   |   LED(s) faulty.  If LED on MPB board is bad, replace board and
     |   reenter system identifier using Entering the System Identifier
     |   procedure in chapter 3.  If cabinet front-panel LED is bad, replace
     |   it using Replacing DI Indicator Panel LEDs procedure in chapter 9.
     |
     |
     V
  To C on Sheet 3
```

Figure 5-13. Troubleshooting DI Power Problems

(Continued)

(Continued)

```
                                         Troubleshooting DI Power Problems Sheet 3
From C on Sheet 2
     |
     |
     V
16   Are any voltages too high (table 5-2)?  For example, if -5 V
     measures -5.5 V:
     N     Y
     |     |
     |     |
     |     V
17   |     Is -5 V the high voltage?
     |     N     Y
     |     |     |
     |     |     |
     |     |     V
18   |     |     Refer to table 5-2. If none of the boards in your unit
     |     |     uses -5 V, no action is required.  Otherwise, replace
     |     |     the power supply.
     |     |
     |     |
     |     V
19   |     Replace power supply.
     |
     |
     V
20   Proceed as follows for voltages that are missing or measure lower than
     specifications in table 5-2 (for example if -5 V measures -4.5 V).
     |
     |
     V
21   Set PWR DISCONNECT circuit breaker to 0 (Off) position.
     |
     |
     V
22   Unseat, but do not remove, all boards except the LIMs and recheck
     voltages.
     |
     |
     V
23   Is voltage still missing or low?
     Y     N
     |     |
     |     |
     V     V
   To D and E on Sheet 4
```

Figure 5-13. Troubleshooting DI Power Problems

(Continued)

(Continued)

```
                                        Troubleshooting DI Power Problems Sheet 4
 From D and E on Sheet 3
       |     |
       |     |
       |     V
24     |    One of the unseated boards was holding the voltage down. Reseat
       |    boards one at a time, checking voltage after each board
       |    is inserted.  When voltage drops again, replace the last
       |    board inserted.
       |     |
       |     |
       |     V
25     |    Reenter system identifier as described in Entering the System
       |    Identifier procedure in chapter 3 (this is necessary because
       |    MPB was removed).
       |
       V
26   Reseat all boards.
       |
       |
       V
27   Set PWR DISCONNECT circuit breaker to 0 (Off) position.
       |
----------------------------------WARNING-------------------------------------
  To avoid electrical shock, use extreme caution when measuring voltages on the
  LIM backpanel.  Current levels on the backpanel are high enough to cause
  severe injury.
------------------------------------------------------------------------------
       |
       V
28   Unseat, but do not remove, LIM boards and recheck voltages.
       |
       |
       V
29   Is voltage still low or missing?
       Y     N
       |     |
       |     |
       |     V
30     |    One of the unseated boards was holding the voltage down. Reseat
       |    boards one at a time, checking voltage after each board
       |    is inserted.  When voltage drops again, replace the last
       |    board inserted.
       |
       |
       V
31   Reenter system identifier as described in Entering the  System
     Identifier procedure in chapter 3 (this is necessary because
     MPB was removed.
```

Figure 5-13. Troubleshooting DI Power Problems

Network Troubleshooting Examples

The following examples show how you could troubleshoot typical network problems.

Example 1

Assume users in NET_3 cannot connect to host 1 or 2. However, they can connect to host 3. You could proceed as follows:

	Action	Result
1.	Obtain a map of the network (figure 5-14) from the network administrator and determine what network elements are involved.	Users in NET_3 can connect to host 3 so problem appears to involve the path between NET_3 and hosts 1 and 2. This includes: NDI_6, NET_2, NDI_5, MDIs 1 and 2, and hosts 1 and 2.
2.	Check if any new hardware or software was installed.	No new hardware or software was installed. There were no configuration changes to the network. Users were able to make a connection as of that morning.
3.	Sign on to host 3 via terminal connected to TDI_9.	Sign on is successful.
4.	Check status of NET_2 and link between NET_1 and NET_3 by sending a DISPLAY_DI_SYSTEM_STATUS (expanded) to NDI_5. `senc c='disdss,do=e',s=ndi_5`	Cannot connect. You see the following message: `--ERROR-- System NDI_5 is Unknown`
5.	Check NET_3 side of link by sending a DISPLAY_DI_SYSTEM_STATUS (expanded) to NDI_6. `senc c='disdss,do=e',s=ndi_6`	Buffer and memory state are good. Associated CIM and LIM are ON. The port is ENABLED, indicating a connection has not been made. This is normal, considering you were unable to make a connection to NDI_5.
6.	Run online port test on the related port on NDI_6, as an additional check of the LIM, port, and modem.	No errors. NDI_6 and its associated modem appear to be ok.

(Continued)

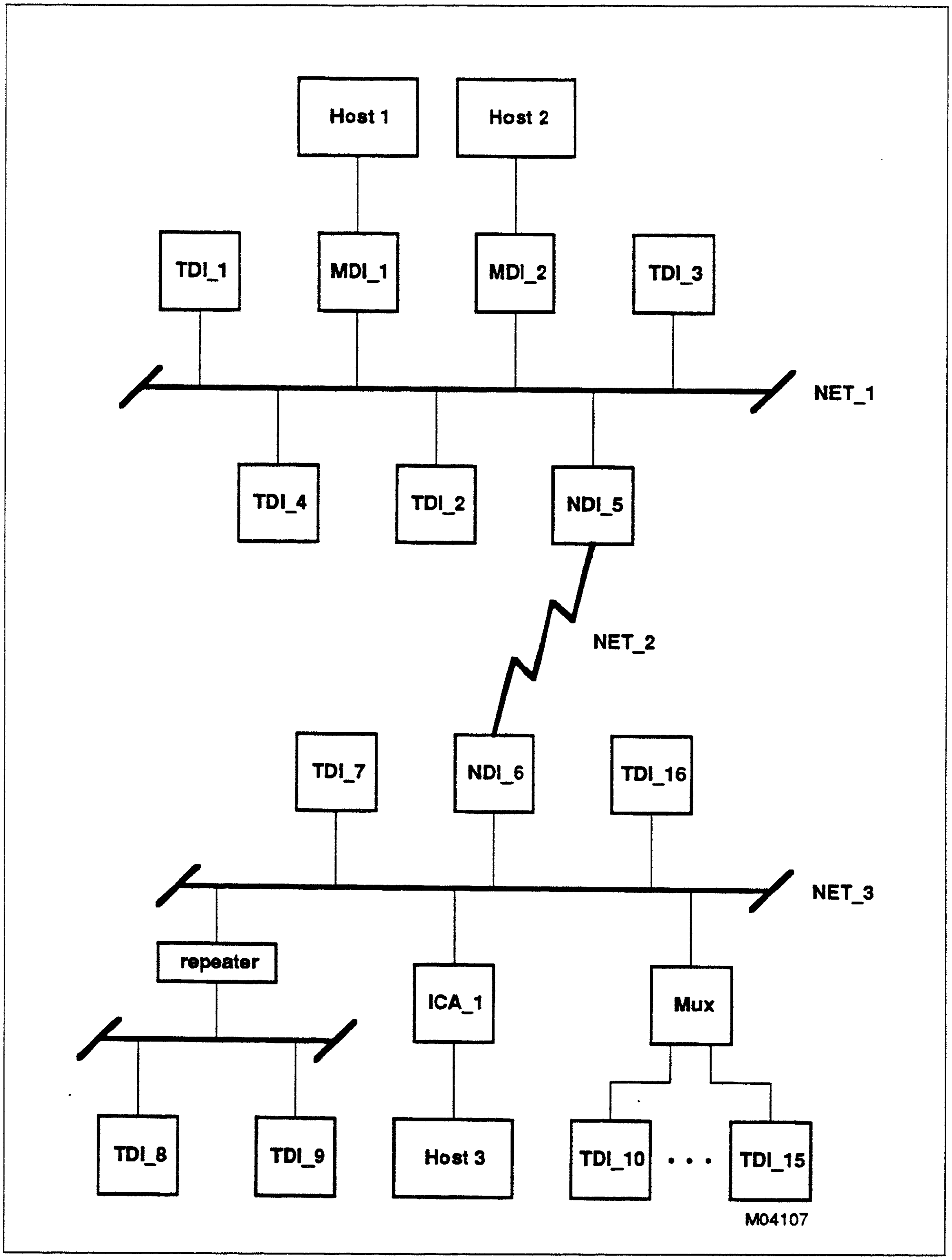


Figure 5-14. Network Troubleshooting Example 1

	Action	Result
	NOTE Someone at the other site may have to perform steps 7 through 12.	
7.	Attempt to sign on to one of the hosts in NET_1 from a TDI in that network, and perform the following steps.	Sign on is successful. This indicates that NET_1 is operational and points to a problem with NDI_5, modem, or line.
8.	Perform Troubleshooting a DI procedure and start checking NDI_5 by sending it DISPLAY_DI_SYSTEM_STATUS (expanded). `senc c='disdss,do=e',s=ndi_5`	Associated CIM is On but LIM is DOWN indicating it is not operational (it may have failed onboards following a reset).
9.	Perform a preliminary check of the NDI to try and find a cause for the disabled line. Start by checking the error LEDs and completing the preliminary checklist.	Preliminary checklist turns up no problems, but LIM error LED is On. This points to a problem with the LIM.
10.	Replace LIM using Replacing LIM/URI Boards procedure in chapter 9 and initiate onboard tests.	No errors detected.
11.	Run online port test as an additional check of LIM, port, and modem.	No errors detected.
12.	Have operator retry normal communications over the line.	Successful. Problem solved.

Example 2

Assume that users in both NET_1 and NET_2 are unable to connect to host 1 (figure 5-15). However, they can connect to host 2.

	Action	Result
1.	Obtain a map of the network (figure 5-15) from the network administrator and determine what network elements are involved.	Host 1 attaches to both NET_1 and NET_2. Because users on neither network are able to make a connection to host 1, the problem appears to be with either that host or its MDI.
2.	Check if any new hardware or software was installed.	No new hardware or software was installed. There were no configuration changes to the network. Users were able to make a connection as of that morning.
3.	Sign on to host 2 via terminal connected to TDI_3.	Sign on is successful.
4.	Proceed to Troubleshooting a DI procedure and start checking MDI_1 by sending it a DISPLAY_DI_SYSTEM_STATUS (expanded). `senc c='disdss,do=e',s=mdi_1`	No response. You see the following message: `--ERROR-- System MDI_1 is Unknown`
5.	Check the error LEDs on MDI_1 and complete the preliminary checklist (table 5-1).	Error LEDs indicate that the initialization stage failed, but do not indicate a specific board. The preliminary checklist turns up no problems.
6.	Reset MDI_1 to initiate onboard diagnostics.	MDI_1 doesn't load and indications are same as in step 5. All boot switch settings and cables are correct (checked in step 5. This points to a possible mainframe or configuration problem. Call analyst or next level of support.

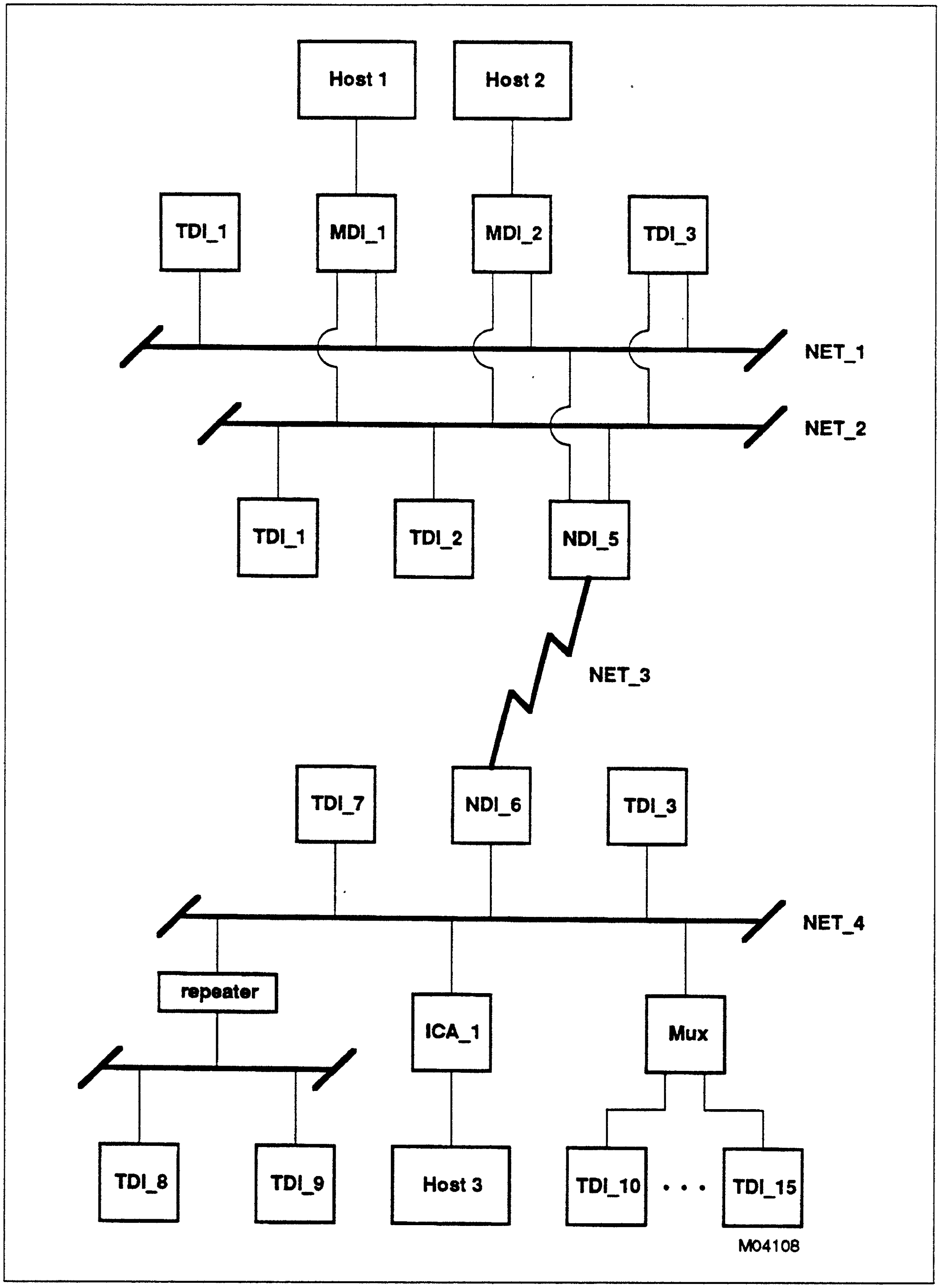


Figure 5-15. Network Troubleshooting Example 2

Example 3

Assume that users on TDI_3 are unable to connect to host 1 (figure 5-16), although they can connect to host 2. Other TDIs are able to connect to host 1.

	Action	Result
1.	Obtain a map of the network (figure 5-16) from the network administrator and determine what network elements are involved.	TDI_3 attaches to both NET_1 and NET_2. Other NET_1 users can connect to host 1, so the problem seems to involve TDI_3 and its ESCI board for NET_1.
2.	Check if any new hardware or software was installed.	No new hardware or software was installed. There were no configuration changes to the network. Users were able to make a connection as of that morning.
3.	Sign on to host 2 via terminal connected to TDI_3.	Sign on is successful.
4.	Proceed to Troubleshooting a DI procedure and start checking TDI_3 by sending it a DISPLAY_DI_SYSTEM_STATUS (expanded). `senc c='disdss,do=e',s=tdi_3`	NET_1 is enabled (per this DI). ESCI attaching to NET_1 is DOWN. This is abnormal status because both NET_1 and its ESCI should be active.
5.	Check the error LEDs on TDI_3 and complete the preliminary checklist (table 5-1).	Error LED on ESCI board is On. Recommended action is to replace ESCI board.
6.	Replace ESCI using the procedure in chapter 9 and initiate onboard tests.	No errors detected.
7.	Run the ESCI online diagnostic on the TDI_3 ESCI that attaches to NET_1.	No errors detected.
8.	Retry normal communications.	Successful. Problem solved.

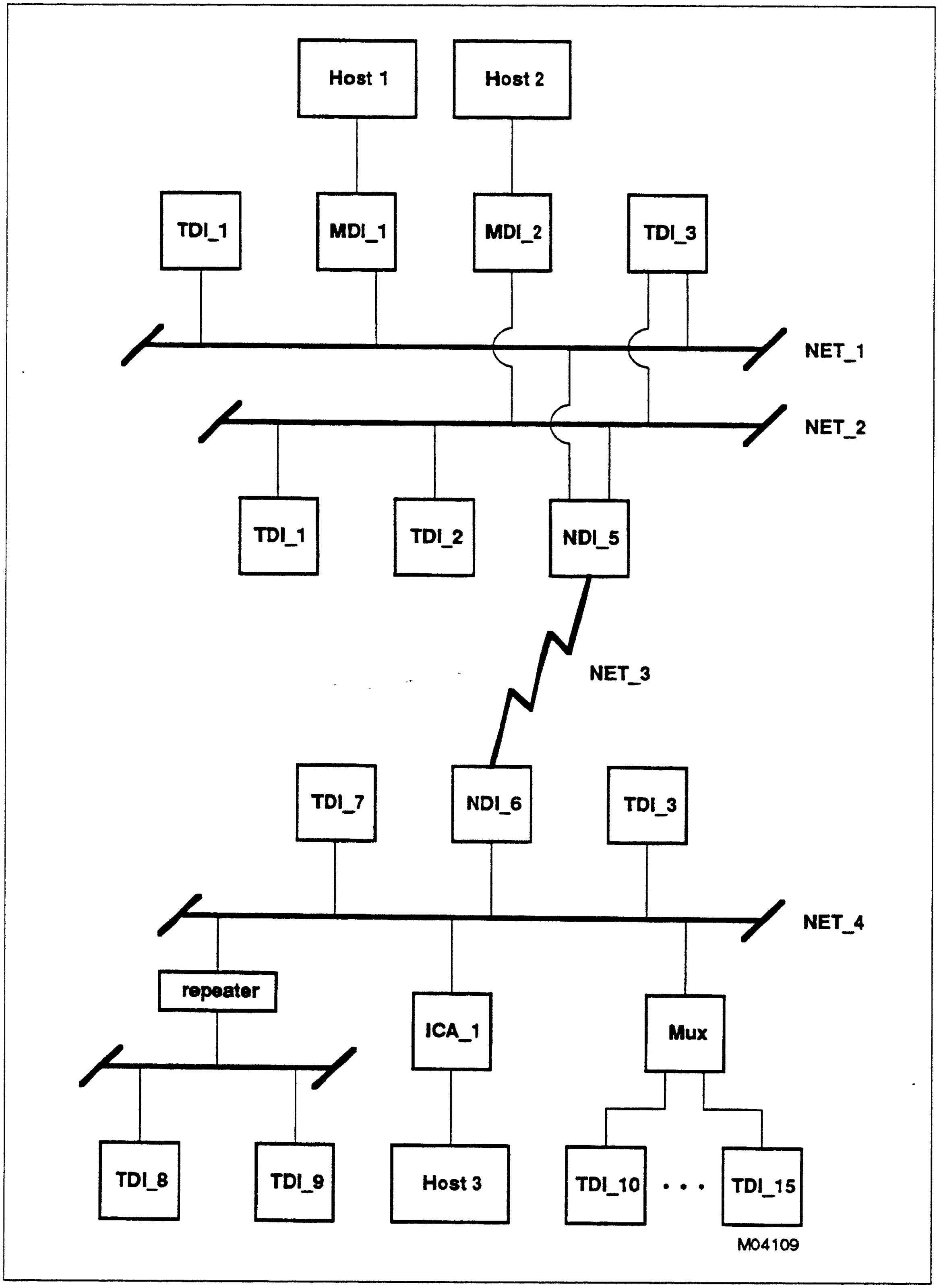


Figure 5-16. Network Troubleshooting Example 3

Example 4

Assume that users on TDI_8 cannot connect to host 3 (figure 5-17).

	Action	Result
1.	Obtain a map of the network (figure 5-17) from the network administrator and determine what network elements are involved.	TDT_8 and TDI_9 connect to the network via a repeater (figure 5-17).
2.	Check if any new hardware or software was installed.	No new hardware or software was installed. There were no configuration changes to the network. Users were able to make a connection as of that morning.
3.	Sign on to host 3 via terminal connected to TDI_7.	Sign on is successful.
4.	Proceed to Troubleshooting a DI procedure and check TDI_8 by sending it a DISPLAY_DI_SYSTEM_STATUS (expanded). `senc c='disdss,do=e',s=tdi_8`	No response. You see the following message `--ERROR-- System TDI_8 is Unknown`
5.	Check TDI_9, which also connects through the repeater, by sending it a DISPLAY_DI_SYSTEM_STATUS (expanded). `senc c='disdss,do=e',s=tdi_9`	No response. You see the following message `--ERROR-- System TDI_9 is Unknown`
6.	Reset TDI_8 and TDI_9 to initiate onboard diagnostics.	No errors detected. This points to the repeater as the failing component.
7.	Replace the repeater using procedure in chapter 9, and retry normal communications on the system.	Successful. Problem solved.

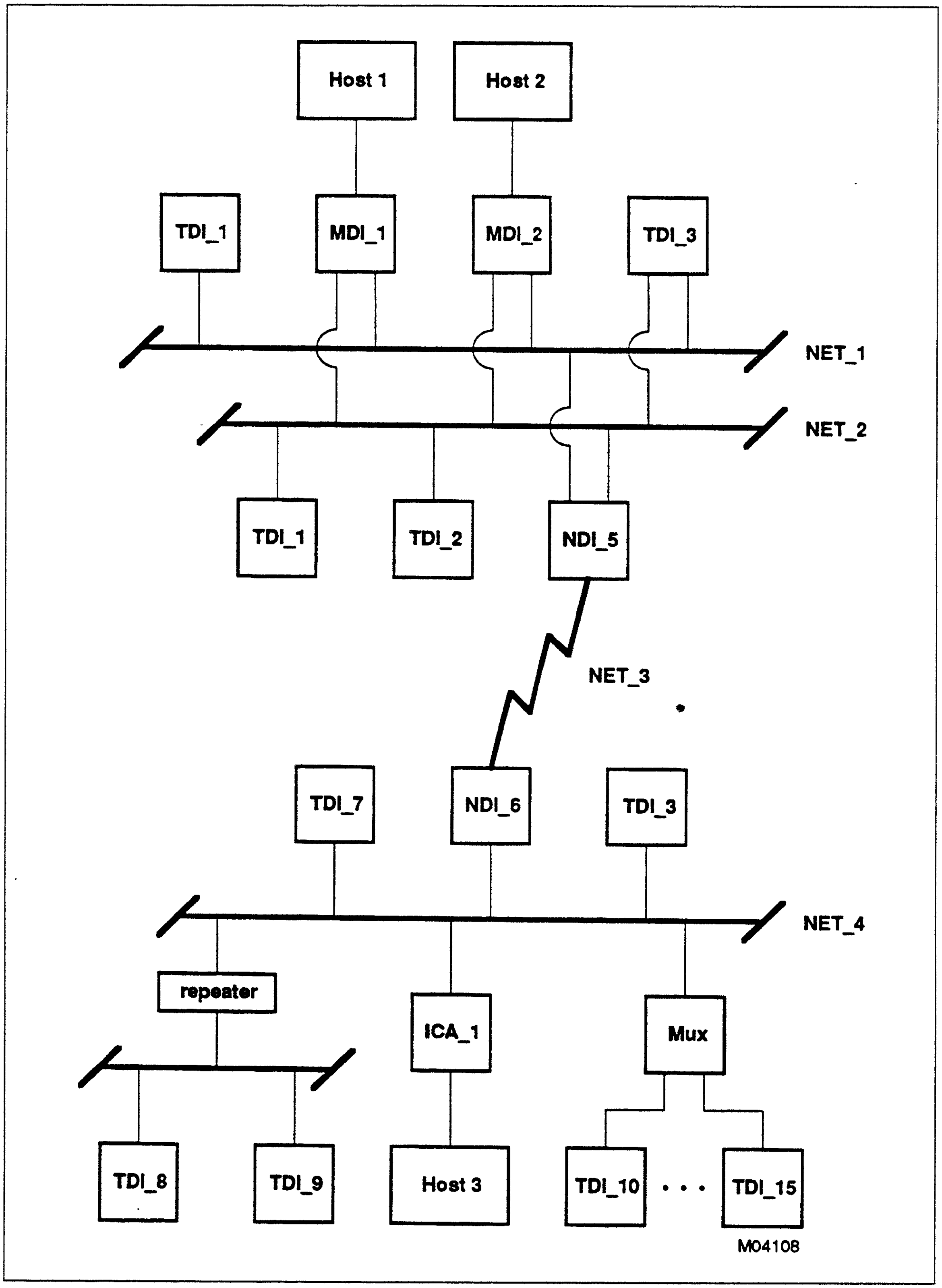


Figure 5-17. Network Troubleshooting Example 4

How to Run Online and Inline Tests 6

How to Run Online and Inline Tests 6

This chapter explains how to use the online diagnostic tests to troubleshoot the network. The MCI inline test and several miscellaneous tests and procedures are also included. The following topics are covered:

- How to use the information in this chapter
- How to display test results as alarm messages
- How to run the CIM online test
- How to run the LIM online test
- How to run the port online test
- How to run the URI online test
- How to run the ESCI online test
- How to run the MCI online test
- How to run the MCI inline test
- How to run the network path verification inline tests
- Miscellaneous online tests and procedures

Each test description in this chapter is organized as follows:

- Introduction - Brief description of the test and what it does.
- Test notes - Information pertinent to the test procedure. Read this information before running the test.
- Test procedure - Step by step description of the test procedure.
- CML/VE menus - Shows most frequently used menu choices if you are using CML/VE.
- CMSI menus - Shows most frequently used menu choices if you are using CMSI.
- NETOU command summary - List of most frequently used commands if you are using NETOU.
- Example test - Shows how the commands and menu selections could be used in a typical situation.
- Command responses - Lists the responses to expect after initiating a test.
- Test status responses - Lists the responses to expect from a display test status menu selection (or command).

How to Use the Information in This Chapter

The steps below describe how to make the best use of the information in this chapter.

CAUTION

To prevent possible loss of customer data, notify all users before taking any actions that affect the operation of the network. Be sure to include users on the other side of HDLC and X.25 lines.

1. Familiarize yourself with how to use CML/VE, CMSI, or NETOU command mode, whichever is appropriate for your system.
2. Enable alarms, if desired, by following instructions under How to Display Test Results as Alarm Messages.
3. Read the test notes table (table 6-1) before starting the test. This table contains information necessary to do the test properly.
4. Perform the test as described in the test procedure. Use the appropriate menu or command summary. These summaries appear immediately after the procedure and provide a quick reference for the menu selections or commands used during the test.
5. Interpret response to the command that starts the test by referring to the command response table.
6. Check test completion status and interpret the response by referring to the test status response table. Take corrective actions as recommended in the table, then retest the unit to ensure it is working properly.
7. Use procedures in chapter 9 to replace parts. Chapter 10 has part numbers.
8. If you cannot solve the problem, save all information (NPA reports and so on) and call the next level of support.

Also remember, the procedures here will enable you to correct most problems. But some situations may require you to use variations of these methods. For example, you may have to change test parameters from those used by CML/VE and CMSI, or use menu choices not covered in this chapter. Chapter 4 of this manual provides more information on CML/VE, CMSI, and NETOU. For more advanced troubleshooting activities, refer to the CDCNET Network Operations and Analysis manual.

How to Display Test Results as Alarm Messages

The procedures in this chapter use the DISPLAY_TEST_STATUS command or the equivalent menu option to display results from diagnostics tests. However, you can also display the results as alarms at your terminal. This is done by setting the diagnostic command logging parameter to On and defining the appropriate log messages as alarms. The logging parameter is always On with CML/VE and CMSI, and defaults to On in command mode (unless you turn it OFF by changing the parameter). Assuming that logging is On, define the alarm messages as follows:

1. Define the appropriate log messages as alarms. Use DEFINE_SOURCE_ALARM_MESSAGE command (see appendix G) or the equivalent CML/VE or CMSI menu option. To get a description of the messages, enter NPA and use the EXPLAIN_CDCNET_LOG_MESSAGES command (see appendix G).

   - If you are running online diagnostics, ensure that log messages 346 through 350, message 352, and message 673 are defined as alarms (these are the standard default alarms).

   - If you are running the MCI inline diagnostic, define log messages 585 through 592 as alarms.

2. Activate the alarm messages so they will be displayed at your terminal. Use the ACTIVATE_ALARMS command (see appendix G) or CML/VE menu option.

3. Use the EXPLAIN_CDCNET_LOG_MESSAGES command (see appendix G to determine recommended actions if you receive an alarm.

4. Cancel the alarms, when you are through troubleshooting, by using CANCEL_SOURCE_ALARM_MESSAGE command (see appendix G) or the equivalent CML/VE or CMSI menu option.

How to Run the CIM Online Test

Use this diagnostic if you have problems with more than one LIM or URI board connected to the same CIM. The CIM test checks the following:

- CIM board
- CIM to MPB interface
- CIM to SMM interface
- LIMS and URIs associated with this CIM. The LIM and URIs are tested in the internal loopback mode.

The remainder of this topic explains how to use the CIM test and interpret its results.

CIM Test Notes

Table 6-1 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-1. CIM Test Notes

1. If CIM is used as a boot source, ensure that FCO CD17983 is installed before proceeding (see Verifying FCO Level of Equipment, in chapter 10).
2. Certain LIM failures (for example, LIM interrupt daisy-chain failures) can only be detected by running LIM port conflict tests. If you do not detect any errors while running the CIM, LIM, or port tests, or if the customer reports problems on more than one LIM, run the conflict tests on all available LIM ports (see How to Run Online Conflict Tests, later in this chapter).
3. CML/VE and CMSI CIM test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.
   - Success State = ON
   - Logging = ON
   - Stop on Error = ON
   - Repeat Pass = 1
4. If you replace a board, the onboard diagnostics run automatically after you power on the DI. Refer to chapter 7 to isolate failures that occur during the onboard tests.

CIM Test Procedure

Figure 6-1 outlines the CIM test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                                   CIM Test Sheet 1
1    Read CIM test notes (table 6-1) before proceeding.
      |
      |
      V
2    Disconnect any LIM cables not connected to an external device. Unused
     LIM cables attached to a port can cause diagnostics to fail.
      |
      |
      V
3    Log in to CML/VE, CMSI, or NETOU.
      |
      |
      V
4    If you are on NOS, select a command MDI.
      |
      |
      V
5    Select target DI.
      |
      |
      V
6    Stop all lines and trunks connected to this CIM.

      - Use STOP_NETWORK for HDLC trunks.

      - Use STOP_X25_INTERFACE for X.25 trunks.

      - Use STOP_LINE for all other communications lines.

      |
      |
      V
7    Change CIM element state to DOWN.
      |
      |
      V
8    Start CIM test.
      |
      |
      V
   Go to A on Sheet 2
```

Figure 6-1. CIM Online Test Procedure

(Continued)

(Continued)

```
                                                         CIM Test Sheet 2
  From A on Sheet 1
       |
       |
       V
 9     Does response indicate test started (table 6-1)?
       Y    N
       |    |
       |    |
       |    V
10     |    Was there a response?
       |    Y    N
       |    |    |
       |    |    |
       |    |    V
11     |    |    Run onboard tests (see chapter 7).
       |    |
       |    |
       |    V
12     |    Take action per command response table (table 6-2).
       |    |
       |    |
       |    V
13     |    Rerun CIM test to verify.
       |
       |
       V
14     Check results using DISPLAY_TEST_STATUS. Repeat command as necessary until
       you get a test complete status (table 6-2).
       |
       |
       V
15     Does response indicate test passed?
       N    Y
       |    |
       |    |
       |    V
16     |    CIM ok.  Run port and URI tests (described later in this chapter)
       |    as appropriate.  Use external loopback mode.
       |
       |
       V
17     Perform actions recommended in test status response table (table 6-3).
       |
       |
       V
    Go to B on Sheet 3
```

Figure 6-1. CIM Online Test Procedure

(Continued)

(Continued)

```
                                                                CIM Test Sheet 3
    From B on Sheet 2
      |
      |
      V
18   Rerun test to verify.
      |
      |
      V
19   Problem corrected?
      Y     N
      |     |
      |     |
      |     V
20    |    Run onboard tests (see chapter 7).
      |     |
      |     |
      |     V
21    |    Problem corrected?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
22    |     |    Run NPA and DI hardware status reports.  Save for next level
      |     |    of support.
      |     |
      |_____|
      |
      |
      V
23   Return DI to normal operation as follows:

      - Change CIM element state to ON (assumes test failed).

      - Restart communications over lines or trunks that were stopped.

           Use START_NETWORK for HDLC trunks.

           Use START_X25_INTERFACE for X.25 trunks.

           Use START_LINE for all other communications lines.
```

Figure 6-1. CIM Online Test Procedure

CML/VE Menu Summary for CIM Online Test

The following shows the CML/VE menu choices necessary to run the CIM online test. Each menu choice is shown on figure 6-2 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the CIM test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (CIM).
2 [2]	Stop all lines on CIM.
3	Change CIM element state to DOWN.
4	Start test (see table 6-2 for command response).
5	Display status of test (see table 6-3 for responses).
	Stop test early if desired.[3]

After testing, restore CIM to normal operation as follows:

6	Put CIM in ON state (assumes test failed).
7	Restart all lines and trunks.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-2.
2. If any HDLC or X.25 trunks connect to this CIM you must also stop them before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart the HDLC and START_X25_INTERFACE to restart the X.25 trunk.
3. Use the STOP_CIM_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                              ---------------------
                              CML_700 - CDCNET MENU
                              ---------------------
                              1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
                              2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
                   ___________[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES
                   |        __[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
                   |        |  5. VIEW CDCNET STATUS DISPLAYS.
                   |        |  6. MANAGE MESSAGE LOGGING AND ALARMS
                   |        |  7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
                   |        |     CDCNET SYSTEM DI.
                   |        |_____________________________________________
                   |                                                      |
                   |                                                      |
  ------------------------------------                  ---------------------------------
  CML_730 - CDCNET NAMES SELECTION MENU                 CML_740 - CDCNET DIAGNOSTICS MENU
  ------------------------------------                  ---------------------------------
[1]1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.            1.  SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
   2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.       [4]2.  RUN CIM TEST.
   3.  STOP A LINE.                                        3.  RUN ESCI TEST.
[7]4.  START A LINE.                                       4.  RUN LIM TEST.
[6]5.  CHANGE ELEMENT STATE TO ON.                         5.  RUN MCI INLINE TEST.
[3]6.  CHANGE ELEMENT STATE TO DOWN.                       6.  RUN MCI ONLINE TEST.
   7.  CHANGE ELEMENT STATE TO OFF.                        7.  RUN PORT TEST (INTERNAL LOOPBACK).
   8.  CANCEL A LINE.                                      8.  RUN PORT TEST (EXT MODEM LOOPBACK).
   9.  DEFINE A LINE.                                      9.  RUN URI TEST.
   10. STOP A NETWORK.                                     10. PERFORM DI CONFLICT TESTING.
   11. START A NETWORK.                                    11  PERFORM LIM/PORT CONFLICT TESTING
   12. STOP_NP INTERFACE.                                  12. RUN NETWORK PATH VERIFICATION TEST.
   13. START_NP INTERFACE.                                 13. EXECUTE A TERMINAL/LINE ECHO TEST.
 __14. MANAGE MULTIPLE LINES.                              14  PERFORM INTELLIGENT MODEM TEST
|  15. DISPLAY_HARDWARE_STATUS.                            15  SEND TEST FILE TO PUBLIC PRINTER
|                                                          16  SEND TEST FILE TO PRIVATE PRINTER.
|                                                          17. SEND COMMANDS TO INTELLIGENT MODEM
|                                                          18. SEND MESSAGE TO TERMINAL /LIM PORT.
|_______________                                           19. MANAGE CDCNET ELEMENT STATES.
                |                                       [5]20. VIEW CDCNET STATUS DISPLAYS
                |
  ---------------------------------------------
  CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
  ---------------------------------------------
   1.  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
   2.  STOP ALL LINES EXCEPT ACTIVE LINES
   3.  DOWN ALL STOPPED, CONFIGURED, AND
       UNCONFIGURED LINES.
   4.  STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
[2]5.  STOP AND DOWN ALL LINES (WARNING, THIS
       INCLUDES LINES CURRENTLY IN USE).
   6.  SET ALL PORTS TO ON STATE.
   7.  SET ALL LIMS TO DOWN STATE.
   8.  SET ALL LIMS TO ON STATE.
   9.  DISPLAY_HARDWARE_STATUS.
```

Figure 6-2. CML/VE Menus for CIM Online Test

CMSI Menu Summary for CIM Online Test

The following shows the sequence of actions necessary to run the CIM online test. Each menu choice is shown on figure 6-3 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the CIM test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2 [2]	Stop all lines on CIM (must repeat for each line).
3	Change CIM element state to DOWN.
4	Start test (see table 6-2 for command response).
5	Display status of test (see table 6-3 for responses).
	Stop test early if desired.[3]

After testing, restore CIM to normal operation as follows:

6	Put CIM in ON state (assumes test failed).
7	Restart all lines.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-3.

2. If any HDLC or X.25 trunks connect to this CIM you must also stop them before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart the HDLC and START_X25_INTERFACE to restart the X.25 trunk.

3. Use the STOP_CIM_TEST command to stop the test. CMSI does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
----------------------------
CMSI - CDCNET MENU - CMSI260
----------------------------
 1. EXECUTE NETOU IN EXPERT MODE
[2. SELECT A DI TO USE
[3. MANAGE NETWORK,DEVICE, AND LINE STATES
[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
 5. VIEW CDCNET STATUS DISPLAYS
 6. MANAGE MESSAGE LOGGING AND ALARMS
 9. -----RETURN TO PREVIOUS CMSI MENU
```

```
-------------------------------------------
CMSI - CDCNET ELEMENT SELECTIONS - CMSI262
-------------------------------------------
   1. DISPLAY AVAILABLE DI NAMES
[1]2. SELECT A COMMAND MDI AND A TARGET DI FOR
      CDCNET ACTIVITIES
   3. DISPLAY CURRENTLY SELECTED COMMAND AND
      TARGET DI NAMES
   9  -----RETURN TO PREVIOUS CMSI MENU
```

```
-----------------------------------
CMSI - CDCNET DIAGNOSTICS - CMSI264
-----------------------------------
    1. SELECT A DI TO USE
[4] 2. RUN CIM TEST
    3. RUN ESCI TEST
    4. RUN LIM TEST
    5. RUN MCI INLINE TEST
    6. RUN MCI ONLINE TEST
    7. RUN PORT TEST (INTERNAL LOOPBACK)
    8. RUN PORT TEST (EXTERNAL/ MODEM LOOPBACK)
    9. RUN URI TEST
   10. MORE CDCNET DIAGNOSTICS
[5]11. DISPLAY TEST STATUS
   12. DISPLAY HARDWARE STATUS
   13. -----RETURN TO PREVIOUS CMSI MENU
```

```
----------------------------------------------
CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263
----------------------------------------------
    1. SELECT A DI TO USE
[2] 2. STOP A LINE
[7] 3. START A LINE
    4. CANCEL A LINE
    5. DEFINE A LINE
[6] 6. CHANGE ELEMENT STATE TO ON
[3] 7. CHANGE ELEMENT STATE TO DOWN
    8. CHANGE ELEMENT STATE TO OFF
    9. MANAGE MULTIPLE LINES
---[10. MANAGE NETWORKS
   11. DISPLAY HARDWARE STATUS
   12. DISPLAY LINE STATUS (SUMMARY)
   13. -----RETURN TO PREVIOUS CMSI MENU
```

```
---------------------------------------
CMSI - CDCNET MANAGE NETWORKS - CMSI2630
---------------------------------------
 1. SELECT A DI TO USE
 2. STOP A NETWORK
 3. START A NETWORK
 4. STOP NP INTERFACE
 5. START NP INTERFACE
 6. DISPLAY NETWORK STATUS
 9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-3. CMSI Menus for CIM Online Test

NETOU Command Summary for CIM Online Test

The following shows the sequence of commands necessary to run the CIM online test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the CIM test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_LINE (STOL)[2] Stop communications on the lines (repeat command for each line on the CIM).	`senc c='stol ln=line01',s=tdi_1`
2.	CHANGE_ELEMENT_STATE (CHAES) Put CIM in DOWN state.	`senc c='chaes dn=$cim7,s=down'`
3.	START_CIM_TEST (STACT) Start test (see table 6-2 for command responses).	`senc c='stact dn=$cim7 rp=10'`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-3 for responses).	`senc c='dists dn=$cim7'`
5.	STOP_CIM_TEST (STOCT) Stop test early if desired.	`senc c='stoct dn=$cim7'`

After testing, restore CIM to normal operation as follows:

	Command and Description	Example
6.	CHANGE_ELEMENT_STATE (CHAES) Put CIM in ON state (assumes test failed).	`senc c='chaes dn=$cim7,s=on'`
7.	START_LINE (STAL) Restart lines (repeat once for each line on the CIM).	`senc c='stal ln=line01'`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

2. If any HDLC or X.25 trunks connect to this CIM you must also stop them before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart the HDLC and START_X25_INTERFACE to restart the X.25 trunk.

CIM Test Example

Figure 6-4 shows a possible network configuration. To test the CIM in figure 6-4, you could use the commands given in the previous topic, NETOU Command Summary for CIM Online Test. You could also use the equivalent CML/VE or CMSI menu selections.

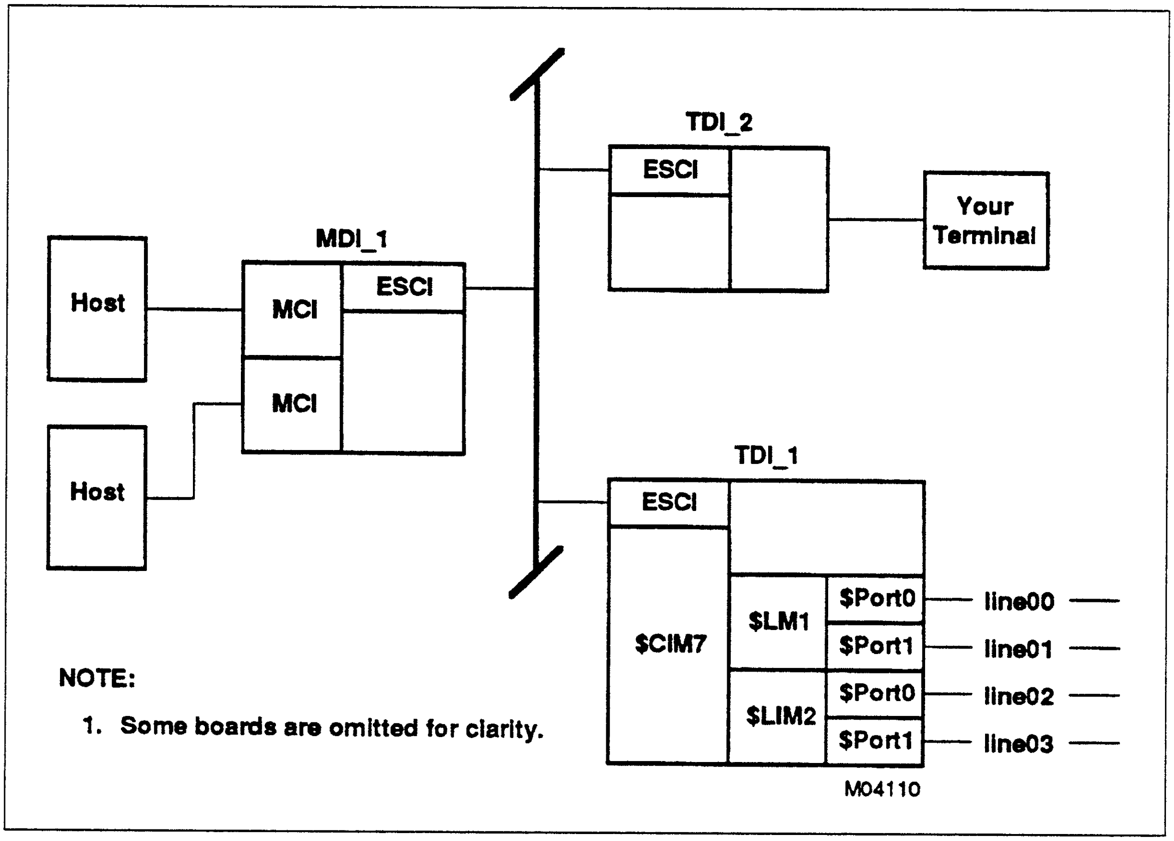


Figure 6-4. Example Network for CIM Test

Responses for START_CIM_TEST Command or Menu Selection

Table 6-2 lists the responses to expect after initiating a START_CIM_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-2. Command Responses for CIM Test

Type of Response	Message and Recommended Action

Success	`CIM test started, version xxxx`
	`CIM slot number = x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--ERROR-- Device $CIMx not installed in system` ACTION: A CIM could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $CIMx not in "DOWN" state` ACTION: The CIM in slot x was not put in the DOWN state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put LIM in DOWN state and restart test.
Error	`--WARNING-- Device $CIMx test already started` ACTION: A test is already running on the test device or on a device attached to the test device. Check for the correct parameters or stop the test on the device indicated.

Error	`--FATAL-- CIM test aborted, version xxxx`
	`CIM slot number = x`
	`Unable to start test task`
	
	ACTION: A serious system failure has occurred. Run onboard diagnostics (see chapter 7). Save dump analyzer reports for next level of support.

Error	`--FATAL-- CIM test aborted, version xxxx`
	`CIM slot number = x`
	`Test task stop flag set`
	
	ACTION: A serious system failure has occurred. The test started but terminated prematurely. Check with the system analyst.

Test Status Responses for CIM Test

Table 6-3 shows the responses you receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-3. Test Status Responses for CIM Test

Type of Response	Message and Recommended Action

Success	`CIM test status`
	`CIM slot number = x`
	`RUNNING on-line version xxxx`
	`Testing LIM ports`
	`Pass count = x  Total errors = x`
	
	ACTION: Test is still running. Repeat DISPLAY_TEST_STATUS checks as necessary to determine when test is complete. Duration of test varies with pass count option. PASSED replaces RUNNING if the test completes without errors.

Error	`CIM test status`
	`CIM slot number = x`
	`PASSED on-line version xxxx  01/16/85  14:34:21`
	`pass count = x`
	`    LIM/PORT failure summary:`
	
	`FAILED lim x` on-line version xxxx 01/16/85 14.34.21
	`FAILED lim x portx` on-line version xxxx 01/16/85 14.34.21
	`FAILED uri x` on-line version xxxx 01/16/85 14.34.21
	
	ACTION: Replace the LIM/URI board in the slot number indicated. If all LIMs/URIs are reported as faulty, replace the CIM board. If more than one LIM/URI but not all LIMs/URIs are reported as faulty, replace LIM/URI in the lowest slot number with LED ON. When you power on the DI after replacing a board, the onboard diagnostics run automatically. If errors occur (it is normal for the 8-port LIMs and URIs fault LEDs to remain on), use the procedure in chapter 7 to isolate the failure. If no errors occur, rerun the CIM online diagnostic. If the CIM test still fails, suspect a bad URI or 8-port LIM (these are not tested by the onboards). To isolate this type of failure, disconnect the CIM/LIM cable from one URI or one 8-port LIM and rerun test. If the problem disappears, replace the disconnected URI or 8-port LIM. If the problem remains, reconnect the URI or 8-port LIM and disconnect a different URI or 8-port LIM. Repeat this procedure for all URIs and 8-port LIMs.
	
	If the box is allowed to load following a reset, then URI and 8-port LIMs are automatically tested by the online diagnostic URI/port test prior to execution of the DI configuration file.

(Continued)

Table 6-3. Test Status Responses for CIM Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`CIM test status`
	`CIM slot number = x`
	`FAILED on-line version xxxx 10/15/85 11.12.23`
	`Testing CIM/MPB interface`
	`Pass count = x Total errors = x`
	
	ACTION: A failure is found while testing the MPB to CIM interface. Replace the CIM board and repeat the test.

Error	`CIM test status`
	`CIM slot number = x`
	`FAILED on-line version xxxx 10/15/85 11.12.23`
	`Testing CIM/SMM interface`
	`Pass count = x Total errors = x`
	
	ACTION: A failure is found while testing the CIM to SMM interface. Replace the CIM board and repeat the test.

Error	`CIM test status`
	`CIM slot number = x`
	`FAILED on-line version xxxx 10/15/85 11.12.23`
	`Not enough memory currently exists to continue test`
	`Pass count = x Total errors = x`
	
	ACTION: The test is unable to get sufficient data buffers to perform SMM data/address testing. This indicates a system error. Contact the system analyst.

How to Run the LIM Online Test

Use this test if you have problems with two or more ports on the same LIM. The LIM test runs the internal loopback port test on all of its ports. The remainder of this topic explains how to use the LIM test and interpret its results.

LIM Test Notes

Table 6-4 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-4. LIM Test Notes

1. Certain LIM failures (for example, LIM interrupt daisy-chain failures) can only be detected by running LIM port conflict tests. If you do not detect any errors while running the CIM, LIM, or port tests, or if the customer reports problems on more than one LIM, run the conflict tests on all available LIM ports. See How to Run Online Conflict Tests, later in this chapter.

2. CML/VE and CMSI LIM test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.

   - Success State = ON
   - Logging = ON
   - Stop on Error = ON
   - Repeat Pass = 1

3. If you replace a board, the onboard diagnostics run automatically after you power on the DI (8-port LIMs aren't tested by onboards). Refer to chapter 7 to isolate failures that occur during the onboard tests.

LIM Test Procedure

Figure 6-5 shows the LIM test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                                           LIM Test Sheet 1
1    Read LIM test notes (table 6-4) before proceeding.
      |
      |
      V
2    Disconnect any LIM cables not connected to an external device. Unused
     LIM cables attached to a port can cause diagnostics to fail.
      |
      |
      V
3    Log in to CML/VE, CMSI, or NETOU.
      |
      |
      V
4    If you are on NOS, select a command MDI.
      |
      |
      V
5    Select target DI.
      |
      |
      V
6    Stop all lines and trunks connected to this LIM.

       - Use STOP_NETWORK for HDLC trunks.

       - Use STOP_X25_INTERFACE for X.25 trunks.

       - Use STOP_LINE for all other communications lines.

      |
      |
      V
7    Does any port on this LIM connect to a 64 kilobit per second or
     higher X.25 or HDLC trunk that is supported by the hdlc256 or hdlc3x64
     driver (check by using appropriate display trunk options command)?
      N     Y
      |     |
      |     |
      |     V
8     |    Proceed to step 11.
      |
      |
      V
     Go to A on Sheet 2
```

Figure 6-5. LIM Online Test Procedure

(Continued)

(Continued)

```
                                                        LIM Test Sheet 2
 From A on Sheet 1
    |
    |
    V
9   If any other LIMs on this CIM have ports supported by the hdlc256 or
    hdlc3x64 driver, stop communications on trunks connected to those ports.
    |
    |
    V
10  If trunk or line speed for any port on this LIM is 56 kilobits per second
    or higher (excludes those supported by hdlc256 or hdlc3x64 driver), stop
    activity on all other ports on this CIM.
    |
    |
    V
11  Change LIM element state to DOWN.
    |
    |
    V
12  Start LIM test.
    |
    |
    V
13  Does response indicate test started (table 6-5)?
    Y     N
    |     |
    |     |
    |     V
14  |    Was there a response?
    |     Y     N
    |     |     |
    |     |     |
    |     |     V
15  |     |    Run onboard tests (see chapter 7).
    |     |
    |     |
    |     V
16  |    Take action per command response table (table 6-5).
    |     |
    |     |
    |     V
17  |    Rerun LIM test to verify.
    |
    |
    V
  Go to B on Sheet 3
```

Figure 6-5. LIM Online Test Procedure

(Continued)

(Continued)

```
                                                        LIM Test Sheet 3
   From B on Sheet 2
     |
     |
     V
18   Check results using DISPLAY_TEST_STATUS. Repeat command as necessary until
     you get a test complete status (table 6-6).
     |
     |
     V
19   Does response indicate test passed?
     N    Y
     |    |
     |    |
     |    V
20   |    Run port test (see that test later in this chapter).
     |
     |
     V
21   Perform actions recommended in test status response table (table 6-6).
     |
     |
     V
22   Rerun test to verify.
     |
     |
     V
23   Problem corrected?
     Y    N
     |    |
     |    |
     |    V
24   |    Run onboard tests (see chapter 7).
     |    |
     |    |
     |    V
25   |    Problem corrected?
     |    Y    N
     |    |    |
     |    |    |
     |    |    V
26   |    |    Run NPA and DI hardware status reports.  Save for next level
     |    |    of support.
     |    |
     |____|
     |
     |
     V
   Go to C on Sheet 4
```

Figure 6-5. LIM Online Test Procedure

(Continued)

(Continued)

```
                                                LIM Test Sheet 4
   From C on Sheet 3
     |
     |
     V
27   Return DI to normal operation as follows:

      - Change LIM element state to ON (assumes test failed).

      - Restart communications over lines and trunks that were stopped.

           Use START_NETWORK for HDLC trunks.

           Use START_X25_INTERFACE for X.25 trunks.

           Use START_LINE for all other communications lines.
```

Figure 6-5. LIM Online Test Procedure

CML/VE Menu Summary for LIM Online Test

The following shows the CML/VE menu choices necessary to run the LIM online test. Each menu choice is shown on figure 6-6 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the LIM test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (LIM).
2[2]	Stop all lines on LIM.
3	Change LIM element state to DOWN.
4	Start test (see table 6-5 for command response).
5	Display status of test (see table 6-6 for responses).
	Stop test early if desired.[3]

After testing, restore LIM to normal operation as follows:

6	Put LIM in ON state (assumes test failed).
7	Restart all lines.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-6.

2. If any HDLC or X.25 trunks connect to this LIM you must also stop them before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart the HDLC and START_X25_INTERFACE to restart the X.25 trunk. If any port on the LIM is configured with a trunk or line speed equal to 56 kilobits per second, stop activity on all other ports connected to the associated CIM.

3. Use the STOP_LIM_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                                    ---------------------
                                    CML_700 - CDCNET MENU
                                    ---------------------
                                    1. EXECUTE NETOU IN EXPERT (COMMAND MODE)
                                    2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
                       ____________[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
                       |          __[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
                       |          |  5. VIEW CDCNET STATUS DISPLAYS.
                       |          |  6. MANAGE MESSAGE LOGGING AND ALARMS.
                       |          |  7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
                       |          |     CDCNET SYSTEM DI
                       |          |_______________________________________________
                       |                                                          |
                       |                                                          |
  -------------------------------------                 ---------------------------------
  CML_730 - CDCNET DEVICE/LINE STATE MENU               CML_740 - CDCNET DIAGNOSTICS MENU
  -------------------------------------                 ---------------------------------
[1]1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.          1.  SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
   2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.        2.  RUN CIM TEST.
   3.  STOP A LINE.                                      3.  RUN ESCI TEST.
[7]4.  START A LINE.                                  [4]4.  RUN LIM TEST.
[6]5.  CHANGE ELEMENT STATE TO ON.                       5.  RUN MCI INLINE TEST.
[3]6.  CHANGE ELEMENT STATE TO DOWN.                     6.  RUN MCI ONLINE TEST.
   7.  CHANGE ELEMENT STATE TO OFF.                      7.  RUN PORT TEST (INTERNAL LOOPBACK).
   8.  CANCEL A LINE.                                    8.  RUN PORT TEST (EXT MODEM LOOPBACK).
   9.  DEFINE A LINE.                                    9.  RUN URI TEST.
  10.  STOP A NETWORK.                                  10.  PERFORM DI CONFLICT TESTING.
  11.  START A NETWORK.                                 11.  PERFORM LIM/PORT CONFLICT TESTING.
  12.  STOP_NP INTERFACE.                               12.  RUN NETWORK PATH VERIFICATION TEST.
  13.  START_NP INTERFACE                               13.  EXECUTE A TERMINAL/LINE ECHO TEST.
____14.  MANAGE MULTIPLE LINES.                         14.  PERFORM INTELLIGENT MODEM TEST.
|   15.  DISPLAY_HARDWARE_STATUS.                       15.  SEND TEST FILE TO PUBLIC PRINTER
|                                                       16   SEND TEST FILE TO PRIVATE PRINTER.
|                                                       17.  SEND MESSAGE TO TERMINAL /LIM PORT.
|                                                       18.  SEND COMMANDS TO INTELLIGENT MODEM
|___________________                                    19.  MANAGE CDCNET ELEMENT STATES
                       |                             [5]20.  VIEW CDCNET STATUS DISPLAYS
                       |
  ---------------------------------------------
  CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
  ---------------------------------------------
   1.  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
   2.  STOP ALL LINES EXCEPT ACTIVE LINES
   3.  DOWN ALL STOPPED, CONFIGURED, AND
       UNCONFIGURED LINES
   4.  STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
[2]5.  STOP AND DOWN ALL LINES (WARNING, THIS
       INCLUDES LINES CURRENTLY IN USE)
   6.  SET ALL PORTS TO ON STATE.
   7.  SET ALL LIMS TO DOWN STATE.
   8.  SET ALL LIMS TO ON STATE.
   9.  DISPLAY_HARDWARE_STATUS.
```

Figure 6-6. CML/VE Menus for LIM Online Test

CMSI Menu Summary for LIM Online Test

The following shows the sequence of actions necessary to run the LIM online test. Each menu choice is shown on figure 6-7 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the LIM test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2 [2]	Stop all lines on LIM (repeat for each line).
3	Change LIM element state to DOWN.
4	Start test (see table 6-5 for command response).
5	Display status of test (see table 6-6 for responses).
	Stop test early if desired.[3]

After testing, restore LIM to normal operation as follows:

6	Put LIM in ON state (assumes test failed).
7	Restart all lines.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-7.

2. If any HDLC or X.25 trunks connect to this LIM you must also stop them before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart the HDLC and START_X25_INTERFACE to restart the X.25 trunk. If any port on the LIM is configured with a trunk or line speed equal to 56 kilobits per second, stop activity on all other ports connected to the associated CIM.

3. Use the STOP_LIM_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

6

```
                                   ----------------------------
                                   CMSI - CDCNET MENU - CMSI260
                                   ----------------------------
                                     1. EXECUTE NETOU IN EXPERT MODE
                    ____________[2. SELECT A DI TO USE
                   |     _______[3  MANAGE NETWORK, DEVICE, AND LINE STATES
                   |    |    ___[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
                   |    |   |    5  VIEW CDCNET STATUS DISPLAYS
                   |    |   |    6  MANAGE MESSAGE LOGGING AND ALARMS
                   |    |   |    9  -----RETURN TO PREVIOUS CMSI MENU
                   |    |   |
                   |    |   |_______________________________________________
                   |    |                                                   |
                   |    |_____________________________                      |
                   |                                  |                     |
 ------------------------------------------           |    ----------------------------------
 CMSI - CDCNET ELEMENT SELECTIONS - CMSI262           |    CMSI - CDCNET DIAGNOSTICS - CMSI264
 ------------------------------------------           |    ----------------------------------
   1 DISPLAY AVAILABLE DI NAMES                       |      1.  SELECT A DI TO USE
[1]2. SELECT A COMMAND MDI AND A TARGET DI FOR        |      2.  RUN CIM TEST
      CDCNET ACTIVITIES                               |      3.  RUN ESCI TEST
   3. DISPLAY CURRENTLY SELECTED COMMAND AND          |   [4]4.  RUN LIM TEST
      TARGET DI NAMES                                 |      5.  RUN MCI INLINE TEST
   9  -----RETURN TO PREVIOUS CMSI MENU               |      6.  RUN MCI ONLINE TEST
                                                      |      7.  RUN PORT TEST (INTERNAL LOOPBACK)
                                                      |      8.  RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
                   ___________________________________|      9.  RUN URI TEST
                   |                                        10.  MORE CDCNET DIAGNOSTICS
                   |                                    [5] 11.  DISPLAY TEST STATUS
 ----------------------------------------------             12.  DISPLAY HARDWARE STATUS
 CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263            13.  -----RETURN TO PREVIOUS CMSI MENU
 ----------------------------------------------
   1. SELECT A DI TO USE
[2]2. STOP A LINE
[7]3. START A LINE
   4. CANCEL A LINE
   5. DEFINE A LINE
[6]6. CHANGE ELEMENT STATE TO ON
[3]7. CHANGE ELEMENT STATE TO DOWN
   8. CHANGE ELEMENT STATE TO OFF
   9. MANAGE MULTIPLE LINES
---[10. MANAGE NETWORKS
|    11. DISPLAY HARDWARE STATUS
|    12. DISPLAY LINE STATUS (SUMMARY)
|    13. -----RETURN TO PREVIOUS CMSI MENU
|
|___________________
                   |
                   |
 ---------------------------------------
 CMSI - CDCNET MANAGE NETWORKS - CMSI2630
 ---------------------------------------
   1. SELECT A DI TO USE
   2. STOP A NETWORK
   3. START A NETWORK
   4. STOP NP INTERFACE
   5. START NP INTERFACE
   6. DISPLAY NETWORK STATUS
   9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-7. CMSI Menus for LIM Online Test

NETOU Command Summary for LIM Online Test

The following shows the sequence of commands necessary to run the LIM online test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the LIM test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_LINE (STOL)[2] Stop all lines on LIM (repeat command for each line).	`senc c='stol ln=line02',s=tdi_1`
2.	CHANGE_ELEMENT_STATE (CHAES) Put LIM in DOWN state.	`senc c='chaes dn=$lim2,s=down'`
3.	START_LIM_TEST (STALT) Start test (see table 6-5 for command responses).	`senc c='stalt dn=$lim2 rp=10'`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-6 for responses).	`senc c='dists dn=$lim2'`
5.	STOP_LIM_TEST (STOLT) Stop test early if desired.	`senc c='stolt dn=$lim2'`

After testing, restore LIM to normal operation as follows:

	Command and Description	Example
6.	CHANGE_ELEMENT_STATE (CHAES) Put LIM in ON state (assumes test failed).	`senc c='chaes dn=$lim2,s=on'`
7.	START_LINE (STAL) Restart line (repeat command for each line).	`senc c='stal ln=line02'`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

2. If any HDLC or X.25 trunks connect to this LIM you must also stop them before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart the HDLC and START_X25_INTERFACE to restart the X.25 trunk. If any port on the LIM is configured with a trunk or line speed equal to 56 kilobits per second, stop activity on all other ports connected to the associated CIM.

LIM Test Example

Figure 6-8 shows a possible network configuration. To test $LIM2 in figure 6-8, you could use the commands given in the previous topic, NETOU Command Summary for LIM Online Test. You could also use the equivalent CML/VE or CMSI menu selections.

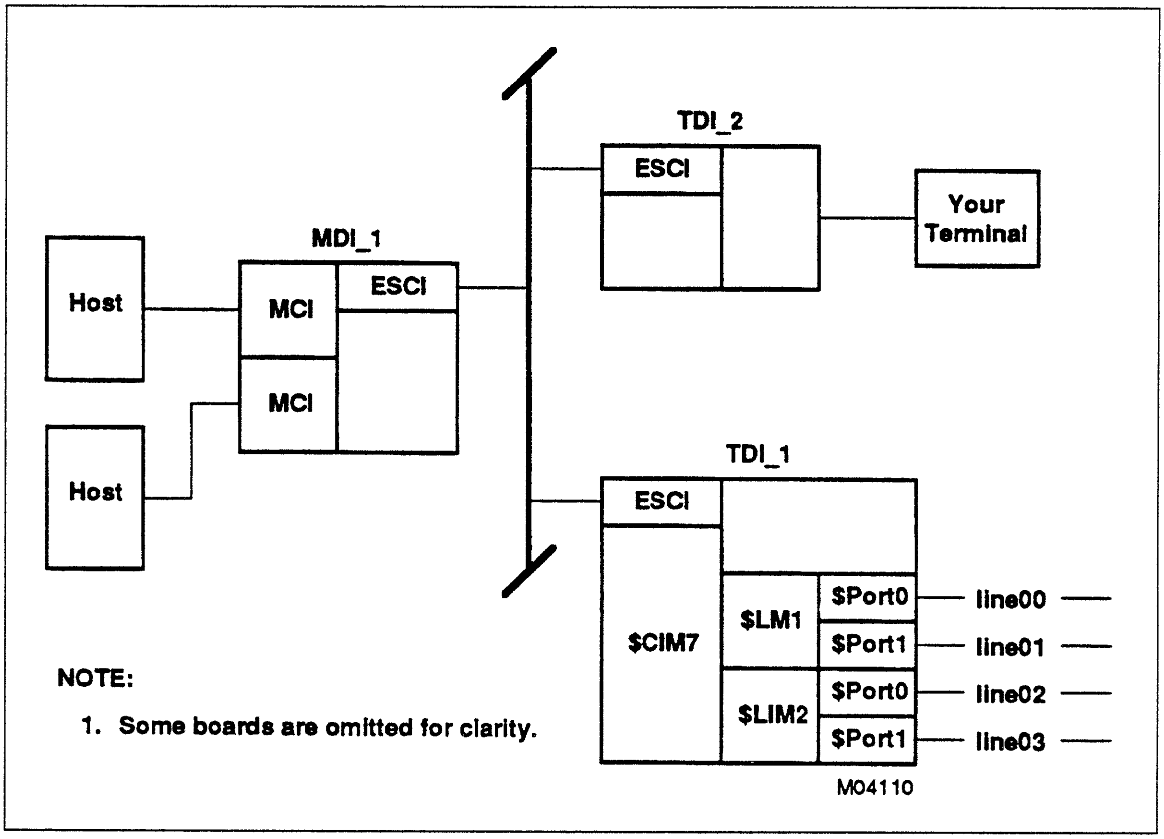


Figure 6-8. Example Network for LIM Test

Responses for START_LIM_TEST Command or Menu Selection

Table 6-5 lists the responses to expect after initiating a START_LIM_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-5. Command Responses for LIM Test

Type of Response	Message and Recommended Action

Success	`LIM test started, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--ERROR-- Device $LIMx not installed in system` ACTION: A LIM could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $LIMx not in "DOWN" state` ACTION: The LIM in slot x was not put in the DOWN state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put LIM in DOWN state and restart test.
Error	`--WARNING-- Device $LIMx test already started` ACTION: A test is already running on the test device or on a device attached to the test device. Check for the correct parameter, then either stop the test or wait for it to finish.

Error	`--FATAL-- LIM test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`Test task stop flag set`
	
	ACTION: A serious system failure has occurred. The test started but terminated prematurely. Check with the system analyst.

(Continued)

Table 6-5. Command Responses for LIM Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`--FATAL-- LIM test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`Previous CIM failure requires CIM to be tested first`
	`ENTER "start_cim_test dn=$cimx"`
	
	ACTION: A special case for LIM failures that prevents starting a LIM or port test if the CIM has failed. You must run the CIM test first.

Error	`--FATAL-- LIM test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`Test is not allowed for LIM type xx`
	
	ACTION: A LIM test is attempted on a LIM that is not an RS-232-C, RS-449, X.24, or V.35 LIM.

Error	`--FATAL-- LIM test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`Unable to start test task`
	
	ACTION: A serious system failure has occurred. Run onboard diagnostics (see chapter 7). Save dump analyzer reports for next level of support.

Error	`--FATAL-- LIM test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`LIM Status Table indicates no ports supported on lim`
	
	ACTION: There are no ports supported on the LIM as indicated by the LIM status table. This may occur if the LIM onboard tests fail. Use DISPLAY_TEST_STATUS command or menu selection to determine the status of onboard tests.

Error	`--FATAL-- LIM test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`State of all ports is "OFF"`
	
	ACTION: The LIM test cannot run because all ports on the LIM are turned off. Use CHANGE_ELEMENT_STATE command or menu selection to correct this.

(Continued)

Table 6-5. Command Responses for LIM Test *(Continued)*

Type of Response	Message and Recommended Action
Error	`--ERROR-- Device $LIMx cannot be tested at this time. $CIMn must be dedicated to the hdlcxxxx driver and is currently active. The STALT command may be reissued once all active trunks on $CIMn are stopped.` ACTION: Stop communications over the trunk(s) on $CIMn.

6

Test Status Responses for LIM Test

Table 6-6 shows the responses you might receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-6. Display Test Status Responses for LIM Test

Type of Response	Message and Recommended Action

Success	`LIM test status`
	`CIM slot number = x`
	`LIM slot number = x`
	`RUNNING on-line version xxxx`
	`Testing LIM Port's`
	`Pass count = x  Total errors = x`
	
	ACTION: Test is still running. Repeat DISPLAY_TEST_STATUS check as necessary to determine when test is complete. Duration of test varies with pass count option. PASSED replaces RUNNING when test is complete. If there are no LIM/PORT failures to report, "no errors found" is displayed.

Error	`LIM test status`
	`CIM slot number = x`
	`LIM slot number = x`
	`FAILED on line version xxxx  10/15/85  11.12.23`
	`Testing LIM ports`
	`pass count = 1  total failures = x`
	
	ACTION: Replace LIM in indicated slot number (x).

How to Run the Port Online Test

Use this test if you have problems with specific ports. Run the CIM or LIM test first if you suspect problems with more than one port on the same CIM or LIM. This test checks the ability of the LIM to transmit and receive data through the selected port. The remainder of this topic explains how to use the port test and interpret its results.

Port Test Notes

Table 6-7 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-7. Port Test Notes

1. Certain LIM failures (for example, LIM interrupt daisy-chain failures) can only be detected by running LIM port conflict tests. If you do not detect any errors while running the CIM, LIM, or port tests, or if the customer reports problems on more than one LIM, run the multiple port tests on all available LIM ports. You must use NETOU expert (command) mode to run multiple port tests. See How to Run Online Conflict Tests, later in this chapter.

2. CML/VE and CMSI test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.

   - Success State = ON
   - Logging = ON
   - Stop on Error = ON
   - Repeat Pass = 10

3. A CIM hardware failure may be reported as a modem failure when using 9600 baud or higher modem speeds. Try running on another LIM port. If the failure still occurs, replace the CIM.

4. Run the port test internal and external loopback options before running the modem option.

5. The SEND_DIAGNOSTIC_DATA (SENDD) command allows you to send data through a LIM port and over an asyncronous line to a remote modem or other equipment (see How to Test or Send Commands to an Intelligent Modem, later in this chapter).

6. The port test automatically starts at the completion of onboard diagnostics, providing the software is successfully loaded. The purpose is to test the 8-port LIMs, which onboard diagnostics do not test. Testing occurs before the configuration file is processed.

Port Test Procedure

Figure 6-9 shows the port test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                                      Port Test Sheet 1
1    Read port test notes (table 6-7) before proceeding.
      |
      |
      V
2    Log in to CML/VE, CMSI, or NETOU.
      |
      |
      V
3    If you are on NOS, select a command MDI.
      |
      |
      V
4    Select target DI.
      |
      |
      V
5    Stop line or trunk connected to this port.

      - Use STOP_NETWORK for HDLC trunks.

      - Use STOP_X25_INTERFACE for X.25 trunk.

      - Use STOP_LINE for all other communications lines.

      |
      |
      V
6    Does this port connect to a 64 kilobit per second or
     higher X.25 or HDLC trunk that is supported by the hdlc256 or hdlc3x64
     driver (check by using appropriate display trunk options command)?
      N     Y
      |     |
      |     |
7     |    Proceed to step 10.
      |
      |
      V
8    If any other ports on this CIM are supported by the hdlc256 or hdlc3x64
     driver, stop communications on trunks connected to those ports.
      |
      |
      V
Go to A on Sheet 2
```

Figure 6-9. Port Online Test Procedure

(Continued)

(Continued)

```
                                                                Port Test Sheet 2
 From A on Sheet 1
      |
      |
      V
 9    If trunk or line speed for this port is 56 kilobits per second or higher
      (excludes those supported by hdlc256 or hdlc3x64 driver), stop activity on
      all other ports on this CIM.
      |
      |
      V
 10   Change port element state to DOWN.
      |
      |
      V
 11   Start port test using internal loopback mode.
      |
      |
      V
 12   Does response indicate test started (table 6-8)?
      Y     N
      |     |
      |     |
      |     V
 13   |     Was there a response?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
 14   |     |     Run onboard tests (see chapter 7). Save dump analyzer reports
      |     |     for next level of support.
      |     |
      |     |
      |     V
 15   |     Take action per command response table (table 6-8).
      |     |
      |     |
      |     V
 16   |     Rerun port test to verify.
      |
      |
      V
 17   Check results using DISPLAY_TEST_STATUS command or menu selection.  Repeat
      command as necessary until you get a test complete status (table 6-9).
      |
      |
      V
 Go to B on Sheet 3
```

Figure 6-9. Port Online Test Procedure

(Continued)

(Continued)

```
                                                        Port Test Sheet 3
 From B Sheet 2
     |
     |
     V
18   Does response indicate test passed?
     N     Y
     |     |
     |     |
     |     V
19   |     Has port been tested in external loopback mode?
     |     Y     N
     |     |     |
     |     |     |
     |     |     V
20   |     |     Remove cable from LIM port and install loopback  plug on LIM
     |     |     port connector.  When testing a DY230A LIM port supporting a
     |     |     synchronous line (such as HDLC), remove the external clock strap.
     |     |     |
     |     |     |
     |     |     V
21   |     |     Start port test in external loopback mode and repeat this
     |     |     procedure starting with step 12.
     |     |
     |     V
22   |     Has port been tested in modem loopback mode?
     |     N     Y
     |     |     |
     |     |     |
     |     |     V
23   |     |     Run LIM port conflict tests using that procedure.  If you
     |     |     removed clock strap from DY230A LIM, replace it now.
     |     |
     |     |
     |     V
24   |     Is port connected to a terminal?
     |     N     Y
     |     |     |
     |     |     |
     |     |     V
25   |     |     Install loopback plug at terminal end of cable.
     |     |     |
     |     |     |
     |     |     V
26   |     |     Start port test in modem loopback mode and repeat this
     |     |     procedure starting with step 12.
     |     |
     |     |
     V     V
   To C and D on Sheet 4
```

Figure 6-9. Port Online Test Procedure

(Continued)

(Continued)

```
                                                        Port Test Sheet 4
  From C and D on Sheet 3
       |     |
       |     |
       |     V
 27    |    Set switch on modem to select loopback mode (see your modem manual).
       |    If you have an asynchronous intelligent modem use the SENDD command
       |    (see How to Test or Send Commands to an Intelligent Modem, later
       |    in this chapter).
       |     |
       |     |
       |     V
 28    |    When testing a DY230A LIM port supporting a synchronous line
       |    (such as HDLC), remove the external clock strap.
       |     |
       |     |
       |     V
 29    |    Start port test in modem loopback mode and repeat this procedure
       |    starting with step 12.
       |
       |
       V
 30   Perform actions recommended in test status response table (table 6-9).
       |
       |
       V
 31   Rerun test to verify.
       |
       |
       V
 32   Problem corrected?
       Y     N
       |     |
       |     |
       |     V
 33    |    Run onboard tests (see chapter 7).
       |     |
       |     |
       V     V
    To E and F on Sheet 5
```

Figure 6-9. Port Online Test Procedure

(Continued)

(Continued)

```
                                                          Port Test Sheet 5
 From E and F on Sheet 4
      |     |
      |     |
      |     V
34    |    Problem corrected?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
35    |     |    Run NPA and DI hardware status reports.  Save for next level
      |_____|    of support.
      |
      |
      V
36   Return DI to normal operation as follows:

      - If you removed external clock strap from a DY230A LIM, replace it now.

      - Change port element state to ON (assumes test failed).

      - Restart communications lines or trunks that were stopped.

           Use START_NETWORK for HDLC trunks.

           Use START_X25_INTERFACE for X.25 trunks.

           Use START_LINE for all other communications lines.
```

Figure 6-9. Port Online Test Procedure

CML/VE Menu Summary for Port Online Test

The following shows the CML/VE menu choices necessary to run the port online test. Each menu choice is shown on figure 6-10 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the port test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (port).
2 [2]	Stop the line.
3	Change port element state to DOWN.
4	Start test (see table 6-8 for command response).
5	Display status of test (see table 6-9 for responses).
	Stop test early if desired.[3]

After testing, restore port to normal operation as follows:

6	Put port in ON state (assumes test failed).
7	Restart the line.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-10.

2. If an HDLC or X.25 trunk connects to this port you must also stop it before testing. Use STOP_NETWORK for HDLC trunk and STOP_X25_INTERFACE for X.25 trunk. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk. If port is configured with a line or trunk speed equal to 56 kilobits per second, stop activity on all other ports connected to this CIM.

3. Use the STOP_PORT_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
CML_700 - CDCNET MENU
---------------------
1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
 5. VIEW CDCNET STATUS DISPLAYS.
 6. MANAGE MESSAGE LOGGING AND ALARMS.
 7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
    CDCNET SYSTEM DI.
```

```
CML_730 - CDCNET DEVICE/LINE STATE MENU
---------------------------------------
[1] 1. SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.
    2. DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.
[2] 3. STOP A LINE.
[7] 4. START A LINE.
[6] 5. CHANGE ELEMENT STATE TO ON.
[3] 6. CHANGE ELEMENT STATE TO DOWN.
    7  CHANGE ELEMENT STATE TO OFF.
    8  CANCEL A LINE.
    9  DEFINE A LINE.
    10. STOP A NETWORK.
    11. START A NETWORK.
    12. STOP_NP INTERFACE.
    13. START_NP INTERFACE.
    14. MANAGE MULTIPLE LINES.
    15. DISPLAY_HARDWARE_STATUS
```

```
CML_740 - CDCNET DIAGNOSTICS MENU
---------------------------------
    1. SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
    2. RUN CIM TEST.
    3. RUN ESCI TEST.
    4. RUN LIM TEST.
    5. RUN MCI INLINE TEST.
    6. RUN MCI ONLINE TEST.
[4] 7. RUN PORT TEST (INTERNAL LOOPBACK).
    8. RUN PORT TEST (EXT MODEM LOOPBACK).
    9. RUN URI TEST.
    10. PERFORM DI CONFLICT TESTING.
    11. PERFORM LIM/PORT CONFLICT TESTING.
    12. RUN NETWORK PATH VERIFICATION TEST.
    13. EXECUTE A TERMINAL/LINE ECHO TEST.
    14  PERFORM INTELLIGENT MODEM TEST.
    15. SEND TEST FILE TO PUBLIC PRINTER.
    16. SEND TEST FILE TO PRIVATE PRINTER.
    17. SEND MESSAGE TO TERMINAL /LIM PORT
    18. SEND COMMANDS TO INTELLIGENT MODEM.
    19. MANAGE CDCNET ELEMENT STATES.
[5] 20. VIEW CDCNET STATUS DISPLAYS.
```

```
CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
----------------------------------------------
1  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
2. STOP ALL LINES EXCEPT ACTIVE LINES.
3  DOWN ALL STOPPED, CONFIGURED, AND
   UNCONFIGURED LINES.
4. STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
5. STOP AND DOWN ALL LINES (WARNING, THIS
   INCLUDES LINES CURRENTLY IN USE).
6. SET ALL PORTS TO ON STATE.
7. SET ALL LIMS TO DOWN STATE.
8. SET ALL LIMS TO ON STATE.
9. DISPLAY_HARDWARE_STATUS.
```

Figure 6-10. CML/VE Menus for Port Online Test

CMSI Menu Summary for Port Online Test

The following shows the sequence of actions necessary to run the port online test. Each menu choice is shown on figure 6-11 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the port test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2 [2]	Stop line connected to this port.
3	Change port element state to DOWN.
4	Start test (see table 6-8 for command response).
5	Display status of test (see table 6-9 for responses).
	Stop test early if desired.[3]

After testing, restore port to normal operation as follows:

6	Put port in ON state (assumes test failed).
7	Restart the line.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-11.

2. If an HDLC or X.25 trunk connects to this port you must also stop it before testing. Use STOP_NETWORK for HDLC trunk and STOP_X25_INTERFACE for X.25 trunk. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk. If port is configured with a line or trunk speed equal to 56 kilobits per second, stop activity on all other ports connected to this CIM.

3. Use the STOP_PORT_TEST command to stop the test. CMSI does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

6

```
                         -----------------------------
                         CMSI - CDCNET MENU - CMSI260
                         -----------------------------
                          1  EXECUTE NETOU IN EXPERT MODE
                _________[2. SELECT A DI TO USE
               |   ______[3. MANAGE NETWORK, DEVICE, AND LINE STATES
               |  |   ___[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
               |  |  |    5. VIEW CDCNET STATUS DISPLAYS
               |  |  |    6  MANAGE MESSAGE LOGGING AND ALARMS
               |  |  |    9. -----RETURN TO PREVIOUS CMSI MENU
               |  |  |
               |  |  |_______________________________________________
               |  |                                                  |
               |  |___________________________                       |
               |                              |                      |
 -------------------------------------------  |   -----------------------------------
 CMSI - CDCNET ELEMENT SELECTIONS - CMSI262   |   CMSI - CDCNET DIAGNOSTICS - CMSI264
 -------------------------------------------  |   -----------------------------------
   1. DISPLAY AVAILABLE DI NAMES              |      1.  SELECT A DI TO USE
 [1]2. SELECT A COMMAND MDI AND A TARGET DI FOR |    2.  RUN CIM TEST
      CDCNET ACTIVITIES                       |      3.  RUN ESCI TEST
   3. DISPLAY CURRENTLY SELECTED COMMAND AND  |      4.  RUN LIM TEST
      TARGET DI NAMES                         |      5.  RUN MCI INLINE TEST
   9. -----RETURN TO PREVIOUS CMSI MENU       |      6.  RUN MCI ONLINE TEST
                                              |   [4]7.  RUN PORT TEST (INTERNAL LOOPBACK)
                                              |      8.  RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
               _______________________________|      9.  RUN URI TEST
              |                                     10.  MORE CDCNET DIAGNOSTICS
              |                                  [5]11.  DISPLAY TEST STATUS
 -----------------------------------------------    12.  DISPLAY HARDWARE STATUS
 CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263    13   -----RETURN TO PREVIOUS CMSI MENU
 -----------------------------------------------
   1. SELECT A DI TO USE
 [2]2. STOP A LINE
 [7]3. START A LINE
   4. CANCEL A LINE
   5. DEFINE A LINE
 [6]6. CHANGE ELEMENT STATE TO ON
 [3]7. CHANGE ELEMENT STATE TO DOWN
   8. CHANGE ELEMENT STATE TO OFF
   9. MANAGE MULTIPLE LINES
---[10. MANAGE NETWORKS
|   11. DISPLAY HARDWARE STATUS
|   12. DISPLAY LINE STATUS (SUMMARY)
|   13. -----RETURN TO PREVIOUS CMSI MENU
|
|____________________
                     |
                     |
 ----------------------------------------
 CMSI - CDCNET MANAGE NETWORKS - CMSI2630
 ----------------------------------------
   1. SELECT A DI TO USE
   2. STOP A NETWORK
   3. START A NETWORK
   4. STOP NP INTERFACE
   5. START NP INTERFACE
   6. DISPLAY NETWORK STATUS
   9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-11. CMSI Menus for Port Online Test

NETOU Command Summary for Port Online Test

The following shows the sequence of commands necessary to run the port online test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the port test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_LINE (STOL)[2] Stop communications on the line.	`senc c='stol ln=line02',s=tdi_1`
2.	CHANGE_ELEMENT_STATE (CHAES) Put port in DOWN state.	`senc c='chaes dn=$lim2_port0,..` `s=down'`
3.	START_PORT_TEST (STAPT) Start test (see table 6-8 for command responses).	`senc c='stapt dn=$lim2_port0 rp=10'`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-9 for responses).	`senc c='dists dn=$lim2_port0'`
5.	STOP_PORT_TEST (STOPT) Stop test early if desired.	`senc c='stopt dn=$lim2_port0'`

After testing, restore port to normal operation as follows:

	Command and Description	Example
6.	CHANGE_ELEMENT_STATE (CHAES) Put port in ON state (assumes test failed).	`senc c='chaes dn=$lim2_port0,s=on'`
7.	START_LINE (STAL) Restart line.	`senc c='stal ln=line02'`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

2. If an HDLC or X.25 trunk connects to this port you must also stop it before testing. Use STOP_NETWORK for HDLC trunk and STOP_X25_INTERFACE for X.25 trunk. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk. If port is configured with a line or trunk speed equal to 56 kilobits per second, stop activity on all other ports connected to this CIM.

Port Test Example

Figure 6-12 shows a possible network configuration. To test $port0 on $LIM2, you could use the commands given in the previous topic, NETOU Command Summary for Port Online Test. You could also use the equivalent CML/VE or CMSI menu selections.

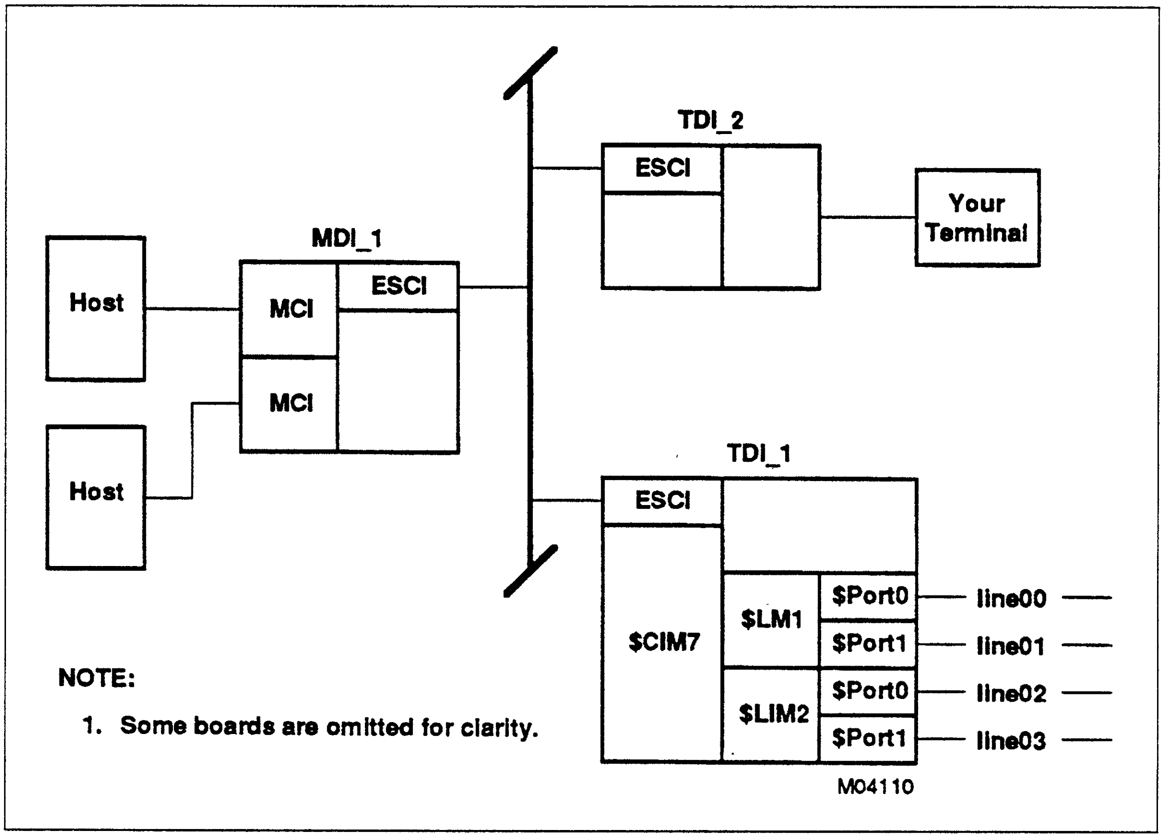


Figure 6-12. Example Network for Port Test

Responses for START_PORT_TEST Command or Menu Selection

Table 6-8 lists the responses to expect after initiating a START_PORT_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-8. Command Responses for Port Test

Type of Response	Message and Recommended Action

Success	`PORT test started, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT number = x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--ERROR-- Device $LIMx_PORTx not in "DOWN" state` ACTION: The port in slot x was not put in the DOWN state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put port in DOWN state and restart test.
Error	`--WARNING-- Device $LIMx_PORTx test already started` ACTION: A test is already running on the test device or on a device attached to the test device. Check for the correct parameters, then either stop the test or wait for it to finish.

Error	`--FATAL-- PORT test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT number = x`
	`Port test is not allowed for LIM type 08`
	`ENTER "start_lim_test dn=$limx"`
	
	ACTION: A port test was attempted on an RS-232-C LIM with an ID type=08. Type 08 LIMs are an older type and only LIM tests can be run on them. The port test is allowed on RS-232-C LIMs with an ID type 09 through 0F (hexadecimal).

(Continued)

Table 6-8. Command Responses for Port Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`--FATAL-- PORT test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT number = x`
	`Previous CIM failure requires CIM to be tested first`
	`ENTER "start_cim_test dn=$cimx"`
	
	`--FATAL-- PORT test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT number = x`
	`Previous LIM failure requires LIM to be tested first`
	`ENTER "start_lim_test dn=$limx"`
	
	ACTION: These are special cases for CIM and LIM failures that prevent starting a lower level test. If the CIM has failed, you must run the CIM test before the LIM or port test. If a LIM has failed, you must run the LIM test first.

Error	`--ERROR-- Device $LIMx_PORTx not installed in system` ACTION: The port could not be located in the designated slot (x). Check for the correct device name parameter.

Error	`--FATAL-- PORT test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT number = 2`
	`Test is not allowed for LIM type xx`
	
	ACTION: A LIM or port test is attempted on a LIM that is not a V.35, X.24, RS-232-C, or RS-449 LIM.

Error	`--FATAL-- PORT test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT slot number = x`
	`Unable to start test task`
	
	ACTION: A serious system failure has occurred. Run onboard diagnostics.

(Continued)

Table 6-8. Command Responses for Port Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`--FATAL-- Port test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`Port slot number = x`
	`Test task stop flag set`
	
	ACTION: A serious system failure has occurred. The test started but terminated prematurely. Check with the system analyst.

Error	`--FATAL-- PORT test aborted, version xxxx`
	`CIM slot number = x`
	`LIM slot number = x`
	`PORT number = x`
	`Modem Class (MC) parameter is required for modem loopback when`
	`line has not been configured or is an auto-recognition line.`
	
	ACTION: An attempt was made to run the modem loopback test without specifying modem class. Modem class must be specified if the line is not configured by system software, or if it has been configured as an automatic recognition line. Include the modem class parameter and restart the test.

Error	`--ERROR-- Device $LIMx_PORTy cannot be tested at this time.`
	`$CIMn must be dedicated to the hdlcxxxx driver and is`
	`currently active. The STAPT command may be reissued once`
	`all active trunks on $CIMn are stopped.`
	
	ACTION: Stop communications over the trunk(s) on $CIMn.

Test Status Responses for Port Test

Table 6-9 shows the responses you receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-9. Display Test Status Responses for Port Test

<table>
<tr><th>Type of Response</th><th colspan="2">Message and Recommended Action</th></tr>
<tr><td>Success</td><td colspan="2"><pre>PORT test status
CIM slot number = x
LIM slot number = x
PORT number = x
PASSED on-line version xxxx 10/15/85 11.12.23
Pass count = x</pre>ACTION: No action is required.</td></tr>
<tr><td>Error</td><td colspan="2"><pre>PORT test status
CIM slot number = x
LIM slot number = x
PORT number = x
FAILED on-line version xxxx 10/15/85 11.12.23
Testing Internal Loopback
Pass count = x   Total errors = x</pre>ACTION: Three methods of loopback testing are used when testing LIM ports: internal, external, and modem.</td></tr>
<tr><td></td><td>Internal</td><td>Replace the LIM or use another port.</td></tr>
<tr><td></td><td>External</td><td>Check to ensure proper loopback connector is installed. If connector is correct, replace LIM or use another port.</td></tr>
<tr><td></td><td>Modem</td><td>Replace LIM, use another port, replace LIM to modem cable, replace modem, or check with common carrier.</td></tr>
</table>

How to Run the URI Online Test

Use the URI test if you have problems with a URI port. If you have problems with more than one URI, run the CIM test prior to this one. The remainder of this topic explains how to use the URI test and interpret its results.

URI Test Notes

Table 6-10 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-10. URI Test Notes

1. CML/VE and CMSI URI test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.

   - Success State = ON
   - Logging = ON
   - Stop on Error = ON
   - Repeat Pass = 1

2. The URI test automatically starts at the completion of onboard diagnostics, providing the software is successfully loaded. This occurs because URIs are not tested by onboard diagnostics. Testing occurs before the configuration file is processed.

3. Run the internal loopback option first. When running external loopback test, attach a loopback plug to the URI board or the printer end of the URI-to-printer cable before running the test (see chapter 10 for loopback plug part number).

URI Test Procedure

Figure 6-13 shows the URI test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                                          URI Test Sheet 1
 1   Read URI test notes (table 6-10) before proceeding.
      |
      |
      V
 2   Log in to CML/VE, CMSI, or NETOU.
      |
      |
      V
 3   If you are on NOS, select a command MDI.
      |
      |
      V
 4   Select target DI.
      |
      |
      V
 5   Stop line connected to URI.
      |
      |
      V
 6   If any HDLC or X.25 trunks on this CIM are supported by the hdlc256 or
     hdlc3x64 driver, stop communications on those trunks.
      |
      |
      V
 7   Change URI element state to DOWN.
      |
      |
      V
 8   Start URI test using internal loop mode.
      |
      |
      V
 9   Does response indicate test started (table 6-11)?
      Y     N
      |     |
      |     |
      |     V
10    |    Was there a response?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
11    |     |    Run NPA and DI status reports and save for next level
      |     |    of support.
      |     |
      |     |
      V     V
 Go to A and B  on Sheet 2
```

Figure 6-13. URI Online Test Procedure

(Continued)

(Continued)

```
                                                               URI Test Sheet 2
  From A and B on Sheet 1
       |    |
       |    V
 12    |    Take action per command response table (table 6-11).
       |    |
       |    |
       |    V
 13    |    Rerun URI test to verify.
       |
       |
       V
 14    Check results using DISPLAY_TEST_STATUS command.  Repeat command as
       necessary until you get a test complete status (table 6-12).
       |
       |
       V
 15    Does response indicate test passed?
       N    Y
       |    |
       |    |
       |    V
 16    |    Has URI been tested in external loopback mode?
       |    Y    N
       |    |    |
       |    |    |
       |    |    V
 17    |    |    Install loopback plug on the URI connector at the DI or
       |    |    to the printer end of the URI-to-printer cable.
       |    |    |
       |    |    |
       |    |    V
 18    |    |    Start URI test in external loopback mode and repeat this
       |    |    procedure starting with step 8.
       |    |
       |    |
       |    V
 19    |    URI ok. If problem persists, run NPA and DI status reports and call
       |    next level of support.
       |
       |
       V
     To C on Sheet 3
```

Figure 6-13. URI Online Test Procedure

(Continued)

(Continued)

```
                                                              URI Test Sheet 3
    From C on Sheet 3
      |
      |
      V
20  Perform actions recommended in test status response table (table 6-12).
      |
      |
      V
21  Rerun test to verify.
      |
      |
      V
22  Problem corrected?
      Y     N
      |     |
      |     |
      |     V
23    |     Run NPA and DI hardware status reports.  Save for next level
      |     of support.
      |
      |
      |
      |
      V
24  Return DI to normal operation as follows:

      - Change URI element state to ON (assumes test failed).

      - Restart communications over any HDLC or X.25 trunks that were stopped.

      - Restart the URI line.
```

Figure 6-13. URI Online Test Procedure

CML/VE Menu Summary for URI Online Test

The following shows the CML/VE menu choices necessary to run the URI online test. Each menu choice is shown on figure 6-14 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the URI test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (URI).
2	Stop the line.[2]
3	Change URI element state to DOWN.
4	Start test (see table 6-11 for command response).
5	Display status of test (see table 6-12 for responses).
	Stop test early if desired.[3]

After testing, restore URI to normal operation as follows:

6	Put URI in ON state (assumes test failed).
7	Restart the line.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-14.

2. If an HDLC or X.25 trunk connects to this CIM and uses the hdlc256 or hdlc3x64 driver, you must stop it before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk.

3. Use the STOP_URI_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                           ---------------------
                           CML_700 - CDCNET MENU
                           ---------------------
                           1  EXECUTE NETOU IN EXPERT (COMMAND MODE)
                           2  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
              ------------[3  MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES
              |         __[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
              |         |  5. VIEW CDCNET STATUS DISPLAYS.
              |         |  6  MANAGE MESSAGE LOGGING AND ALARMS.
              |         |  7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
              |         |     CDCNET SYSTEM DI.
              |         |_______________________________________________
              |                                                         |
              |                                                         |
---------------------------------------                ---------------------------------
CML_730 - CDCNET DEVICE/LINE STATE MENU                CML_740 - CDCNET DIAGNOSTICS MENU
---------------------------------------                ---------------------------------
[1]1. SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.            1. SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
   2. DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.          2. RUN CIM TEST.
[2]3. STOP A LINE.                                        3. RUN ESCI TEST.
[7]4. START A LINE.                                       4. RUN LIM TEST.
[6]5. CHANGE ELEMENT STATE TO ON.                         5. RUN MCI INLINE TEST.
[3]6. CHANGE ELEMENT STATE TO DOWN.                       6. RUN MCI ONLINE TEST.
   7. CHANGE ELEMENT STATE TO OFF.                        7. RUN PORT TEST (INTERNAL LOOPBACK).
   8. CANCEL A LINE.                                      8. RUN PORT TEST (EXT MODEM LOOPBACK)
   9. DEFINE A LINE.                                   [4]9. RUN URI TEST.
  10. STOP A NETWORK.                                     10 PERFORM DI CONFLICT TESTING.
  11. START A NETWORK.                                    11. PERFORM LIM/PORT CONFLICT TESTING.
  12. STOP_NP INTERFACE.                                  12. RUN NETWORK PATH VERIFICATION TEST.
  13. START_NP INTERFACE.                                 13. EXECUTE A TERMINAL/LINE ECHO TEST.
  14. MANAGE MULTIPLE LINES.                              14. PERFORM INTELLIGENT MODEM TEST.
  15. DISPLAY_HARDWARE_STATUS.                            15. SEND TEST FILE TO PUBLIC PRINTER.
                                                          16. SEND TEST FILE TO PRIVATE PRINTER
                                                          17. SEND MESSAGE TO TERMINAL /LIM PORT.
                                                          18. SEND COMMANDS TO INTELLIGENT MODEM.
                                                          19. MANAGE CDCNET ELEMENT STATES.
                                                       [5]20. VIEW CDCNET STATUS DISPLAYS.
```

Figure 6-14. CML/VE Menus for URI Online Test

CMSI Menu Summary for URI Online Test

The following shows the sequence of actions necessary to run the URI online test. Each menu choice is shown on figure 6-15 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the URI test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2	Stop line connected to this URI.[2]
3	Change URI element state to DOWN.
4	Start test (see table 6-11 for command response).
5	Display status of test (see table 6-12 for responses).
	Stop test early if desired.[3]

After testing, restore port to normal operation as follows:

6	Put URI in ON state (assumes test failed).
7	Restart the line.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-15.

2. If an HDLC or X.25 trunk connects to this CIM and uses the hdlc256 or hdlc3x64 driver, you must stop it before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk.

3. Use the STOP_URI_TEST command to stop the test. CMSI does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

6

```
                              -----------------------------
                              CMSI - CDCNET MENU - CMSI260
                              -----------------------------
                               1  EXECUTE NETOU IN EXPERT MODE
                  ___________[2.  SELECT A DI TO USE
                 |    _______[3.  MANAGE NETWORK, DEVICE, AND LINE STATES
                 |   |    ___[4.  EXECUTE CDCNET ONLINE DIAGNOSTICS
                 |   |   |    5.  VIEW CDCNET STATUS DISPLAYS
                 |   |   |    6.  MANAGE MESSAGE LOGGING AND ALARMS
                 |   |   |    9.  -----RETURN TO PREVIOUS CMSI MENU
                 |   |   |
                 |   |   |_______________________________________________
                 |   |                                                   |
                 |   |___________________________                        |
                 |                               |                       |
-------------------------------------------      |    -----------------------------------
CMSI - CDCNET ELEMENT SELECTIONS - CMSI262        |    CMSI - CDCNET DIAGNOSTICS - CMSI264
-------------------------------------------      |    -----------------------------------
   1. DISPLAY AVAILABLE DI NAMES                  |       1.  SELECT A DI TO USE
[1]2. SELECT A COMMAND MDI AND A TARGET DI FOR    |       2.  RUN CIM TEST
      CDCNET ACTIVITIES                           |       3.  RUN ESCI TEST
   3. DISPLAY CURRENTLY SELECTED COMMAND AND      |       4.  RUN LIM TEST
      TARGET DI NAMES                             |       5.  RUN MCI INLINE TEST
   9. -----RETURN TO PREVIOUS CMSI MENU           |       6.  RUN MCI ONLINE TEST
                                                  |       7.  RUN PORT TEST (INTERNAL LOOPBACK))
                                                  |       8.  RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
                  ________________________________|   [4]9.  RUN URI TEST
                 |                                       10.  MORE CDCNET DIAGNOSTICS
                 |                                   [5]11.  DISPLAY TEST STATUS
-----------------------------------------------          12   DISPLAY HARDWARE STATUS
CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263          13.  -----RETURN TO PREVIOUS CMSI MENU
-----------------------------------------------
   1. SELECT A DI TO USE
[2]2. STOP A LINE
[7]3. START A LINE
   4. CANCEL A LINE
   5. DEFINE A LINE
[6]6. CHANGE ELEMENT STATE TO ON
[3]7. CHANGE ELEMENT STATE TO DOWN
   8. CHANGE ELEMENT STATE TO OFF
   9. MANAGE MULTIPLE LINES
   10. MANAGE NETWORKS
   11. DISPLAY HARDWARE STATUS
   12. DISPLAY LINE STATUS (SUMMARY)
   13. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-15. CMSI Menus for URI Online Test

NETOU Command Summary for URI Online Test

The following shows the sequence of commands necessary to run the URI online test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the URI test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_LINE (STOL)[2] Stop communications on the line.	`senc c='stol ln=line00',s=tdi_1`
2.	CHANGE_ELEMENT_STATE (CHAES) Put URI in DOWN state.	`senc c='chaes dn=$uri2,s=down'`
3.	START_URI_TEST (STAUT) Start test (see table 6-11 for command responses).	`senc c='staut dn=$uri2,rp=10'`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-12 for responses).	`senc c='dists dn=$uri2'`
5.	STOP_URI_TEST (STOUT) Stop test early if desired.	`senc c='stout dn=$uri2'`

After testing, restore URI to normal operation as follows:

	Command and Description	Example[1]
6.	CHANGE_ELEMENT_STATE (CHAES) Put URI in ON state (assumes test failed).	`senc c='chaes dn=$uri2,s=on'`
7.	START_LINE (STAL) Restart line.	`senc c='stal ln=line00'`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

2. If an HDLC or X.25 trunk connects to this CIM and uses the hdlc256 or hdlc3x64 driver, you must stop it before testing. Use STOP_NETWORK for HDLC trunks and STOP_X25_INTERFACE for X.25 trunks. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk.

URI Test Example

Figure 6-16 shows a TDI containing a URI. To test the URI in figure 6-16, you could use the commands given in the previous topic, NETOU Command Summary for URI Online Test. You could also use the equivalent CML/VE or CMSI menu selections.

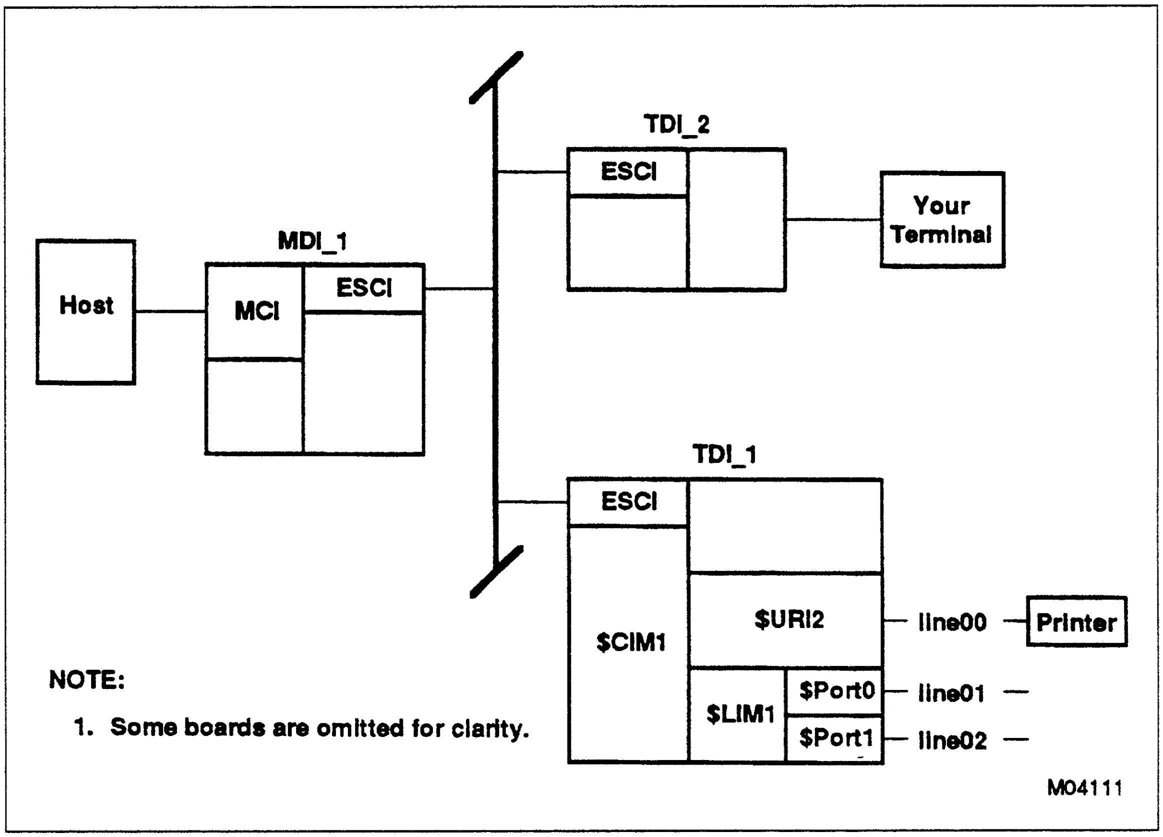


Figure 6-16. Example Network for URI Test

Responses for START_URI_TEST Command or Menu Selection

Table 6-12 lists the responses to expect after initiating a START_URI_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-11. Command Responses for URI Test

Type of Response	Message and Recommended Action

Success	`URI test started, version xxxx`
	`CIM slot number = x`
	`URI slot number = x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--ERROR-- Device $URIx not installed in system` ACTION: The URI could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $URIx not in "DOWN" state` ACTION: The URI in slot x was not put in the DOWN state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put LIM in DOWN state, then restart test.
Error	`--WARNING-- Device $URIx test already started` ACTION: A test is already running on the test device or on a device attached to the test device. Check for correct parameters, then either stop the test or wait for it to finish.

Error	`--FATAL-- URI test aborted, version xxxx`
	`CIM slot number = x`
	`URI slot number = x`
	`Previous CIM failure requires CIM to be tested first`
	`ENTER "start_cim_test dn=$cimx"`
	
	ACTION: A special case for LIM failures that prevents starting a URI, LIM, or port test if the CIM has failed. You must run the CIM test first.

(Continued)

Table 6-11. Command Responses for URI Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`--FATAL-- URI test aborted, version xxxx`
	`CIM slot number = x`
	`URI slot number = x`
	`Unable to start test task`
	
	ACTION: A serious system failure has occurred. Check with the system analyst.

Error	`--FATAL-- URI test aborted, version xxxx`
	`CIM slot number = x`
	`URI slot number = x`
	`Test task stop flag set`
	
	ACTION: A serious system failure has occurred. The test started but terminated prematurely. Check with the system analyst.

Error	`--ERROR-- Device $URIx cannot be tested at this time.`
	`$CIMn must be dedicated to the hdlcxxxx driver and is`
	`currently active. The STAUT command may be reissued once`
	`all active trunks on $CIMn are stopped.`
	
	ACTION: Stop communications over the trunk(s) on $CIMn.

Test Status Responses for URI Test

Table 6-12 shows the responses you might receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-12. Display Test Status Responses for URI Test

Type of Response	Message and Recommended Action

Success	`URI test status`
	`CIM slot number = x`
	`URI slot number = x`
	`RUNNING on-line version xxxx`
	`Testing URI internal loopback`
	`Pass count = x  Total errors = x`

Success	`URI test status`
	`CIM slot number = x`
	`URI slot number = x`
	`RUNNING on-line version xxxx`
	`Testing URI external loopback`
	`Pass count = x  Total errors = x`
	
	ACTION: Test is still running. Repeat DISPLAY_TEST_STATUS check as necessary to determine when test is complete. Duration of test varies with pass count options. PASSED replaces RUNNING if the test completes without errors.

Error	`URI test status`
	`CIM slot number = x`
	`URI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Testing URI Internal Loopback`
	`Pass count = x  Total errors = x`
	
	ACTION: Two methods of loopback testing are used when testing a URI: internal and external.
	
	Internal — Replace the URI.
	
	External — Check to make sure the proper loopback connector is installed. If connector is correct, replace the URI or the printer cable, depending on where loopback connector was installed.

How to Run the ESCI Online Test

Use this test to isolate failures on an ESCI board or its associated transciever. The ECI test checks the following:

- Interface between ESCI and MPB
- ESCI board
- Interface between ESCI and PMM
- Transceiver connected to the ESCI board

The remainder of this topic explains how to use the ESCI test and interpret its results.

ESCI Test Notes

Table 6-13 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-13. ESCI Test Notes

1. You cannot use the ESCI test unless both your DI and the target DI have a path to NETOU other than through the network connecting to the ESCI under test (see figure 6-20). The alternative path can be an MCI, LIM port, or another ESCI.

2. CML/VE and CMSI ESCI test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.

   - Success State = ON
   - Logging = ON
   - Stop on Error = ON
   - Repeat Pass = 1

3. If you replace a board, the onboard diagnostics run automatically after you power on the DI. Refer to chapter 7 to isolate failures that occur during onboard tests.

ESCI Test Procedure

Figure 6-17 shows the ESCI test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                                    ESCI Test Sheet 1
 1    Read ESCI test notes (table 6-13) before proceeding.
       |
       |
       V
 2    Log in to CML/VE, CMSI, or NETOU.
       |
       |
       V
 3    If you are on NOS, select a command MDI.
       |
       |
       V
 4    Select target DI.
       |
       |
       V
 5    Stop network connected to this ESCI.
       |
       |
       V
 6    Change ESCI element state to DOWN.
       |
       |
       V
 7    Start ESCI test.
       |
       |
       V
     Go to A on Sheet 2
```

Figure 6-17. ESCI Online Test Procedure

(Continued)

(Continued)

```
                                                         ESCI Test Sheet 2
  From A on Sheet 1
      |
      |
      V
 8    Does response indicate test started (table 6-14)?
       Y     N
       |     |
       |     |
       |     V
 9     |     Was there a response?
       |      Y     N
       |      |     |
       |      |     |
       |      |     V
 10    |      |     Run onboard tests (see chapter 7).
       |      |
       |      |
       |      V
 11    |     Take action per command response table (table 6-14).
       |      |
       |      |
       |      V
 12    |     Rerun ESCI test to verify.
       |
       |
       V
 13   Check results using DISPLAY_TEST_STATUS command.  Repeat command as
      necessary until you get a test complete status (table 6-15).
       |
       |
       V
 14   Does response indicate test passed?
       N     Y
       |     |
       |     |
       |     V
 15    |     ESCI ok.  If you cannot find problem, run NPA and DI
       |     status reports and save for next level of support.
       |
       |
       V
 16   Perform actions recommended in test status response table (table 6-15).
       |
       |
       V
    Go to B on Sheet 3
```

Figure 6-17. ESCI Online Test Procedure

(Continued)

(Continued)

```
                                                         ESCI Test Sheet 3
   From B on Sheet 2
      |
      |
      V
17    Rerun test to verify.
      |
      |
      V
18    Problem corrected?
      Y     N
      |     |
      |     |
      |     V
19    |     Run onboard tests (see chapter 7).
      |     |
      |     |
      |     V
      |     Problem corrected?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
20    |     |     Run NPA and DI hardware status reports.  Save for next level
      |     |     of support.
      |     |
      |_____|
      |
      |
      V
21    Return DI to normal operation as follows:

       - Change ESCI element state to ON (assumes test failed).

       - Start network connected to this ESCI.
```

Figure 6-17. ESCI Online Test Procedure

CML/VE Menu Summary for ESCI Online Test

The following shows the CML/VE menu choices necessary to run the ESCI online test. Each menu choice is shown on figure 6-18 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the ESCI test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (ESCI).
2	Stop network connecting to the ESCI to be tested.
3	Change ESCI element state to DOWN.
4	Start test (see table 6-14 for command response).
5	Display status of test (see table 6-15 for responses).
	Stop test early if desired.[2]

After testing, restore ESCI to normal operation as follows:

6	Put ESCI in ON state (assumes test failed).
7	Restart network.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-18.
2. Use the STOP_ESCI_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

6

```
                                ---------------------
                                CML_700 - CDCNET MENU
                                ---------------------
                                 1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
                                 2  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
                   -------------[3  MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
                   |           __[4  EXECUTE CDCNET ONLINE DIAGNOSTICS.
                   |          |  5. VIEW CDCNET STATUS DISPLAYS.
                   |          |  6. MANAGE MESSAGE LOGGING AND ALARMS.
                   |          |  7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
                   |          |     CDCNET SYSTEM DI
                   |          |_______________________________________________
                   |                                                          |
                   |                                                          |
 ----------------------------------------                ---------------------------------
 CML_730 - CDCNET DEVICE/LINE STATE MENU                 CML_740 - CDCNET DIAGNOSTICS MENU
 ----------------------------------------                ---------------------------------
[1] 1. SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.             1. SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
    2. DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.           2. RUN CIM TEST.
    3. STOP A LINE.                                     [4]3.  RUN ESCI TEST.
    4. START A LINE.                                        4. RUN LIM TEST.
[6]5.  CHANGE ELEMENT STATE TO ON.                          5. RUN MCI INLINE TEST.
[3]6.  CHANGE ELEMENT STATE TO DOWN.                        6. RUN MCI ONLINE TEST.
    7. CHANGE ELEMENT STATE TO OFF.                         7. RUN PORT TEST (INTERNAL LOOPBACK).
    8  CANCEL A LINE                                        8. RUN PORT TEST (EXT MODEM LOOPBACK).
    9. DEFINE A LINE.                                       9. RUN URI TEST.
[2] 10. STOP A NETWORK.                                    10. PERFORM DI CONFLICT TESTING.
[7] 11. START A NETWORK.                                   11. PERFORM LIM/PORT CONFLICT TESTING
   12  STOP_NP INTERFACE.                                  12. RUN NETWORK PATH VERIFICATION TEST.
   13. START_NP INTERFACE.                                 13. EXECUTE A TERMINAL/LINE ECHO TEST.
   14. MANAGE MULTIPLE LINES.                              14. PERFORM INTELLIGENT MODEM TEST.
   15. DISPLAY_HARDWARE_STATUS.                            15. SEND TEST FILE TO PUBLIC PRINTER
                                                           16. SEND TEST FILE TO PRIVATE PRINTER.
                                                           17. SEND MESSAGE TO TERMINAL /LIM PORT
                                                           18. SEND COMMANDS TO INTELLIGENT MODEM
                                                           19. MANAGE CDCNET ELEMENT STATES.
                                                       [5]20. VIEW CDCNET STATUS DISPLAYS.
```

Figure 6-18. CML/VE Menus for ESCI Online Test

CMSI Menu Summary for ESCI Online Test

The following shows the sequence of actions necessary to run the ESCI online test. Each menu choice is shown on figure 6-19 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the ESCI test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2	Stop network connected to the ESCI to be tested.
3	Change ESCI element state to DOWN.
4	Start test (see table 6-14 for command response).
5	Display status of test (see table 6-15 for responses).
	Stop test early if desired.[2]

After testing, restore ESCI to normal operation as follows:

6	Put ESCI in ON state (assumes test failed).
7	Restart network.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-19.
2. Use the STOP_ESCI_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

6

```
CMSI - CDCNET MENU - CMSI260

 1. EXECUTE NETOU IN EXPERT MODE
[2. SELECT A DI TO USE
[3. MANAGE NETWORK, DEVICE, AND LINE STATES
[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
 5. VIEW CDCNET STATUS DISPLAYS
 6. MANAGE MESSAGE LOGGING AND ALARMS
 9. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET ELEMENT SELECTIONS - CMSI262

   1. DISPLAY AVAILABLE DI NAMES
[1]2. SELECT A COMMAND MDI AND A TARGET DI FOR
      CDCNET ACTIVITIES
   3. DISPLAY CURRENTLY SELECTED COMMAND AND
      TARGET DI NAMES
   9. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET DIAGNOSTICS - CMSI264

    1. SELECT A DI TO USE
    2. RUN CIM TEST
[4]3. RUN ESCI TEST
    4. RUN LIM TEST
    5. RUN MCI INLINE TEST
    6. RUN MCI ONLINE TEST
    7. RUN PORT TEST (INTERNAL LOOPBACK))
    8. RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
    9. RUN URI TEST
   10. MORE CDCNET DIAGNOSTICS
[5]11. DISPLAY TEST STATUS
   12. DISPLAY HARDWARE STATUS
   13. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263

   1. SELECT A DI TO USE
   2. STOP A LINE
   3. START A LINE
   4. CANCEL A LINE
   5. DEFINE A LINE
[6]6. CHANGE ELEMENT STATE TO ON
[3]7. CHANGE ELEMENT STATE TO DOWN
   8 CHANGE ELEMENT STATE TO OFF
   9. MANAGE MULTIPLE LINES
  [10. MANAGE NETWORKS
   11. DISPLAY HARDWARE STATUS
   12. DISPLAY LINE STATUS (SUMMARY)
   13. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET MANAGE NETWORKS - CMSI2630

   1. SELECT A DI TO USE
[2]2. STOP A NETWORK
[7]3. START A NETWORK
   4. STOP NP INTERFACE
   5. START NP INTERFACE
   6. DISPLAY NETWORK STATUS
   9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-19. CMSI Menus for ESCI Online Test

NETOU Command Summary for ESCI Online Test

The following shows the sequence of commands necessary to run the ESCI online test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the ESCI test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_NETWORK (STON) Stop communications on the network connecting to the ESCI being tested.	senc c='ston nn=net_2',s=tdi_1
2.	CHANGE_ELEMENT_STATE (CHAES) Put ESCI in DOWN state.	senc c='chaes dn=$esci5,s=down'
3.	START_ESCI_TEST (STAET) Start test (see table 6-14 for command responses).	senc c='staet dn=$esci5 rp=10'
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-15 for responses).	senc c='dists dn=$esci5'
5.	STOP_ESCI_TEST (STOET) Stop test early if desired.	senc c='stoet dn=$esci5'

After testing, restore ESCI to normal operation as follows:

	Command and Description	Example[1]
6.	CHANGE_ELEMENT_STATE (CHAES) Put ESCI in ON state (assumes test failed).	senc c='chaes dn=$esci5,s=on'
7.	START_NETWORK (STAN) Restart network.	senc c='stan nn=net_2'

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

ESCI Test Example

Figure 6-20 shows two possible network configurations. In example 1, you cannot test $ESCI5 in TDI_1, because stopping NET_1 breaks the path to NETOU for both you and the ESCI to be tested. However, example 2 shows a redundant network configuration in which stopping one network still leaves a path to NETOU through the other. In example 2, You could test $ESCI5 in TDI_1 by using the commands given in the previous topic, NETOU Command Summary for ESCI Online Test. You could also use the equivalent CML/VE or CMSI menu selections.

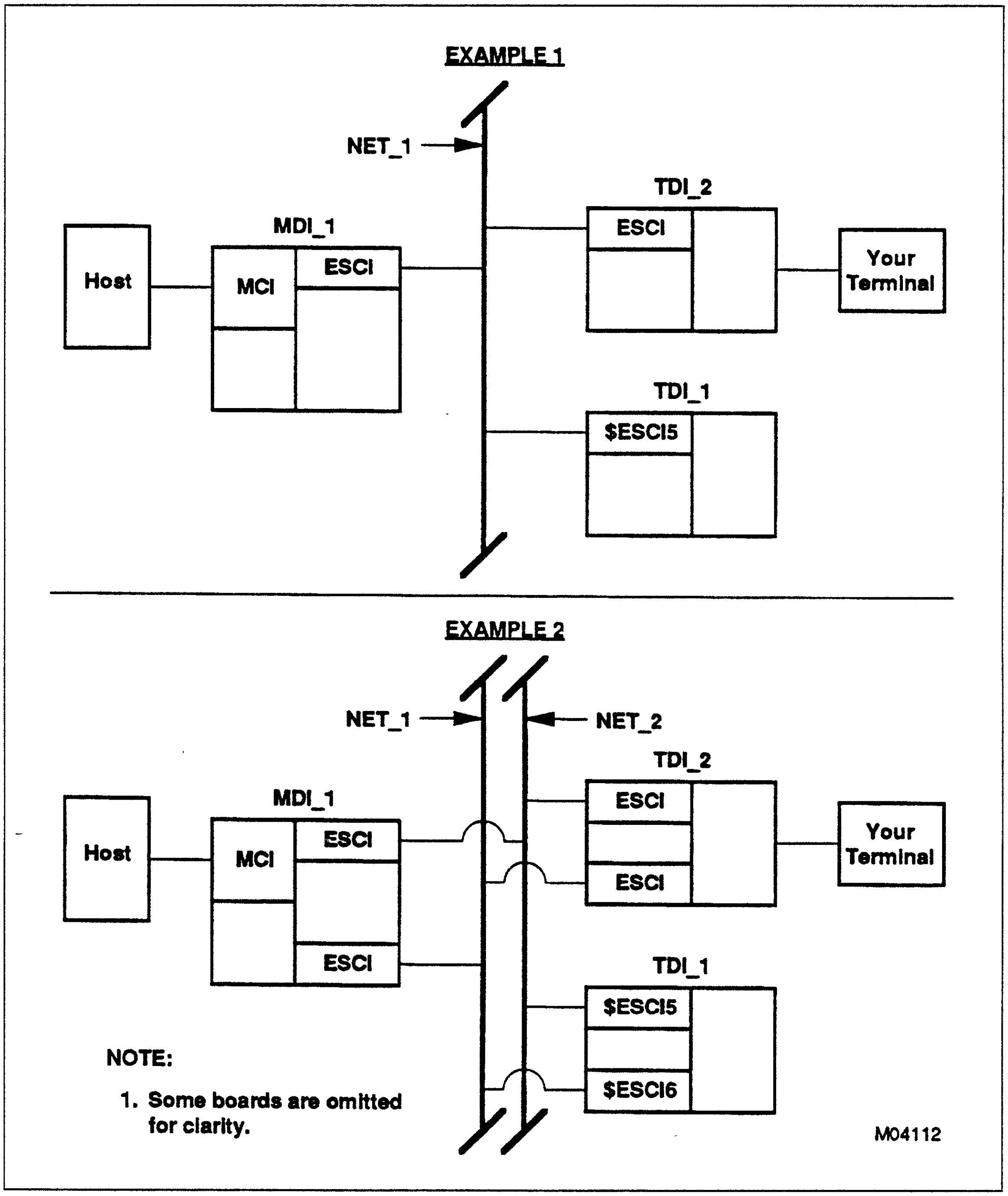


Figure 6-20. Example Network for ESCI Test

Responses for START_ESCI_TEST Command or Menu Selection

Table 6-14 lists the responses to expect after initiating a START_ESCI_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-14. Command Responses for ESCI Test

Type of Response	Message and Recommended Action

Success	`ESCI test started, version xxxx`
	`ESCI slot number=x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--ERROR-- Device $ESCIx not installed in system` ACTION: The ESCI could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $ESCIx not in "DOWN" state` ACTION: The ESCI in slot x was not put in the DOWN state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put ESCI in DOWN state and restart test.
Error	`--WARNING-- Device $ESCIx test already started` ACTION: A test is already running on the given device (x). Check for correct parameter, then either stop the test or wait for it to finish.

Error	`--FATAL-- ESCI test aborted, version xxxx`
	`ESCI slot number= x`
	`Unable to start test task`
	
	ACTION: A serious system failure has occurred. Run onboard diagnostics. Save dump analyzer reports for next level of support.

Error	`--FATAL-- ESCI test aborted, version xxxx`
	`ESCI slot number = x`
	`Test task stop flag set`
	
	ACTION: A serious system failure has occurred. The test started but terminated prematurely. Check with the system analyst.

Test Status Responses for ESCI Test

Table 6-15 shows the responses might receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-15. Display Test Status Responses for ESCI Test

Type of Response	Message and Recommended Action

Success	`ESCI test status`
	`ESCI slot number = x`
	`RUNNING  on-line version xxxx`
	`Test waiting resource`
	`Pass count = x  Total errors = x`
	
	`ESCI test status`
	`ESCI slot number = x`
	`RUNNING  on-line version xxxx`
	`Testing ESCI/MPB ICB interface`
	`Pass count = x  Total errors = x`
	
	ACTION: The test is still running. Repeat DISPLAY_TEST_STATUS check as necessary to determine when test is complete. Duration of test varies with pass count parameter. PASSED replaces RUNNING if test completes without errors.

Success	`ESCI test status`
	`ESCI slot number = x`
	`PASSED  on-line version xxxx  10/15/85  11.12.23`
	`Pass count = x`
	
	ACTION: The test completed without errors. No action is required.

Error	`ESCI test status`
	`ESCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Testing ESCI/MPB ICB interface`
	`Pass count = x  Total errors = x`
	
	ACTION: A failure was found while testing the ESCI to MPB interface. Replace the ESCI board and repeat the test.

(Continued)

Table 6-15. Display Test Status Responses for ESCI Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`ESCI test status`
	`ESCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Testing Ethernet Transceiver`
	`Pass count = x  Total errors = x`
	
	ACTION: A failure is found while testing the Ethernet transceiver. Replace the transceiver and repeat the test. If the same error occurs, replace the ESCI board. If the same error still occurs, replace the transceiver cables.

Error	`ESCI test status`
	`ESCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Testing ESCI/SMM interface`
	`Pass count = x  Total errors = x`
	
	ACTION: A failure was found while testing the ESCI to SMM interface. Replace the ESCI board and repeat the test. If the test fails after ESCI replacement, a faulty MPB or SMM board may need replacing.

Error	`ESCI test status`
	`ESCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Not enough memory currently exists to continue test`
	`Pass count = x  Total errors = x`
	
	ACTION: The test is unable to get sufficient data buffers to perform SMM data/address testing. This might indicate a system error; contact the system analyst.

Error	`--ERROR--`
	`Device $ESCI6 not installed in system`
	
	ACTION: Check the parameters and try again.

How to Run the MCI Online Test

NOTE

The MCI online test does not run on an MDI connected to a NOS/VE host, unless the VE interface has not been defined and started.

Use this test to check an inactive (DOWN state) MCI board. The DI must have an alternative path to the host initiating the diagnostics for this test to work. The MCI test checks the following:

- MCI board
- MPB to MCI and SMM to MCI interfaces
- Peripheral processor interface

The remainder of this topic explains how to use the MCI online test and interpret its results.

MCI Online Test Notes

Table 6-16 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-16. MCI Online Test Notes

1. This test works only if the DI has an alternative path to the host initiating the diagnostic, and an active network with file service defined. The second path can be another MCI, an ESCI, or a LIM port.

2. If the MCI connects to a NOS/VE peripheral processor via a concurrent input/output channel, ensure that FCO CA49716 is installed in that MCI board (see Verifying FCO Level of Equipment, in chapter 10).

3. CML/VE and CMSI MCI test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.

   - Success State = ON
   - Logging = ON
   - Stop on Error = ON
   - Repeat Pass = 1

4. If you replace a board, the onboard diagnostics run automatically after you power on the DI. Refer to chapter 7 to isolate failures that occur during onboard tests.

MCI Online Test Procedure

Figure 6-21 shows the MCI online test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                                               MCI Test Sheet 1
1     Read MCI test notes (table 6-16) before proceeding.
       |
       |
       V
2     Does MCI connect to a NOS/VE host?
       N     Y
       |     |
       |     |
       |     V
3      |     Is the VE interface to the host defined and started?
       |     N     Y
       |     |     |
       |     |     |
       |     |     V
4      |_____|     The MCI test will not run.
       |
       |
       V
5     Log in to CML/VE, CMSI, or NETOU.
       |
       |
       V
6     If you are on NOS, Select a command MDI.
       |
       |
       V
7     Select target DI.
       |
       |
       V
8     If you are on NOS, use STOP_NP_INTERFACE command to stop the interface
      between the NOS host and the MCI.
       |
       |
       V
9     Change MCI element state to DOWN.
       |
       |
       V
10    Start MCI test.
       |
       |
       V
     Go to A on Sheet 2
```

Figure 6-21. MCI Online Test Procedure

(Continued)

(Continued)

```
                                                       MCI Test Sheet 2
 From A on Sheet 1
     |
     |
     V
11   Does response indicate test started (table 6-17)?
     Y     N
     |     |
     |     |
     |     V
12   |     Was there a response?
     |     Y     N
     |     |     |
     |     |     |
     |     |     V
13   |     |     Run onboard tests (see chapter 7).
     |     |
     |     |
     |     V
14   |     Take action per command response table (table 6-17).
     |     |
     |     |
     |     V
15   |     Rerun MCI test to verify.
     |
     |
     V
16   Check results using DISPLAY_TEST_STATUS command. Repeat command as
     necessary until you get a test complete status (table 6-18).
     |
     |
     V
17   Does response indicate test passed?
     N     Y
     |     |
     |     |
     |     V
18   |     MCI ok.  If you cannot find problem, run NPA and DI
     |     status reports and save for next level of support.
     |
     |
     V
19   Perform actions recommended in test status response table (table 6-18).
     |
     |
     V
   Go to B on Sheet 3
```

Figure 6-21. MCI Online Test Procedure

(Continued)

(Continued)

```
                                                          MCI Test Sheet 3
   From B on Sheet 2
     |
     |
     V
20   Rerun test to verify.
     |
     |
     V
21   Problem corrected?
     Y     N
     |     |
     |     |
     |     V
22   |     Run onboard tests (see chapter 7).
     |     |
     |     |
     |     V
23   |     Problem corrected?
     |     Y     N
     |     |     |
     |     |     |
     |     |     V
24   |     |     Run NPA and DI hardware status reports.  Save for next level
     |     |     of support.
     |     |
     |_____|
     |
     |
     V
25   Return DI to normal operation as follows:

      - Change MCI element state to ON (assumes test failed).

      - Use START_NP_INTERFACE command or menu selection to restart the
        interface between the MCI and NOS host.
```

Figure 6-21. MCI Online Test Procedure

CML/VE Menu Summary for MCI Online Test

The following shows the CML/VE menu choices necessary to run the MCI online test on an MCI connected to a NOS host. Each menu choice is shown on figure 6-22 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the MCI test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (MCI).
2	Use STOP_NP_INTERFACE to stop interface between the MCI and NOS host.
3	Change MCI element state to DOWN.
4	Start test (see table 6-17 for command response).
5	Display status of test (see table 6-18 for responses).
	Stop test early if desired.[2]

After testing, restore MCI to normal operation as follows:

6	Put MCI in ON state (assumes test failed).
7	Restart network products (NP) interface.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-22.

2. Use the STOP_MCI_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                         ---------------------
                         CML_700 - CDCNET MENU
                         ---------------------
                          1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
                          2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
         ----------------[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
        |              __[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
        |             |   5. VIEW CDCNET STATUS DISPLAYS
        |             |   6. MANAGE MESSAGE LOGGING AND ALARMS.
        |             |   7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
        |             |      CDCNET SYSTEM DI.
        |             |_______________________________________________
        |                                                             |
        |                                                             |
---------------------------------------       ---------------------------------
CML_730 - CDCNET DEVICE/LINE STATE MENU       CML_740 - CDCNET DIAGNOSTICS MENU
---------------------------------------       ---------------------------------
[1] 1. SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.      1. SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
    2. DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.    2. RUN CIM TEST.
    3. STOP A LINE.                                  3. RUN ESCI TEST.
    4. START A LINE.                                 4. RUN LIM TEST.
[6] 5. CHANGE ELEMENT STATE TO ON.                   5. RUN MCI INLINE TEST.
[3] 6. CHANGE ELEMENT STATE TO DOWN.             [4] 6. RUN MCI ONLINE TEST.
    7. CHANGE ELEMENT STATE TO OFF.                  7. RUN PORT TEST (INTERNAL LOOPBACK).
    8. CANCEL A LINE.                                8. RUN PORT TEST (EXT MODEM LOOPBACK).
    9. DEFINE A LINE.                                9. RUN URI TEST.
   10. STOP A NETWORK.                              10. PERFORM DI CONFLICT TESTING.
   11. START A NETWORK                              11. PERFORM LIM/PORT CONFLICT TESTING.
[2]12. STOP_NP INTERFACE.                           12. RUN NETWORK PATH VERIFICATION TEST.
[7]13. START_NP INTERFACE.                          13. EXECUTE A TERMINAL/LINE ECHO TEST.
   14. MANAGE MULTIPLE LINES.                       14. PERFORM INTELLIGENT MODEM TEST.
   15. DISPLAY_HARDWARE_STATUS                      15. SEND TEST FILE TO PUBLIC PRINTER.
                                                    16. SEND TEST FILE TO PRIVATE PRINTER.
                                                    17. SEND MESSAGE TO TERMINAL /LIM PORT
                                                    18. SEND COMMANDS TO INTELLIGENT MODEM
                                                    19. MANAGE CDCNET ELEMENT STATES
                                                [5] 20. VIEW CDCNET STATUS DISPLAYS.
```

Figure 6-22. CML/VE Menus for MCI Online Test

CMSI Menu Summary for MCI Online Test

The following shows the sequence of actions necessary to run the MCI online test. Each menu choice is shown on figure 6-23 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the MCI test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2	Use STOP_NP_INTERFACE to stop interface between MCI and NOS host.
3	Change MCI element state to DOWN.
4	Start test (see table 6-17 for command response).
5	Display status of test (see table 6-18 for responses).
	Stop test early if desired.[2]

After testing, restore MCI to normal operation as follows:

6	Put MCI in ON state (assumes test failed).
7	Restart network products (NP) interface.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-23.
2. Use the STOP_MCI_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                                   ----------------------------
                                   CMSI - CDCNET MENU - CMSI260
                                   ----------------------------
                                     1  EXECUTE NETOU IN EXPERT MODE
                        ___________[2  SELECT A DI TO USE
                       |     _______[3. MANAGE NETWORK, DEVICE, AND LINE STATES
                       |    |     ___[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
                       |    |    |   5. VIEW CDCNET STATUS DISPLAYS
                       |    |    |   6. MANAGE MESSAGE LOGGING AND ALARMS
                       |    |    |   9  -----RETURN TO PREVIOUS CMSI MENU
                       |    |    |
                       |    |    |_______________________________________________
                       |    |                                                    |
                       |    |___________________________                         |
                       |                                |                        |
 ------------------------------------------             |   -----------------------------------
 CMSI - CDCNET ELEMENT SELECTIONS - CMSI262             |   CMSI - CDCNET DIAGNOSTICS - CMSI264
 ------------------------------------------             |   -----------------------------------
   1. DISPLAY AVAILABLE DI NAMES                        |      1.  SELECT A DI TO USE
[1]2. SELECT A COMMAND MDI AND A TARGET DI FOR          |      2.  RUN CIM TEST
   FOR CDCNET ACTIVITIES.                               |      3.  RUN ESCI TEST
   3. DISPLAY CURRENTLY SELECTED COMMAND AND            |      4.  RUN LIM TEST
      TARGET DI NAMES                                   |      5.  RUN MCI INLINE TEST
   9. -----RETURN TO PREVIOUS CMSI MENU                 |  [4]6.  RUN MCI ONLINE TEST
                                                        |      7.  RUN PORT TEST (INTERNAL LOOPBACK))
                                                        |      8   RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
                       _________________________________|      9.  RUN URI TEST
                       |                                      10.  MORE CDCNET DIAGNOSTICS
                       |                                  [5]11.  DISPLAY TEST STATUS
 ----------------------------------------------               12.  DISPLAY HARDWARE STATUS
 CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263              13.  -----RETURN TO PREVIOUS CMSI MENU
 ----------------------------------------------
   1. SELECT A DI TO USE
   2. STOP A LINE
   3. START A LINE
   4. CANCEL A LINE
   5. DEFINE A LINE
[6]6. CHANGE ELEMENT STATE TO ON
[3]7. CHANGE ELEMENT STATE TO DOWN
   8. CHANGE ELEMENT STATE TO OFF
   9. MANAGE MULTIPLE LINES
---[10. MANAGE NETWORKS
|   11. DISPLAY HARDWARE STATUS
|   12. DISPLAY LINE STATUS (SUMMARY)
|   13. -----RETURN TO PREVIOUS CMSI MENU
|
|____________________
                     |
                     |
 ---------------------------------------
 CMSI - CDCNET MANAGE NETWORKS - CMSI2630
 ---------------------------------------
   1. SELECT A DI TO USE
   2. STOP A NETWORK
   3. START A NETWORK
[2]4. STOP NP INTERFACE
[7]5. START NP INTERFACE
   6. DISPLAY NETWORK STATUS
   9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-23. CMSI Menus for MCI Online Test

NETOU Command Summary for MCI Online Test

The following shows the sequence of commands necessary to run the MCI online test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the MCI test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_NP_INTERFACE (STONI) Use for NOS systems to stop both the network products and underlying channel trunk protocols.	`senc c='stoni in=cyber_109'`
2.	CHANGE_ELEMENT_STATE (CHAES) Put CIM in DOWN state.	`senc c='chaes dn=$mci7,s=down'`
3.	START_MCI_TEST (STAMT) Start test (see table 6-17 for command responses).	`senc c='stamt dn=$mci7 rp=10'`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-18 for responses).	`senc c='dists dn=$mci7'`
5.	STOP_MCI_TEST (STOMT) Stop test early if desired.	`senc c='stomt dn=$mci7'`

After testing, restore MCI to normal operation as follows:

	Command and Description	Example[1]
6.	CHANGE_ELEMENT_STATE (CHAES) Put MCI in ON state (assumes test failed).	`senc c='chaes dn=$mci7,s=on'`
7.	START_NP_INTERFACE (STANI) Use for NOS to restart channel trunk protocol.	`senc c='stani in=cyber_109'`

NOTES:

1. Use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

MCI Online Test Example

Figure 6-24 shows two possible network configurations. In example 1, you cannot test the MCI in MDI_1 because you must stop the path to the host. However, in example 2 the MDI has two MCI boards and a path to an alternative host, so stopping one trunk still leaves a path to NETOU through the other. In example 2, You could test $MCI7 in MDI_1 by signing on to host 2 and using the commands given in the previous topic, NETOU Command Summary for MCI Online Test. You could also use the equivalent CML/VE or CMSI menu selections.

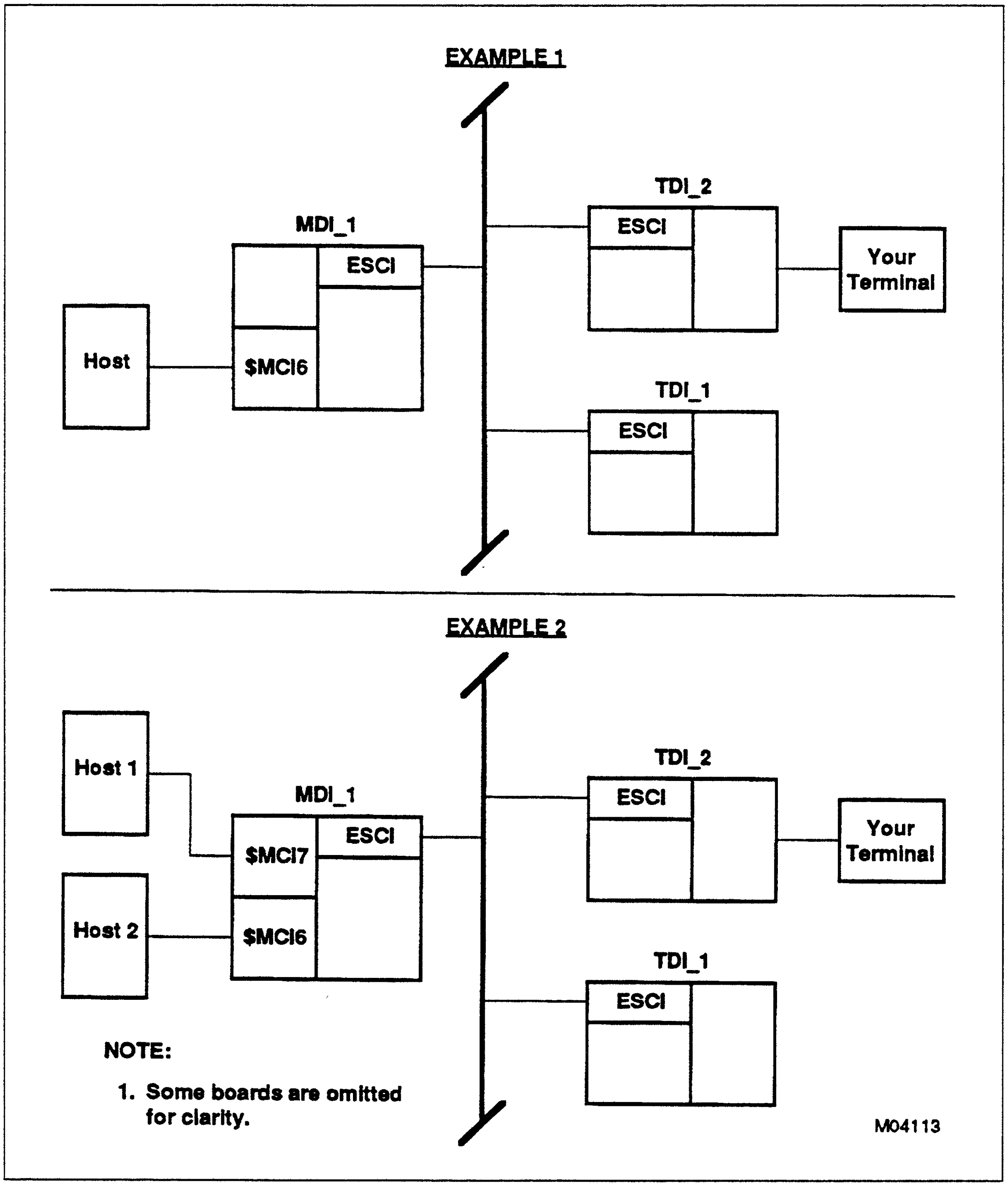


Figure 6-24. Example Network for MCI Online Test

Responses for START_MCI_TEST Command or Menu Selection

Table 6-17 lists the responses to expect after initiating a START_MCI_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-17. Command Responses for MCI Online Test

Type of Response	Message and Recommended Action

Success	`MCI test started, version xxxx`
	`MCI slot number=x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--ERROR-- Device $MCIx not installed in system` ACTION: The MCI could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $MCIx not in "DOWN" state` ACTION: The MCI in slot x was not put in the DOWN state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put MCI in DOWN state, and restart test.
Error	`--ERROR-- Device $MCIx test already started` ACTION: A test is already running on the given device (x). Check for correct parameter, then either stop the test or wait for it to finish.

Error	`--ERROR-- Device $MCIx test already started.`
	`Only one MCI test is allowed to be Active at one time.`
	`Stop Active test or wait for it to complete.`
	
	ACTION: Before running another MCI test, you must wait for the initial test to complete.

(Continued)

Table 6-17. Command Responses for MCI Online Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`--FATAL-- MCI test aborted, version xxxx`
	`MCI slot number= 7`
	`Unable to start test task`
	
	ACTION: A serious system failure has occurred. Run the onboard diagnostics. Save dump analyzer reports for next level of support.

Error	`--FATAL-- MCI test aborted, version xxxx`
	`MCI slot number = 7`
	`Test task stop flag set`
	
	ACTION: A serious system failure has occurred. The test started but terminated prematurely. Check with the system analyst.

Test Status Responses for MCI Online Test

Table 6-18 shows the responses you receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-18. Display Test Status Responses for MCI Online Test

Type of Response	Message and Recommended Action

Success	`MCI test status`
	`MCI slot number = x`
	`RUNNING  on-line version xxxx`
	`Waiting for initial host response`
	`Pass count = x  Total errors = x`
	
	`MCI test status`
	`MCI slot number = x`
	`RUNNING  on-line version xxxx`
	`Testing MCI/PP interface`
	`Pass count = x  Total errors = x`
	
	ACTION: The test is still running. Repeat DISPLAY_TEST_STATUS check as necessary to determine when test is complete. Duration of test varies with pass count parameter.

Success	`MCI test status`
	`MCI slot number = x`
	`PASSED  on-line version xxxx  10/15/85  11.12.23`
	`Pass count = x`
	
	ACTION: The test completed without errors. No action is required.

Error	`MCI test status`
	`MCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Testing MCI/MPB interface`
	`Pass count = x  Total errors = x`
	
	ACTION: A failure is found while testing the MCI to MPB interface. Replace the MCI board and repeat the test.

(Continued)

Table 6-18. Display Test Status Responses for MCI Online Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`MCI test status`
	`MCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Testing MCI/PP interface`
	`Pass count = x  Total errors = x`
	
	ACTION: A failure is found while testing the MCI to peripheral processor interface. Replace the MCI board and repeat the test. If the same error still occurs, check the peripheral processor cables, then the peripheral processor and channel.

Error	`MCI test status`
	`MCI slot number = x`
	`FAILED  on-line version xxxx  10/15/85  11.12.23`
	`Waiting for initial host response`
	`Pass count = x  Total errors = x`
	
	ACTION: Verify that the peripheral processor program is active. Check the peripheral processor channel cables and then the peripheral processor status.

Error	`--ERROR--`
	`Device $MCI6 not installed in system`
	
	ACTION: Check the parameters and try again.

How to Run the MCI Inline Test

Use this diagnostic if you need to test an MCI board without putting it in a DOWN state. The MCI inline test shares access to the MCI with nondiagnostic software. This allows the MCI to continue with normal operations during testing.

The remainder of this topic explains how to use the MCI inline test and interpret its results.

MCI Inline Test Notes

Table 6-19 contains information necessary to perform the test properly. This information includes prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-19. MCI Inline Test Notes

1. CML/VE and CMSI MCI inline test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.
   - Message Count = 10
   - Message Length = MIXED
   - Message Interval = 0
2. If you replace a board, the onboard diagnostics run automatically after you power on the DI. Refer to chapter 7 to isolate failures that occur during onboard tests.
3. If the MCI connects to a NOS/VE peripheral processor through a concurrent input/output channel, ensure that FCO CA49716 is installed in the MCI board (see Verifying FCO Level of Equipment in chapter 10).

MCI Inline Test Procedure

Figure 6-25 shows the MCI inline test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                             MCI Inline Test Sheet 1

1    Read MCI inline test notes (table 6-19) before proceeding.
      |
      |
      V
2    Log in to CML/VE, CMSI, or NETOU.
      |
      |
      V
3    If you are on NOS, select a command MDI.
      |
      |
      V
4    Select target DI.
      |
      |
      V
5    Is MCI in ON state (check using display hardware status)?
      Y     N
      |     |
      |     |
      |     V
6     |    Change MCI element state to ON.
      |     |
      |_____|
      |
      |
      V
7    Is MCI active?
      Y     N
      |     |
      |     |
      |     V
8     |    See analyst for assistance.
      |     |
      |_____|
      |
      |
      V
9    Start MCI inline test.
      |
      |
      V
    Go to A on Sheet 2
```

Figure 6-25. MCI Inline Test Procedure

(Continued)

(Continued)

```
                                                 MCI Inline Test Sheet 2
 From A on Sheet 1
     |
     |
     V
10   Does response indicate test started (table 6-20)?
     Y     N
     |     |
     |     |
     |     V
11   |     Was there a response?
     |     Y     N
     |     |     |
     |     |     |
     |     |     V
12   |     |     Run onboard tests (see chapter 7).
     |     |
     |     |
     |     V
13   |     Take action per command response table (table 6-20).
     |     |
     |     |
     |     V
14   |     Rerun MCI inline test to verify.
     |
     |
     V
15   Check results using DISPLAY_TEST_STATUS command. Repeat command as
     necessary until you get a test complete status (table 6-21).
     |
     |
     V
16   Does response indicate test passed?
     N     Y
     |     |
     |     |
     |     V
17   |     MCI ok.  If you cannot find problem, run NPA and DI
     |     status reports and save for next level of support.
     |
     |
     V
18   Perform actions recommended in test status response table (table 6-21).
     |
     |
     V
   Go to B on Sheet 3
```

Figure 6-25. MCI Inline Test Procedure

(Continued)

(Continued)

```
                                                  MCI Inline Test Sheet 3
   From B on Sheet 2
      |
      |
      V
 19   Rerun test to verify.
      |
      |
      V
 20   Problem corrected?
      Y     N
      |     |
      |     |
      |     V
 21   |     Run onboard tests (see chapter 7).
      |     |
      |     |
      |     V
 22   |     Problem corrected?
      |     Y     N
      |     |     |
      |     |     |
      |     |     V
 23   |     |     Run NPA and DI hardware status reports.  Save for next level
      |     |     of support.
      |     |
      |_____|
      |
      |
      V
 24   Return DI to normal operation.
```

Figure 6-25. MCI Inline Test Procedure

CML/VE Menu Summary for MCI Inline Test

The following shows the CML/VE menu choices necessary to run the MCI inline test. Each menu choice is shown on figure 6-26 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the MCI inline test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (MCI).
2	Check hardware status to ensure MCI is in the ON state and active.
3	If necessary, change MCI element state to ON.
	Ensure MCI is in active state. If it is not active, see analyst for assistance.
4	Start test (see table 6-20 for command response).
5	Display status of test (see table 6-21 for responses).
	Stop test early if desired.[2]

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-26.

2. Use the STOP_MCI_INLINE_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                                 ---------------------
                                 CML_700 - CDCNET MENU
                                 ---------------------
                                 1  EXECUTE NETOU IN EXPERT (COMMAND MODE)
                                 2  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
                  -------------[3  MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
                  |          __[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
                  |          |   5  VIEW CDCNET STATUS DISPLAYS.
                  |          |   6  MANAGE MESSAGE LOGGING AND ALARMS.
                  |          |   7  INTERACTIVELY ENTER COMMANDS TO THE CURRENT
                  |          |      CDCNET SYSTEM DI
                  |          |-----------------------------------------------
                  |                                                          |
                  |                                                          |
---------------------------------------              ---------------------------------
CML_730 - CDCNET DEVICE/LINE STATE MENU              CML_740 - CDCNET DIAGNOSTICS MENU
---------------------------------------              ---------------------------------
[1] 1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.          1.  SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
    2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.        2.  RUN CIM TEST.
    3.  STOP A LINE.                                      3.  RUN ESCI TEST.
    4.  START A LINE.                                     4   RUN LIM TEST.
[3] 5.  CHANGE ELEMENT STATE TO ON.                   [4  5.  RUN MCI INLINE TEST.
    6   CHANGE ELEMENT STATE TO DOWN                      6.  RUN MCI ONLINE TEST
    7.  CHANGE ELEMENT STATE TO OFF.                      7.  RUN PORT TEST (INTERNAL LOOPBACK).
    8.  CANCEL A LINE                                     8   RUN PORT TEST (EXT MODEM LOOPBACK).
    9.  DEFINE A LINE.                                    9.  RUN URI TEST.
    10  STOP A NETWORK.                                   10. PERFORM DI CONFLICT TESTING.
    11  START A NETWORK.                                  11. PERFORM LIM/PORT CONFLICT TESTING.
    12  STOP_NP INTERFACE.                                12. RUN NETWORK PATH VERIFICATION TEST.
    13  START_NP INTERFACE.                               13  EXECUTE A TERMINAL/LINE ECHO TEST.
    14. MANAGE MULTIPLE LINES                             14. PERFORM INTELLIGENT MODEM TEST.
    15. DISPLAY_HARDWARE_STATUS                           15  SEND TEST FILE TO PUBLIC PRINTER.
                                                          16  SEND TEST FILE TO PRIVATE PRINTER.
                                                          17  SEND MESSAGE TO TERMINAL /LIM PORT.
                                                          18  SEND COMMANDS TO INTELLIGENT MODEM.
                                                          19. MANAGE CDCNET ELEMENT STATES.
                                                  [2] [5] 20. VIEW CDCNET STATUS DISPLAYS.
```

Figure 6-26. CML/VE Menus for MCI Inline Test

CMSI Menu Summary for MCI Inline Test

The following shows the sequence of actions necessary to run the MCI inline test. Each menu choice is shown on figure 6-27 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CMSI. Familiarize yourself with the MCI inline test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select command MDI and target DI.
2	Check hardware status to ensure MCI is in the ON state and active.
3	If necessary, change MCI element state to ON.
	Ensure MCI is in active state. If it is not active, see analyst for assistance.
4	Start test (see table 6-20 for command response).
5	Display status of test (see table 6-21 for responses).
	Stop test early if desired.[2]

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-27.

2. Use the STOP_MCI_INLINE_TEST command to stop the test. CML/VE does not have a stop test option. Normally it is not necessary because only one pass of the test is performed.

```
                                  ----------------------------
                                  CMSI - CDCNET MENU - CMSI260
                                  ----------------------------
                                   1  EXECUTE NETOU IN EXPERT MODE
                      ___________[2.  SELECT A DI TO USE
                      |    _______[3. MANAGE NETWORK, DEVICE, AND LINE STATES
                      |    |    ___[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
                      |    |    |   5  VIEW CDCNET STATUS DISPLAYS
                      |    |    |   6. MANAGE MESSAGE LOGGING AND ALARMS
                      |    |    |   9. -----RETURN TO PREVIOUS CMSI MENU
                      |    |    |
                      |    |    |_____________________________________________
                      |    |                                                  |
                      |    |__________________________                        |
                      |                               |                       |
------------------------------------------            |   -----------------------------------
CMSI - CDCNET ELEMENT SELECTIONS - CMSI262             |   CMSI - CDCNET DIAGNOSTICS - CMSI264
------------------------------------------            |   -----------------------------------
  1. DISPLAY AVAILABLE DI NAMES                        |     1. SELECT A DI TO USE
[1]2. SELECT A COMMAND MDI AND A TARGET DI FOR         |     2. RUN CIM TEST
    CDCNET ACTIVITIES                                  |     3. RUN ESCI TEST
  3 DISPLAY CURRENTLY SELECTED COMMAND AND             |     4  RUN LIM TEST
    TARGET DI NAMES                                    |  [4]5. RUN MCI INLINE TEST
  9. -----RETURN TO PREVIOUS CMSI MENU                 |     6. RUN MCI ONLINE TEST
                                                       |     7. RUN PORT TEST (INTERNAL LOOPBACK))
                                                       |     8. RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
                      _________________________________|     9. RUN URI TEST
                      |                                     10. MORE CDCNET DIAGNOSTICS
                      |                                 [5]11. DISPLAY TEST STATUS
----------------------------------------------          [2]12. DISPLAY HARDWARE STATUS
CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263             13. -----RETURN TO PREVIOUS CMSI MENU
----------------------------------------------
  1. SELECT A DI TO USE
  2. STOP A LINE
  3. START A LINE
  4  CANCEL A LINE
  5. DEFINE A LINE
[3]6. CHANGE ELEMENT STATE TO ON
  7. CHANGE ELEMENT STATE TO DOWN
  8. CHANGE ELEMENT STATE TO OFF
  9. MANAGE MULTIPLE LINES
  10. MANAGE NETWORKS
  11. DISPLAY HARDWARE STATUS
  12. DISPLAY LINE STATUS (SUMMARY)
  13. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-27. CMSI Menus for MCI Inline Test

NETOU Command Summary for MCI Inline Test

The following shows the sequence of commands necessary to run the MCI inline test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the MCI inline test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	DISPLAY_HARDWARE_STATUS (DISH) Check hardware status to ensure MCI is in the ON state and active.	`senc c='dishs dn=$mci7',s=mdi_1`
2.	CHANGE_ELEMENT_STATE (CHAES) If necessary, put MCI in ON state. Ensure MCI is in active state. If MCI is not active, see analyst for assistance.	`senc c='chaes dn=$mci7,s=on',s=mdi_1`
3.	START_MCI_INLINE_TEST (STAMIT) Start test (see table 6-20 for command responses).	`senc c='stamit dn=$mci7 mc=50',s=mdi_1`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test (see table 6-21 for responses).	`senc c='dists dn=$mci7',s=mdi_1`
5.	STOP_MCI_INLINE_TEST (STOMIT) Stop test early if desired.	`senc c='stomit dn=$mci7',s=mdi_1`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

MCI Inline Test Example

Figure 6-28 shows a possible network configuration. You could test either MCI in figure 6-28 by using the the commands given in the previous topic, NETOU Command Summary for MCI Inline Test. You could also use the equivalent CML/VE or CMSI menu selections.

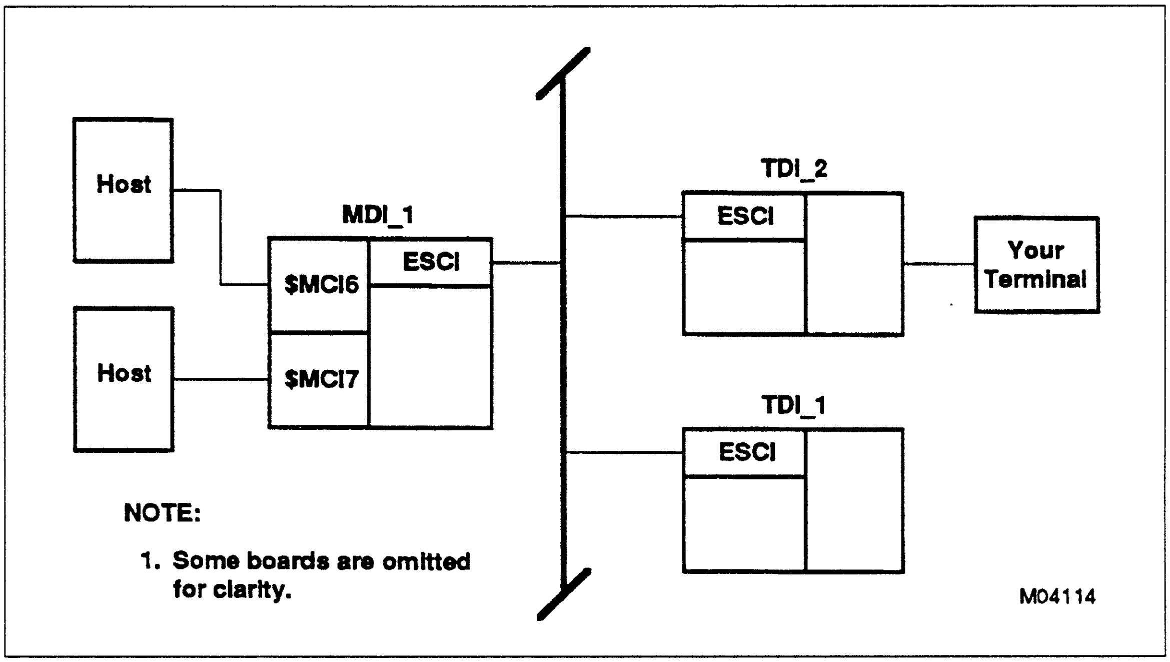


Figure 6-28. Example Network for MCI Inline Test

Responses for START_MCI_INLINE_TEST Command or Menu Selection

Table 6-20 lists the responses to expect after initiating a START_MCI_INLINE_TEST command or making the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-20. Command Responses for MCI Inline Test

Type of Response	Message and Recommended Action
Success	`MCI inline test, version xxxx started for device $MCIx` ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.
Error	`--ERROR-- Device $MCIx not installed in system` ACTION: The MCI could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $MCIx not in "ON" state` ACTION: The MCI in slot x was not in the ON state before starting the test. Use CHANGE_ELEMENT_STATE command or menu selection to put MCI in ON state, and restart test.
Error	`--ERROR-- Device $MCIx not an MCI board` ACTION: Check for the correct parameter.
Error	`--ERROR-- An NP interface or channel network solution for device $MCIx is not defined.` ACTION: The CDCNET software interface for the MCI board in slot x is not defined. Refer to the DEFINE_NP_INTERFACE command (for NOS) or the DEFINE_CHANNEL_NET command (for NOS/VE) in the CDCNET Network Operations and Analysis manual. See network analyst for assistance.

(Continued)

Table 6-20. Command Responses for MCI Inline Test *(Continued)*

Type of Response	Message and Recommended Action
Error	`--ERROR-- Channel trunk for device $MCIx is not defined` ACTION: The MCI channel for the board in slot x is not defined to the CDCNET system. Refer to the DEFINE_CHANNEL_TRUNK command in the CDCNET Network Operations manual. See network analyst for assistance.
Error	`--ERROR-- C170 interface for device x is not up` ACTION: Have system analyst check CYBER 170 for properly defined channel configuration.
Error	`--ERROR-- Channel network solution for the device x is not up` ACTION: Have system analyst check host for properly defined channel configuration.

Error	`--ERROR-- Unable to start the MCI inline diagnostic task`
	`Not enough memory is available for the required table space`
	
	ACTION: The test is unable to get sufficient DI memory to perform the test. This might indicate a system error; contact the system analyst.

Error	`--WARNING-- Inline test for device x is already started` ACTION: No action is required.

Test Status Responses for MCI Inline Test

Table 6-21 shows the responses you receive from a display test status command or menu selection. The table includes corrective actions for errors.

Table 6-21. Display Test Status Responses for MCI Inline Test

Type of Response	Message and Recommended Action

Success	`MCI test status`
	`MCI slot number = x`
	`RUNNING  inline version xxxx`
	`Test waiting resource`
	`Pass count = x  Total errors = x`
	
	ACTION: The test is still running. Repeat DISPLAY_TEST_STATUS as necessary to determine when test is complete.

Success	`MCI test status`
	`MCI slot number = x`
	`PASSED  inline version xxxx  10/15/85  11.12.23`
	`Pass count = x`
	
	ACTION: The test completed without errors. No action is required.

Error	`MCI test status`
	`MCI slot number = x`
	`FAILED  inline version xxxx  10/15/85  11.12.23`
	`Testing MCI inline data`
	`Pass count = x  Total errors = x`
	
	ACTION: Before replacing a board, generate the NPA MCI statistics reports and perform the DI status reports, retaining the information for the next level of support.

How to Run the Network Path Verification Inline Tests

Use one of the two network path verification test options to check the path between two device interfaces:

- Direct Subnet Connect Test - Use this test to check a path between two DIs that are directly connected to the same network. This option allows you to select a specific path, if more than one path exists (see example 1, later in this topic).
- Multi-Hop Echo Test - Use this test to verify that there is an operational path between two selected DIs. Unlike, the subnet connect test, the DIs can be anywhere in the catenet and do not have to connect directly to the same network (see example 2, later in this topic).

The remainder of this topic explains how to use the network path verification tests and interpret their results.

Network Path Verification Test Notes

Table 6-22 contains information necessary to perform the test properly. This information includes prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-22. Network Path Verification Test Notes

1. If the DIs under test do not have release 1.5.1 or above software, these tests may not work.
2. You can use CML/VE menus or NETOU commands to run the Direct Subnet Connect or Multi-Hop Echo tests. They are not available through CMSI.
3. CML/VE test parameter settings for the Direct Subnet Connect test are as follows. Use NETOU expert (command) mode if you need other settings.
   - Message Length = MIXED
   - Message Count = 1
   - Message Interval = 0
   - Repeat Pass = 1
   - Logging = ON
   - Stop on Error = ON

Network Path Verification Test Procedure

Figure 6-29 shows the network path verification test procedure. Refer to the command summary topics for listings of required commands and menu selections.

```
                                         Network Path Verification Test Sheet 1

 1    Read network path verification test notes (table 6-22).
       |
       |
       V
 2    Log in to CML/VE to use menu selections or NETOU to use commands
      (you can also use commands through CML/VE or CMSI expert modes).
       |
       |
       V
 3    If you are on NOS, select a command MDI.
       |
       |
       V
 4    Start desired test:

      -  To check a path between DIs that connect directly to the same network,
         use the Direct Subconnect test.

      -  To check a path between DIs that do not connect directly to the same
         network, use Multi-Hop Echo test.
       |
       |
       V
 5    Does response indicate test started (tables 6-23 and 6-24)?
       Y     N
       |     |
       |     |
       |     V
 6     |    Was there a response?
       |     Y     N
       |     |     |
       |     |     |
       |     |     V
 7     |     |    Run online tests.
       |     |
       |     |
       V     V
    To A and B on Sheet 2
```

Figure 6-29. Network Path Verification Test Procedure

(Continued)

(Continued)

```
                                     Network Path Verification Test Sheet 2
  From A and B on Sheet 1
        |     |
        |     |
        |     |
 8      |     Take action per appropriate command response table (tables 6-23
        |     and 6-24).
        |     |
        |     |
        |     V
 9      |     Rerun test to verify.
        |
        |
        V
 10     Check test results.
        |
        |
        V
 11     Did any errors occur?  Use DISPLAY_TEST_STATUS for Subnet Connect
        test (table 6-24).
        Y     N
        |     |
        |     |
        |     V
 12     |     Network path ok.
        |
        |
        V
 13     Perform actions recommended in table 6-23 for Echo test and 6-25 for
        Subnet Connect test.
```

Figure 6-29. Network Path Verification Test Procedure

CML/VE Menu Summary for Network Path Verification Test

The following shows the CML/VE menu choices necessary to run the network path verification test. Each menu choice is shown on figure 6-30 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select Run Network Path Verification Test.
2	Select source system.
3	Select target system.
4	Select subnet (Direct Subnet Connect test only)
5	Select Direct Subnet Connect or Multi-Hop Echo. [2]
6	Display test status (applies only to Direct Subnet Connect test).

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-30.

2. If subnet connect test is currently running, either let it finish, or use the the STOP_SUBNET_CONNECT_TEST command (see appendix G) to stop it.

6

```
CML_700 - CDCNET MENU

1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
5. VIEW CDCNET STATUS DISPLAYS.
6. MANAGE MESSAGE LOGGING AND ALARMS.
7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
   CDCNET SYSTEM DI


CML_730 - CDCNET NAMES SELECTION MENU

1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.
2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.
3.  STOP A LINE.
4.  START A LINE.
5.  CHANGE ELEMENT STATE TO ON.
6.  CHANGE ELEMENT STATE TO DOWN.
7.  CHANGE ELEMENT STATE TO OFF.
8.  CANCEL A LINE.
9.  DEFINE A LINE.
10. STOP A NETWORK.
11. START A NETWORK.
12. STOP_NP INTERFACE.
13. START_NP INTERFACE.
14  MANAGE MULTIPLE LINES.
15. DISPLAY_HARDWARE_STATUS.


CML_740 - CDCNET DIAGNOSTICS MENU

     1.  SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
     2.  RUN CIM TEST.
     3.  RUN ESCI TEST.
     4.  RUN LIM TEST.
     5   RUN MCI INLINE TEST
     6.  RUN MCI ONLINE TEST.
     7.  RUN PORT TEST (INTERNAL LOOPBACK).
     8   RUN PORT TEST (EXT MODEM LOOPBACK).
     9.  RUN URI TEST.
     10  PERFORM DI CONFLICT TESTING.
     11. PERFORM LIM/PORT CONFLICT TESTING.
[1]  12. RUN NETWORK PATH VERIFICATION TEST.
     13. EXECUTE A TERMINAL/LINE ECHO TEST.
     14. PERFORM INTELLIGENT MODEM TEST
     15. SEND TEST FILE TO PUBLIC PRINTER.
     16  SEND TEST FILE TO PRIVATE PRINTER.
     17. SEND MESSAGE TO TERMINAL /LIM PORT
     18. SEND COMMANDS TO INTELLIGENT MODEM.
     19  MANAGE CDCNET ELEMENT STATES.
[6]  20. VIEW CDCNET STATUS DISPLAYS.


CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU

1. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES
2. STOP ALL LINES EXCEPT ACTIVE LINES.
3. DOWN ALL STOPPED, CONFIGURED, AND
   UNCONFIGURED LINES.
4. STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
5. STOP AND DOWN ALL LINES (WARNING, THIS
   INCLUDES  LINES CURRENTLY IN USE).
6. SET ALL PORTS TO ON STATE.
7. SET ALL LIMS TO DOWN STATE.
8. SET ALL LIMS TO ON STATE.
9. DISPLAY_HARDWARE_STATUS.


CML_743 - NETWORK PATH VERIFICATION TEST

[2] 1. SELECT A SOURCE SYSTEM NAME.
[3] 2. SELECT A TARGET SYSTEM NAME
[4] 3. SELECT A SUBNET NAME.
[5] 4. RUN DIRECT SUBNET CONNECT TEST.
[5] 5. RUN MULTI-HOP ECHO TEST.
```

Figure 6-30. CML/VE Menus for Network Path Verification Test

NETOU Command Summary for Subnet Connect and Echo Tests

The following shows the sequence of commands necessary to run the Direct Subnet Connect and Multi-Hop Echo tests. The purpose of this topic is to serve as a quick reference for the commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Also familiarize yourself with the network path verification test notes given earlier in this topic before running a test.

Direct Subnet Connect Test

	Command and Description	Example[1]
1.	START_SUBNET_CONNECT_TEST (STASCT) Starts a check of the specified path (see table 6-24 for command responses).	`senc c='stasct ds=ndi_b2 sn=net_1..` `rp=10',s=mdi_1`
2.	DISPLAY_TEST_STATUS (DISTS) Display status of test see table 6-24 for command responses).	`senc c='dists d=net_1'`
3.	STOP_SUBNET_CONNECT_TEST (STOSCT) Stops test early if desired.	`senc c='stosct sn=net_1'`

Multi-Hop Echo Test

	Command and Description	Example[1]
1.	EXECUTE_ECHO_TEST (EXEET) Starts a check between the specified systems (see table 6-23 for command responses).	`senc c='exeet ds=tdi_c2,s=tdi_a2`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

Network Path Verification Test Examples

The following examples show how to check network paths with the Direct Subnet Connect and Multi-Hop Echo tests.

Example 1 - Direct Subnet Connect Test

Refer to figure 6-31 and verify the path going from MDI_1, through NET_1, to NDI_B2. Here, there are two possible paths between the DIs. One through NET_1 and another through NET_2. To ensure that the desired path is tested, use the Direct Subnet Connect test and specify NET_1. The command is as follows (you can also use the CML/VE menu selection).

```
senc c='stasct ds=ndi_b2 sn=net_1',s=mdi_1
```

During the test, MDI_1 sends a test message to NDI_B2 via NET_1. If NDI_B2 responds correctly, the path is ok.

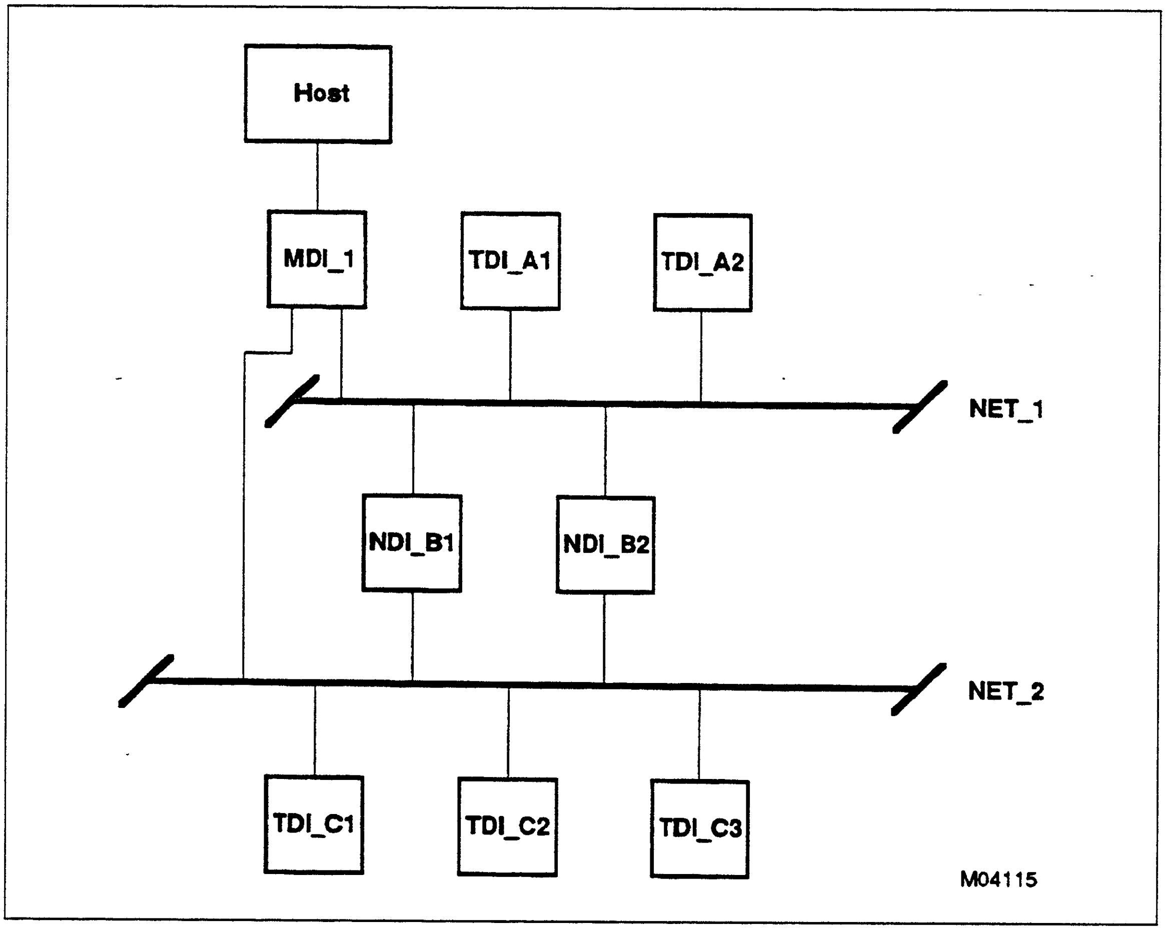


Figure 6-31. Direct Subnet Connect Path Example

Example 2 - Multi-Hop Echo Test Example

Refer to figure 6-32 and verify that there is an operational path between TDI_C2 and TDI_A2. Here, you are checking a link between DIs that are not directly connected to the same network. Therefore, the Direct Subnet Connect test will not work and you must use the Multi-Hop Echo test. You could use the following command or the CML/VE menu selection.

```
senc c='exeet ds=tdi_c2',s=tdi_a2
```

During the test, TDI_A2 sends a message to TDI_C2 via one of the three available paths (NDI_B1, NDI_B2, or MDI_1). The test chooses the path. If TDI_C2 echoes the message back correctly, it indicates that one of the paths is operational.

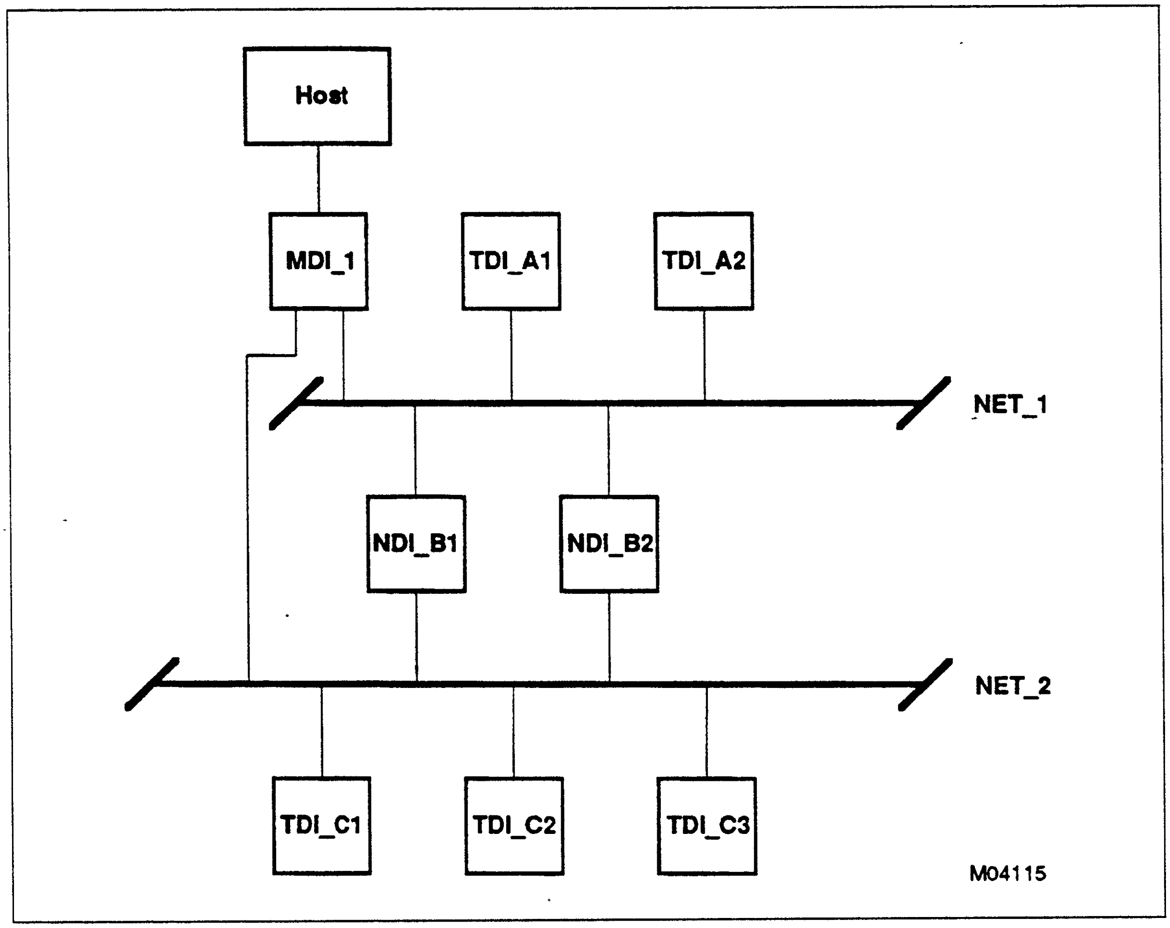


Figure 6-32. Multi-Hop Echo Test Example

Responses for EXECUTE_ECHO_TEST Command or Menu Selection

Table 6-23 lists the responses to expect after initiating an echo test with either the EXECUTE_ECHO_TEST or the equivalent CML/VE menu selection (Run Multi-Hop Echo test). A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-23. Command Responses for Echo Test

Type of Response	Message and Recommended Action

Success	`Echo Test to TDI_x PASSED`
	`Response time (msec.)= 3420`
	
	ACTION: Test successful. No action required.

Error	`--ERROR-- System TDI_x is unknown` ACTION: The device interface could not be located. Either it is unable to respond to commands or you used an incorrect device name.
Error	`--ERROR-- System TDI_x is NOT a CDCNET OSI system` ACTION: The DI does not support the OSI protocol stack. The source, destination, and any NDIs or MDIs in the data path must support the OSI stack to run this test.

Error	`--ERROR-- Echo Test to TDI_x FAILED.`
	`Unsuccessful CLSNS Data Request`
	
	ACTION: Troubleshoot source DI as described in the Troubleshooting a DI procedure in chapter 5.

Error	`--ERROR-- Echo Test to TDI_x FAILED.`
	`No response from the Destination System.`
	
	ACTION: Run the test from different source and destination systems to isolate the failure to a specific DI or segment of the subnet. Run the Subnet Connect test between directly connected DIs to help isolate the problem. If a specific DI is isolated, run online diagnostics on that DI. Also, check the physical connections of the network device (for example: Ethernet transceivers, transceiver cables, or LIM cables.

(Continued)

Table 6-23. Command Responses for Echo Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`--ERROR-- Echo Test to TDI_x FAILED.`
	`Destination System is NOT a CDCNET OSI system.`
	
	ACTION: The DI does not support the OSI protocol stack. The source, destination, and any NDIs or MDIs in the data path must support OSI to run this test.

Error	`--ERROR-- Echo Test to TDI_x FAILED.` `No Echo Test Task ID Table Space Available.`

Error	`--ERROR-- Echo Test to TDI_x FAILED.`
	`System Error - No data buffers available.`
	
	ACTION: With either of these errors, troubleshoot source DI per Troubleshooting a DI procedure in chapter 5.

Responses for SUBNET_CONNECT_TEST Command or Menu Selection

Table 6-24 lists the responses to expect after initiating a subnet connect test with either a command or the equivalent menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-24. Command Responses for Subnet Connect Test

Type of Response	Message and Recommended Action

Success	`Subnet Connect Test STARTED`
	`Destination System = NDI_x`
	`Subnet = NET_x`
	
	ACTION: Use DISPLAY_TEST_STATUS to determine when test is complete and whether any errors occurred.

Error	`--INFORMATIVE-- Subnet NET_x is not available for testing.` ACTION: Troubleshoot network solution per Troubleshooting Network Solutions procedures in chapter 5.
Error	`--ERROR-- Subnet Connect Test of NET_x is already running.` ACTION: A subnet test is already running in NET_x. Check that you have specified the correct system, then either stop the test or wait for it to finish.
Error	`--ERROR-- Subnet NET_x is congested, the test may not be started.` ACTION: Check with system analyst or next level of support.
Error	`--ERROR-- System TDI_x is unknown` ACTION: The device interface could not be located. Verify that you used the correct device name parameter. Verify that the DI is operational (see Troubleshooting a DI in chapter 5). Run the test from different source and destination systems to isolate the failure to a specific device or segment of the subnet.
Error	`--ERROR-- System TDI_x is NOT a CDCNET OSI system` ACTION: The DI does not support the OSI protocol stack. Both source and destination must support OSI to run this test.

(Continued)

Table 6-24. Command Responses for Subnet Connect Test *(Continued)*

Type of Response	Message and Recommended Action
Error	`--ERROR-- Subnet NET_x is not directly connected.` ACTION: Cannot use Direct Subnet Connect test because both the source and target DI must connect directly to the specified subnet. Use Multi-Hop Echo Test instead.

Error	`--ERROR-- System TDI_x is not directly connected via subnet NET_x`
	`The Subnet Connect Test only allows directly connected systems to be tested.`
	
	ACTION: Cannot use Direct Subnet Connect test because both the source and target DI must connect directly to the specified subnet. Use Multi-Hop Echo test instead.

Error	`--ERROR-- System TDI_x is not directly connected.`
	`The Subnet Connect Test only allows directly connected systems to be tested.`
	
	ACTION: Cannot use Direct Subnet Connect test because both the source and target DI must connect directly to the specified subnet. Use Multi-Hop Echo test instead.

Error	`--FATAL-- Unable to start test task.`
Error	`--FATAL-- NIL pointer for status record in the NIB.`
Error	`--FATAL-- No test task response before a timeout.`
	ACTION: With any of these three errors, troubleshoot source DI per Troubleshooting a DI procedure in chapter 5.

6

Test Status Responses for Subnet Connect Test

Table 6-25 shows the responses you receive from a DISPLAY_TEST_STATUS command or menu selection. The table includes corrective actions for errors.

Table 6-25. Display Test Status Responses for Subnet Connect Test

Type of Response	Message and Recommended Action

Success	`Subnet Connect Test to MDI_x on $NET_x PASSED.`
	`pass count = n`
	
	ACTION: Test successful. No action required.

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`System Error - No data buffers available.`

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`Unsuccessful CLSNS Data Request`
	
	ACTION: With either of these two errors, a problem exists with the source system. Start troubleshooting by checking the source DI (see Troubleshooting a DI procedure in chapter 5).

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`No response from the Destination System.`

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`All messages were not returned before a test timeout.`
	
	ACTION: With either of these two errors, try running the test from different source and destination DI to help isolate the failure to a specific DI or segment of the subnet. If a specific DI is isolated, run online diagnostics on that DI. Also, check the physical connections of the network device (for example: Ethernet transceivers, transceiver cables, or LIM cables).

(Continued)

Table 6-25. Display Test Status Responses for Subnet Connect Test *(Continued)*

Type of Response	Message and Recommended Action

Error	`Subnet Connect Test to MDI_1 on $NET_1 FAILED.`
	`pass count = n`
	`The message length received does not equal message length sent.`

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`Data checksum error in a returned message.`

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`Data buffer length error at the Destination system.`
	
	ACTION: With any of these three errors, try running the test from different source and destination DI to help isolate the failure to a specific DI or segment of the subnet. If a specific DI is isolated, run online diagnostics on that DI. Also, check the physical connections of the network device (for example: Ethernet transceivers, transceiver cables, or LIM cables).

Error	`Subnet Connect Test to MDI_x on $NET_x FAILED.`
	`pass count = n`
	`Unexpected intertask message (ITM).`
	
	ACTION: Troubleshoot source DI per Troubleshooting a DI procedure in chapter 5.

Miscellaneous Online Tests and Procedures

The following discussions describe additional online tests and testing methods that can be used during troubleshooting. They are as follows:

- How to run online conflict tests
- How to run the terminal/line echo test
- Testing an intelligent modem

How to Run Online Conflict Tests

During conflict testing you run separate tests on separate devices at the same time (for example, running a LIM test on two separate LIMs). An instance where you may need conflict testing is when ports are failing on more than one LIM or CIM. You can also try conflict testing as a last resort for other problems, when separate tests do not reveal the cause.

There are two ways to do conflict testing.

- Using CML/VE or CMSI conflict test menu selections
- Using NETOU commands

Both are described in the following discussions.

Conflict Test Notes

Table 6-26 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-26. Conflict Test Notes

1. Conflict tests can be run in any combination, as long as no more than one test is trying to run on the same device at the same time. For example, you cannot run CIM and LIM diagnostics simultaneously, because they both try to test LIMs.

2. If you replace a board, the onboard diagnostics run automatically after you power on the DI. Refer to chapter 7 to isolate failures that occur during onboard tests.

3. A conflict test cannot include any port configured with a trunk or line speed equal to 56 kilobits per second. Those ports must be tested separately and activity on all other ports connected to the same CIM must be stopped.

4. CML/VE and CMSI conflict test parameter settings are as follows. Use NETOU expert (command) mode if you need other settings.

   - SUCCESS_STATE = ON
   - LOGGING = ON
   - STOP_ON_ERROR = OFF
   - REPEAT_PASS
     - CML/VE tests (all) = You are prompted to select a time interval between 1 and 30 minutes, during which the tests run continuously.
     - CMSI DI test = 5 for CIM, 10 for ESCI, and 20 for MCI.
     - CMSI LIM/port test = 100.

Conflict Test Procedure

Perform the test procedure for each device as follows:

If you are using CML/VE or CMSI:

1. Read procedure for running online tests on the individual device (for example, How to Run the LIM Online Test).
2. Stop affected lines.
3. Put affected devices in DOWN state.
4. Use the menu choices from the diagnostics menus to run conflict tests on either the large boards (CIM, MCI, ESCI) or the LIMs and ports.
5. Check results as follows:
   - CML/VE displays errors as they occur and also gives you a summary at the end.
   - For CMSI, check results for each device by using the Display Test Status menu selection.

If you are using NETOU command mode:

1. Read procedure for running online tests on the individual device (for example, How to Run the LIM Online Test).
2. Stop affected lines.
3. Put affected devices in DOWN state.
4. Initiate each test with the repeat pass (RP) parameter set to 0. This causes the test to repeat itself indefinitely. Start tests on each device in turn until the desired devices are being tested.
5. Check results for each device, using DISPLAY_TEST_STATUS command. See the related Display Test Status Response tables, elsewhere in this chapter, for recommended actions.
6. Stop test, when desired, using the appropriate stop test commands. For example, use STOP_PORT_TEST for each port test in progress.

CML/VE Menu Summary for Conflict Tests

CML/VE has two choices for conflict testing.

- Perform DI Conflict Testing - Tests the CIM, MCI, and ESCI.
- Perform LIM/Port Conflict Testing - Tests the LIMs and ports.

Both choices are on the CDCNET Diagnostics Menu (figure 6-33). Refer to specific device tests (such as LIM Online Test) for instructions on stopping lines, putting devices in DOWN state, and so on.

```
---------------------
CML_700 - CDCNET MENU
---------------------
1. EXECUTE NETOU IN EXPERT (COMMAND MODE).
2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
[3 MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
5. VIEW CDCNET STATUS DISPLAYS.
6 MANAGE MESSAGE LOGGING AND ALARMS.
7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
   CDCNET SYSTEM DI.
```

```
---------------------------------------
CML_730 - CDCNET DEVICE/LINE STATE MENU
---------------------------------------
1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.
2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.
3.  STOP A LINE.
4.  START A LINE.
5.  CHANGE ELEMENT STATE TO ON.
6.  CHANGE ELEMENT STATE TO DOWN.
7.  CHANGE ELEMENT STATE TO OFF
8.  CANCEL A LINE.
9.  DEFINE A LINE.
10. STOP A NETWORK.
11. START A NETWORK.
12. STOP_NP INTERFACE.
13  START_NP INTERFACE.
14. MANAGE MULTIPLE LINES.
15  DISPLAY_HARDWARE_STATUS
```

```
---------------------------------
CML_740 - CDCNET DIAGNOSTICS MENU
---------------------------------
1.  SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
2.  RUN CIM TEST.
3.  RUN ESCI TEST.
4.  RUN LIM TEST.
5.  RUN MCI INLINE TEST.
6.  RUN MCI ONLINE TEST.
7.  RUN PORT TEST (INTERNAL LOOPBACK).
8.  RUN PORT TEST (EXT MODEM LOOPBACK).
9.  RUN URI TEST.
10. PERFORM DI CONFLICT TESTING.
11. PERFORM LIM/PORT CONFLICT TESTING.
12. RUN NETWORK PATH VERIFICATION TEST.
13. EXECUTE A TERMINAL/LINE ECHO TEST.
14. PERFORM INTELLIGENT MODEM TEST.
15. SEND TEST FILE TO PUBLIC PRINTER.
16. SEND TEST FILE TO PRIVATE PRINTER.
17. SEND MESSAGE TO TERMINAL /LIM PORT.
18. SEND COMMANDS TO INTELLIGENT MODEM.
19. MANAGE CDCNET ELEMENT STATES.
20. VIEW CDCNET STATUS DISPLAYS.
```

```
---------------------------------------------
CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
---------------------------------------------
1. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
2. STOP ALL LINES EXCEPT ACTIVE LINES.
3. DOWN ALL STOPPED, CONFIGURED, AND
   UNCONFIGURED LINES.
4. STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
5. STOP AND DOWN ALL LINES (WARNING, THIS
   INCLUDES LINES CURRENTLY IN USE).
6. SET ALL PORTS TO ON STATE
7. SET ALL LIMS TO DOWN STATE.
8. SET ALL LIMS TO ON STATE.
9. DISPLAY_HARDWARE_STATUS.
```

Figure 6-33. CML/VE Menus for Conflict Tests

CMSI Menu Summary for Conflict Tests

CMSI has two choices for conflict testing.

- Perform DI Conflict Testing - Tests the CIM, MCI, and ESCI.
- Perform LIM/Port Conflict Testing - Tests the LIMs and ports.

Both choices appear on the CDCNET Diagnostics Menu (figure 6-34). Refer to specific device tests (such as How to Run the LIM Online Test) for instructions on stopping lines, putting devices in DOWN state, and so on.

```
CMSI - CDCNET MENU - CMSI260

 1  EXECUTE NETOU IN EXPERT MODE
[2  SELECT A DI TO USE
[3. MANAGE NETWORK, DEVICE, AND LINE STATES
[4. EXECUTE CDCNET ONLINE DIAGNOSTICS
 5. VIEW CDCNET STATUS DISPLAYS
 6. MANAGE MESSAGE LOGGING AND ALARMS
 9. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET ELEMENT SELECTIONS - CMSI262

1. DISPLAY AVAILABLE DI NAMES
2. SELECT A COMMAND MDI AND A TARGET DI FOR
   CDCNET ACTIVITIES
3. DISPLAY CURRENTLY SELECTED COMMAND AND
   TARGET DI NAMES
9. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET DIAGNOSTICS - CMSI264

 1   SELECT A DI TO USE
 2.  RUN CIM TEST
 3.  RUN ESCI TEST
 4.  RUN LIM TEST
 5.  RUN MCI INLINE TEST
 6.  RUN MCI ONLINE TEST
 7.  RUN PORT TEST (INTERNAL LOOPBACK))
 8.  RUN PORT TEST (EXTERNAL/MODEM LOOPBACK)
 9.  RUN URI TEST
[10. MORE CDCNET DIAGNOSTICS
 11. DISPLAY TEST STATUS
 12. DISPLAY HARDWARE STATUS
 13. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET DEVICE/LINE STATES MENU - CMSI263

 1. SELECT A DI TO USE
 2. STOP A LINE
 3. START A LINE
 4. CANCEL A LINE
 5. DEFINE A LINE
 6. CHANGE ELEMENT STATE TO ON
 7. CHANGE ELEMENT STATE TO DOWN
 8. CHANGE ELEMENT STATE TO OFF
 9. MANAGE MULTIPLE LINES
[10 MANAGE NETWORKS
 11. DISPLAY HARDWARE STATUS
 12. DISPLAY LINE STATUS (SUMMARY)
 13. -----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET DIAGNOSTICS - CMS2640

1. SELECT A DI TO USE
2. PERFORM DI CONFLICT TESTING
3. PERFORM LIM/PORT CONFLICT TESTING
4. EXECUTE A TERMINAL/LINE ECHO TEST
5. SEND TEST FILE TO A PRINTER
6. SEND MESSAGE TO A TERMINAL/LIM PORT
9.-----RETURN TO PREVIOUS CMSI MENU
```

```
CMSI - CDCNET MANAGE NETWORKS - CMSI2630

1. SELECT A DI TO USE
2. STOP A NETWORK
3. START A NETWORK
4. STOP NP INTERFACE
5. START NP INTERFACE
6. DISPLAY NETWORK STATUS
9. -----RETURN TO PREVIOUS CMSI MENU
```

Figure 6-34. CMSI Menus for Conflict Test

NETOU Command Summary for Conflict Tests

Refer to specific device tests (such as LIM online test) for commands on stopping lines, putting devices in DOWN state, and so on. Also refer to the Conflict Test Procedure, earlier in this topic, for special instructions.

Example for Conflict Testing

Figure 6-35 shows a possible network configuration. To run LIM conflict tests you could use the commands shown below. You could also use the equivalent CML/VE or CMSI menu selections.

	Command and Description	Example[1]

1.	STOP_LINE (STOL)[2]
	Stop communications on all lines.
		`senc c='stol ln=line00',s=tdi_1`
		`senc c='stol ln=line01'`
		`senc c='stol ln=line02'`
		`senc c='stol ln=line03'`

2.	CHANGE_ELEMENT_STATE (CHAES) Put LIMs in DOWN state.	`senc c='chaes dn=$lim0,s=down'` `senc c='chaes dn=$lim1,s=down'`
3.	START_LIM_TEST (STALT) Start test on LIMs.	`senc c='stalt dn=$lim0 rp=0'` `senc c='stalt dn=$lim1 rp=0'`
4.	DISPLAY_TEST_STATUS (DISTS) Display status of test.	`senc c='dists dn=$lim0'` `senc c='dists dn=$lim1'`
5.	STOP_LIM_TEST (STOLT) Stop test.	`senc c='stolt dn=$lim0'` `senc c='stolt dn=$lim1'`

After testing, restore LIMs to normal operation as follows:

	Command and Description	Example
6.	CHANGE_ELEMENT_STATE (CHAES) Put LIMs in ON state (assumes test failed).	`senc c='chaes dn=$lim0,s=on'` `senc c='chaes dn=$lim1,s=on'`

7.	START_LINE (STAL)
	Restart lines.
		`senc c='stal ln=line00'`
		`senc c='stal ln=line01'`
		`senc c='stal ln=line02'`
		`senc c='stal ln=line03'`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

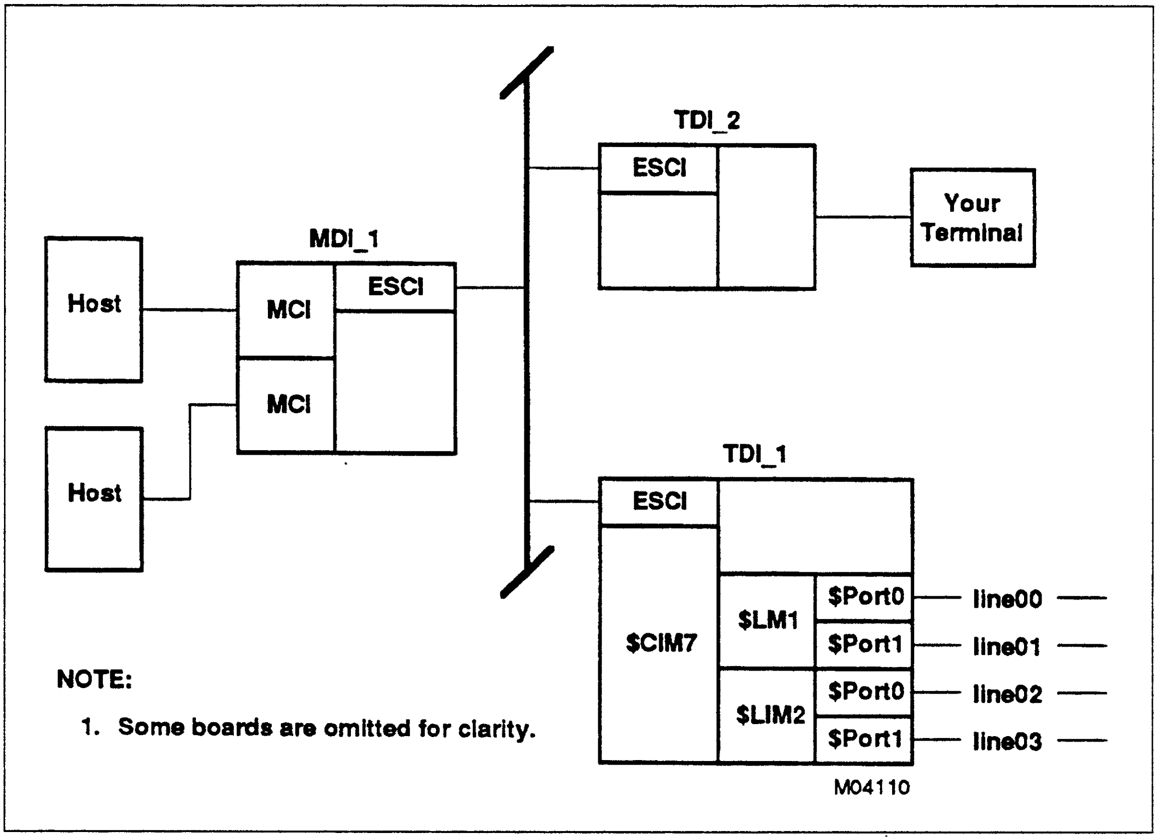


Figure 6-35. Example Network for LIM/Port Conflict Test

Command and Test Status Responses

See the appropriate command and DISPLAY_TEST_STATUS tables for the specific tests being run.

How to Run the Terminal/Line Echo Test

The terminal/line echo test checks the data path between a selected terminal and the host through which you are using NETOU. Use the test to check any terminal in the network, including your own.

During the test, NETOU sends test data to the target terminal (currently selected DI and port). The operator at the target terminal keys in the test data, thus echoing it back to NETOU. If the echoed data matches the original test data, the test is successful. Otherwise, an error has occurred and corrective action is required. NETOU returns the appropriate response (along with the echoed data), to the terminal that initiated the test.

Terminal/Line Echo Test Notes

Table 6-27 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-27. Terminal/Line Echo Test Notes

1. The echo test works only through CML/VE. It is not available through either CMSI or NETOU.

2. If you replace a board, the onboard diagnostics run automatically after you power on the DI (except for 8-port LIMs and URIs). Refer to chapter 7 to isolate failures that occur during onboard tests.

Terminal/Line Echo Test Procedure

Figure 6-36 shows the terminal/line echo test procedure. Refer to the menu and command summary topics for convenient listings of required commands and menu selections.

```
                                             Terminal Line/Echo Test Sheet 1

 1    Read Terminal/Line Echo test notes (table 6-27) before proceeding.
       |
       |
       V
 2    Log in to CML/VE.
       |
       |
       V
 3    Select target DI and port.
       |
       |
       V
 4    Select terminal/line echo test option from diagnostics menu.
       |
       |
       V
 5    The system displays the test message and gives you the option of adding
      test data to the end of the message supplied by the system.  Enter
      additional test data if desired, then press carriage return key to execute
      the test.
       |
       |
       V
 6    The operator at the target terminal keys in the test message.  NETOU checks
      for errors and displays the results at your terminal.
       |
       |
       V
 7    Did any errors occur?
       N     Y
       |     |
       |     |
       |     V
 8     |     Troubleshoot per Troubleshooting Communications Line procedure
       |     in chapter 5.
       |
       |
       V
 9    Path between target terminal and NETOU is ok.
```

Figure 6-36. Terminal/Line Echo Test Procedure

CML/VE Menu Summary for Terminal/Line Echo Test

The following shows the CML/VE menu choices necessary to run the terminal line/echo test. Each menu choice is shown on figure 6-37 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (port).
2	Select and start test.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-37.

```
                         ---------------------
                         CML_700 - CDCNET MENU
                         ---------------------
                            1  EXECUTE NETOU IN EXPERT (COMMAND MODE).
                            2. SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES
             _____________[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
            |           __[4  EXECUTE CDCNET ONLINE DIAGNOSTICS.
            |          |    5  VIEW CDCNET STATUS DISPLAYS.
            |          |    6  MANAGE MESSAGE LOGGING AND ALARMS.
            |          |    7. INTERACTIVELY ENTER COMMANDS TO THE CURRENT
            |          |       CDCNET SYSTEM DI.
            |          |_______________________________________________
            |                                                          |
            |                                                          |
--------------------------------------              ---------------------------------
CML_730 - CDCNET NAMES SELECTION MENU               CML_740 - CDCNET DIAGNOSTICS MENU
--------------------------------------              ---------------------------------
1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES       [1]SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.      2.  RUN CIM TEST.
3.  STOP A LINE.                                    3.  RUN ESCI TEST.
4.  START A LINE.                                   4.  RUN LIM TEST.
5.  CHANGE ELEMENT STATE TO ON.                     5.  RUN MCI INLINE TEST.
6.  CHANGE ELEMENT STATE TO DOWN                    6.  RUN MCI ONLINE TEST.
7.  CHANGE ELEMENT STATE TO OFF.                    7.  RUN PORT TEST (INTERNAL LOOPBACK).
8.  CANCEL A LINE.                                  8.  RUN PORT TEST (EXT MODEM LOOPBACK).
9.  DEFINE A LINE                                   9.  RUN URI TEST.
10  STOP A NETWORK.                                 10. PERFORM DI CONFLICT TESTING.
11. START A NETWORK.                                11. PERFORM LIM/PORT CONFLICT TESTING.
12. STOP_NP INTERFACE.                              12. RUN NETWORK PATH VERIFICATION TEST.
13. START_NP INTERFACE.                          [2] 13. EXECUTE A TERMINAL/LINE ECHO TEST.
____14. MANAGE MULTIPLE LINES.                      14. PERFORM INTELLIGENT MODEM TEST.
|   15  DISPLAY_HARDWARE_STATUS.                    15. SEND TEST FILE TO PUBLIC PRINTER.
|                                                   16. SEND TEST FILE TO PRIVATE PRINTER.
|                                                   17. SEND MESSAGE TO TERMINAL /LIM PORT.
|                                                   18. SEND COMMANDS TO INTELLIGENT MODEM.
|____________________                               19. MANAGE CDCNET ELEMENT STATES
                     |                              20  VIEW CDCNET STATUS DISPLAYS.
                     |
----------------------------------------------
CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
----------------------------------------------
1.  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
2.  STOP ALL LINES EXCEPT ACTIVE LINES.
3.  DOWN ALL STOPPED, CONFIGURED, AND
    UNCONFIGURED LINES.
4.  STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES
5.  STOP AND DOWN ALL LINES (WARNING, THIS
    INCLUDES  LINES CURRENTLY IN USE).
6.  SET ALL PORTS TO ON STATE
7.  SET ALL LIMS TO DOWN STATE.
8.  SET ALL LIMS TO ON STATE.
9.  DISPLAY_HARDWARE_STATUS.
```

Figure 6-37. CML/VE Menus for Terminal/Line Echo Test

Terminal/Line Echo Test Example

Figure 6-38 shows a possible network configuration. In this network, you could check the path between terminal 1 and the host by running the echo test on LIM1_port1 of TDI_2. You could verify the path to your terminal by selecting LIM2_port1 of TDI_1. The required menu selection are given in the previous topic, CML/VE Menu Summary for Terminal/Line Echo Test.

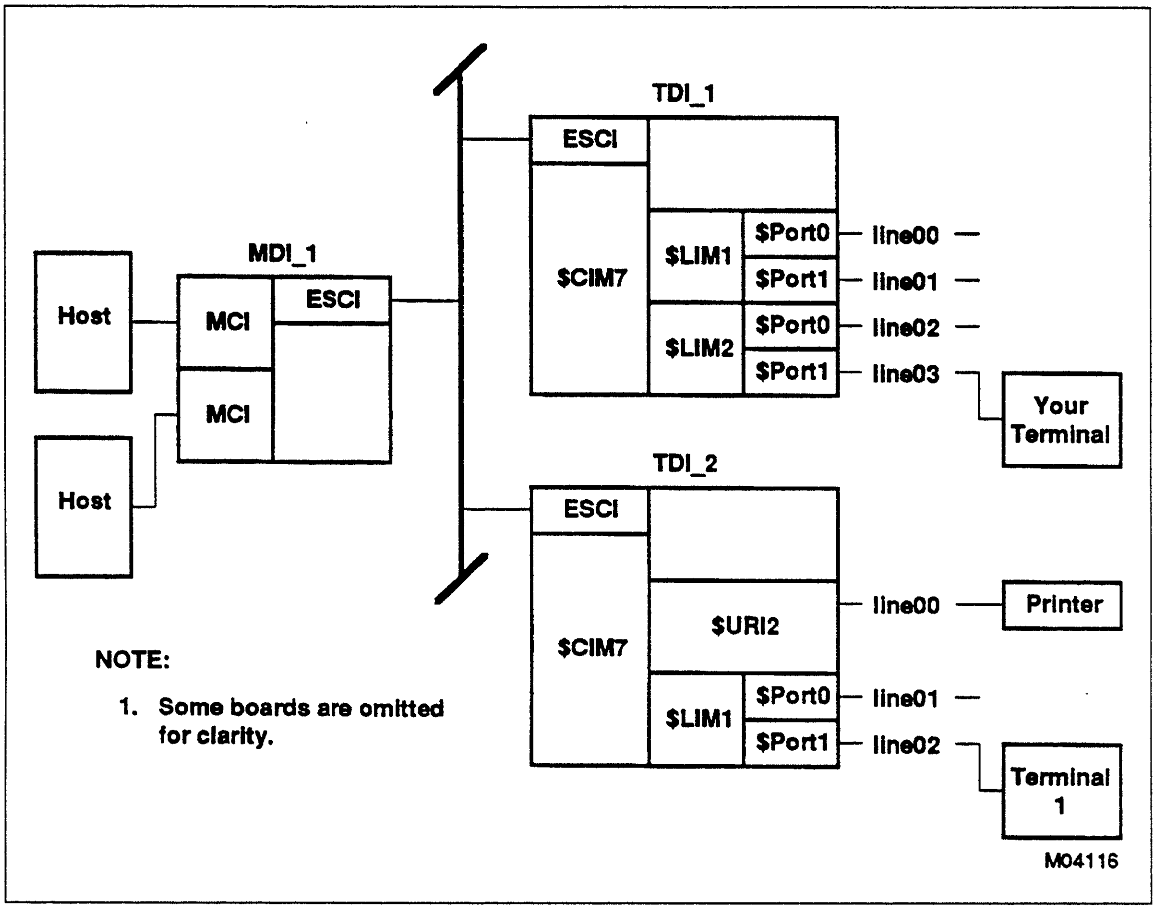


Figure 6-38. Example Network for Terminal/Line Echo Test

How to Test or Send Commands to an Intelligent Modem

You can test or send commands to an intelligent modem using either the SEND_DIAGNOSTIC_DATA command or the related CML/VE menu selections. This capability is not available under CMSI.

A typical application is to put a modem in loopback mode and send it data. If the data is echoed back correctly, both the line and modem are operating. Another option is to put the modem in loopback mode and then run an external loopback test on the related port.

Intelligent Modem Test Notes

Table 6-28 contains information necessary to perform the test properly. This information can include prerequisites for the test and special instructions for problems not covered in the procedure. Read the table before doing the procedure.

Table 6-28. Intelligent Modem Test Notes

1.	A CIM failure may look like a modem failure when line speed is 9600 baud or higher. If the modem and associated line appears to be ok, try running on another LIM port. If the failure still occurs, replace the CIM.
2.	The intelligent modem tests work only on asynchronous lines.

Intelligent Modem Test Procedure

Figure 6-39 outlines the intelligent modem test procedure. Refer to the menu and command and menu summary topics for convenient listings of required commands and menu selections.

```
                                             Intelligent Modem Test Sheet 1

 1    Read intelligent modem test notes (table 6-28) before proceeding.
       |
       |
       V
 2    Log in to CML/VE or NETOU (as desired).
       |
       |
       V
 3    Select target DI.
       |
       |
       V
 4    Stop line connected to the modem.
       |
       |
       V
 5    Change LIM element state to DOWN.
       |
       |
       V
 6    Proceed to test modem using CML/VE or NETOU.
       CML/VE    NETOU
          |        |
          |        |
          |        V
          |       Enter SEND_DIAGNOSTIC_DATA command, using
          |       the desired parameters.  See NETOU
          |       Command Summary for Intelligent Modem
          |       Test and the examples given later in
          |       this topic.
          |
          |
          V
       To A on Sheet 2
```

Figure 6-39. Intelligent Modem Test Procedure

(Continued)

(Continued)

```
                                          Intelligent Modem Test Sheet 2
 From A on Sheet 1
      |
      |
      V
 7    Select LIM and port associated with line to be tested.
      |
      |
      V
 8    Select desired modem test from diagnostics menu:

      -  Perform Intelligent Modem Test gives you a submenu from which you can
         select either a local or remote modem test.  Select either local or
         remote modem test and proceed as prompted.  During the test, the
         diagnostic establishes a connection with either the local or a remote
          modem and then runs the port test.

      -  Send Commands to Intelligent Modem prompts you to enter commands
         or data.
      |
      |
      V
 9    Does the response indicate an error occurred?
      Y     N
      |     |
      |     |
      |     V
10    |     Test successful.
      |
      |
      V
11    Take action per table 6-29 for intelligent modem test failures.
      For port test failures, see Test Status Responses for Port Test,
      earlier in this chapter.
```

Figure 6-39. Intelligent Modem Test Procedure

CML/VE Menu Summary for Testing Intelligent Modems

The following shows the CML/VE menu choices necessary to test or send commands to an intelligent modem. Each menu choice is shown on figure 6-40 and described below. The purpose of this topic is to serve as a quick reference for the most frequently used menu selections. See chapter 4 for a complete description of CML/VE. Familiarize yourself with the test notes and procedure given earlier in this topic before running the test.

Menu Choice[1]	Description
1	Select system (DI).
1	Select device (port).
2 [2]	Stop the line.
3	Change port element state to DOWN.
4	Choose desired option (14 to start test or 18 to send commands). See table 6-29 for command responses.

After testing, restore port to normal operation as follows:

5	Put port in ON state (assumes test failed).
6	Restart the line.

NOTES:

1. Numbers in this column correspond to the bracketed numbers (for example, [1]) on figure 6-40.

2. If an HDLC or X.25 trunk connects to this port you must also stop it before testing. Use STOP_NETWORK for HDLC trunk and STOP_X25_INTERFACE for X.25 trunk. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart the X.25 trunk. If any port on the LIM is configured with a trunk or line speed equal to 56 kilobits per second, stop activity on all other ports connected to the associated CIM.

```
                         ---------------------
                         CML_700 - CDCNET MENU
                         ---------------------
                         1  EXECUTE NETOU IN EXPERT (COMMAND MODE)
                         2  SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
            ____________[3. MANAGE CDCNET NETWORK, DEVICE, AND LINE STATES.
            |         __[4. EXECUTE CDCNET ONLINE DIAGNOSTICS.
            |         |  5. VIEW CDCNET STATUS DISPLAYS
            |         |  6  MANAGE MESSAGE LOGGING AND ALARMS.
            |         |  7  INTERACTIVELY ENTER COMMANDS TO THE CURRENT
            |         |     CDCNET SYSTEM DI
            |         |_______________________________________________
            |                                                        |
            |                                                        |
  ---------------------------------------          ---------------------------------
  CML_730 - CDCNET DEVICE/LINE STATE MENU          CML_740 - CDCNET DIAGNOSTICS MENU
  ---------------------------------------          ---------------------------------
 [1] 1.  SELECT SYSTEM/DEVICE/PORT/NETWORK NAMES.       1.  SELECT A SYSTEM/DEV/PORT/NETWORK NAME.
     2.  DISPLAY STATUS OF AN INDIVIDUAL LINE/PORT.     2   RUN CIM TEST.
 [2] 3.  STOP A LINE.                                   3   RUN ESCI TEST.
 [6] 4.  START A LINE.                                  4   RUN LIM TEST.
 [5] 5.  CHANGE ELEMENT STATE TO ON.                    5.  RUN MCI INLINE TEST.
 [3] 6.  CHANGE ELEMENT STATE TO DOWN.                  6   RUN MCI ONLINE TEST.
     7.  CHANGE ELEMENT STATE TO OFF.                   7.  RUN PORT TEST (INTERNAL LOOPBACK).
     8.  CANCEL A LINE.                                 8.  RUN PORT TEST (EXT MODEM LOOPBACK).
     9.  DEFINE A LINE.                                 9.  RUN URI TEST.
    10.  STOP A NETWORK.                               10   PERFORM DI CONFLICT TESTING.
    11.  START A NETWORK.                              11.  PERFORM LIM/PORT CONFLICT TESTING.
    12.  STOP_NP INTERFACE.                            12.  RUN NETWORK PATH VERIFICATION TEST.
    13.  START_NP INTERFACE.                           13.  EXECUTE A TERMINAL/LINE ECHO TEST.
 ___14.  MANAGE MULTIPLE LINES.                    [4] 14.  PERFORM INTELLIGENT MODEM TEST
|   15.  DISPLAY_HARDWARE_STATUS.                      15   SEND TEST FILE TO PUBLIC PRINTER.
|                                                      16.  SEND TEST FILE TO PRIVATE PRINTER.
|___________________                                   17.  SEND MESSAGE TO TERMINAL /LIM PORT
            |                                      [4] 18.  SEND COMMANDS TO INTELLIGENT MODEM
            |                                          19.  MANAGE CDCNET ELEMENT STATES.
  ---------------------------------------------        20.  VIEW CDCNET STATUS DISPLAYS
  CML_732 - CDCNET MULTIPLE LINE MANAGEMENT MENU
  ---------------------------------------------
  1   SELECT SYSTEM/DEVICE/LINE/NETWORK NAMES.
  2.  STOP ALL LINES EXCEPT ACTIVE LINES.
  3.  DOWN ALL STOPPED, CONFIGURED, AND
      UNCONFIGURED LINES.
  4.  STOP AND DOWN ALL LINES EXCEPT ACTIVE LINES.
  5.  STOP AND DOWN ALL LINES (WARNING, THIS
      INCLUDES  LINES CURRENTLY IN USE).
  6.  SET ALL PORTS TO ON STATE.
  7.  SET ALL LIMS TO DOWN STATE.
  8.  SET ALL LIMS TO ON STATE
  9.  DISPLAY_HARDWARE_STATUS.
```

Figure 6-40. CML/VE Menus for Testing Intelligent Modem

NETOU Command Summary for Intelligent Modem Test

The following shows the sequence of commands necessary to run the intelligent modem test. The purpose of this topic is to serve as a quick reference for the most frequently used commands. See appendix G for a detailed description of these and other commands used during troubleshooting. Familiarize yourself with the test notes and procedure given earlier in this topic before running the test.

	Command and Description	Example[1]
1.	STOP_LINE (STOL)[2] Stop communications on the line.	`senc c='stol ln=line02',s=tdi_1`
2.	CHANGE_ELEMENT_STATE (CHAES) Put port in DOWN state.	`senc c='chaes dn=$lim2_port0,..` `s=down',`

3.	SEND_DIAGNOSTIC_DATA (SENDD)
	Start test (see table 6-29 for command responses).
		`senc c='sendd dn=$lim2_port0..`
		`d=''dddd'''`
		(where dddd = desired character string)
		The character string can be either commands or data. Both commands and responses vary between modem (see modem manual for more information).

After testing, restore port to normal operation as follows:

4.	CHANGE_ELEMENT_STATE (CHAES) Put port in ON state.	`senc c='chaes dn=$lim2_port0,s=on',..`
5.	START_LINE (STAL) Restart line.	`senc c='stal ln=line02'`

NOTES:

1. On NOS, use SEND_COMMAND_SEQUENCE (SENCS) to select a device at the start of the procedure. This eliminates the need to repeat senc in each subsequent command.

2. If an HDLC or X.25 trunk connects to this port you must also stop it before testing. Use STOP_NETWORK for HDLC trunk and STOP_X25_INTERFACE for X.25 trunk. After testing, use START_NETWORK to restart an HDLC and START_X25_INTERFACE to restart an X.25 trunk. If any port on the LIM is configured with a trunk or line speed equal to 56 kilobits per second, stop activity on all other ports connected to the associated CIM.

Examples of Testing Intelligent Modems

The following examples describe how to use the SEND_DIAGNOSTIC_DATA command to communicate with an intelligent modem. You can do the same thing with the CML/VE menu selections described earlier.

NOTE

In the following examples, shaded portions of commands and responses depend on the modem and how it is set up (see your modem manual).

Example 1

This example shows how to use the command to put an intelligent modem in loopback mode. The modem is connected to port 0 of $LIM1 (figure 6-41).

1. Put modem in loopback mode.

```
senc c='sendd dn=$lim1_port0 d=''ATUO''', s=tdi_1
```

The following response appears:

```
Response data follows:
ATUO
```

2. Send a data string to the modem.

```
senc c='sendd dn=$lim1_port0 d=''uuuuu''', s=tdi_1
```

The following response appears:

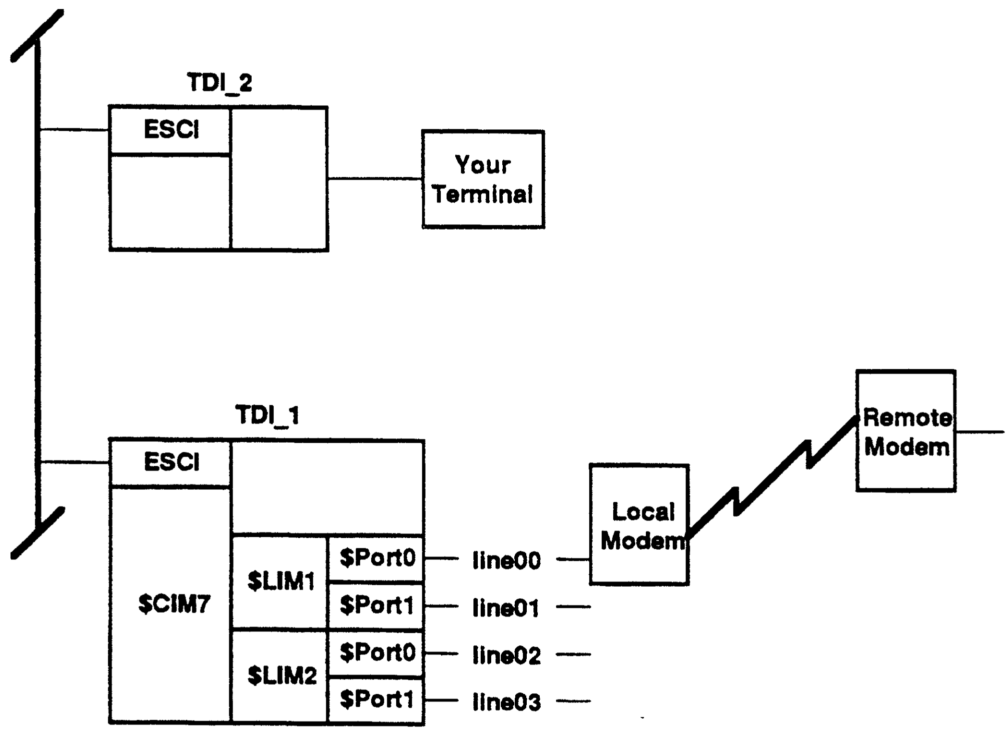
```
Response data follows:
uuuuu
```

3. Terminate the loopback mode on the modem.

```
senc c='sendd dn=$lim1_port0 d=''+++'' cr=false', s=tdi_1
```

The following response appears:

```
Response data follows:
+++
ok
```



NOTE:

1. Some boards are omitted for clarity.

Figure 6-41. Example 1 - Testing Intelligent Modem with SENDD Command

Example 2

This example shows how to use the SENDD command to put a modem in loopback mode prior to running the START_PORT_TEST (STAPT) command. The modem is connected to port 0 of $LIM1 (figure 6-42).

1. Put modem in loopback mode.

```
senc c='sendd dn=$lim1_port0 d=''ATUO''', s=tdi_1
```

   The following response appears:

```
Response data follows:
ATUO
```

2. Execute the START_PORT_TEST (STAPT) command.

```
senc c='stapt dn=$lim1_port0 lm=modem ss=down mc=4', s=tdi_1
```

   In this example, SS=DOWN eliminates need to put port in DOWN state prior to terminating modem loopback mode (next step). See table 6-8 for responses to STAPT command.

3. Terminate the loopback mode on the modem.

```
senc c='sendd dn=$lim1_port0,d=''+++'', cr=false', s=tdi_1
```

   The following response appears:

```
Response data follows:
+++
ok
```

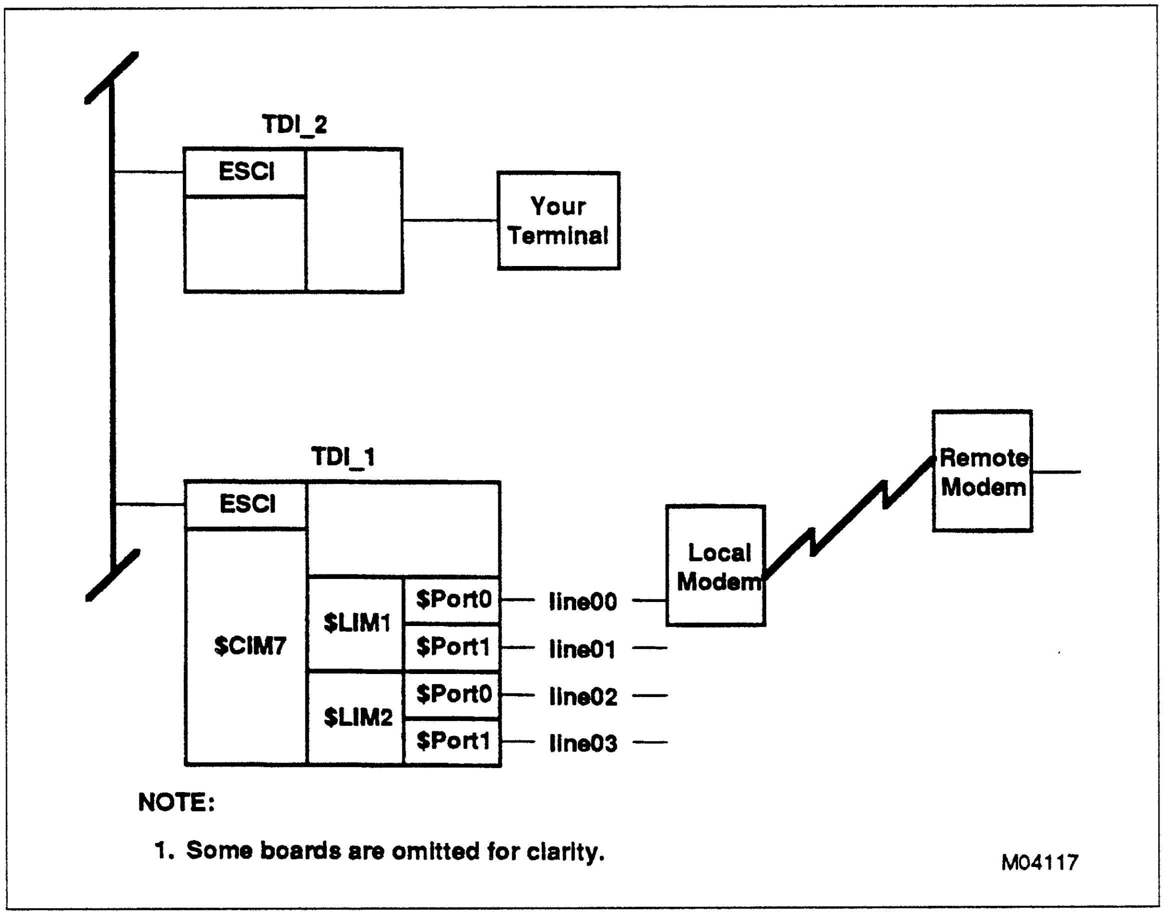


Figure 6-42. Example 2 - Testing Intelligent Modem with SENDD Command

Example 3

The following is an example of testing a remote modem using CML/VE. Figure 6-43 shows the portion of the network containing the device interface and modems referred to in this example.

1. Log in to CML/VE.

2. Select TDI_1.

3. Stop line 00.

4. Change $lim1_port0 element state to DOWN.

5. Select option 14, Perform Intelligent Modem Test, from diagnostics menu. You get the following prompt:

```
Please select an Intelligent Modem test type.

1. Local Modem Test
2. Remote (Dial-up) Modem Test
```

6. Select `Remote (Dial-up) Modem Test`. The diagnostic resets the local modem and shows you whether the connection was successful, then prompts you for the telephone number of the remote modem.

7. Enter the phone number for the remote modem. You see a response indicating whether the connection was successful. After the connection is made, the diagnostic starts the port test on $lim0_port0. When the port test is done, results are displayed.

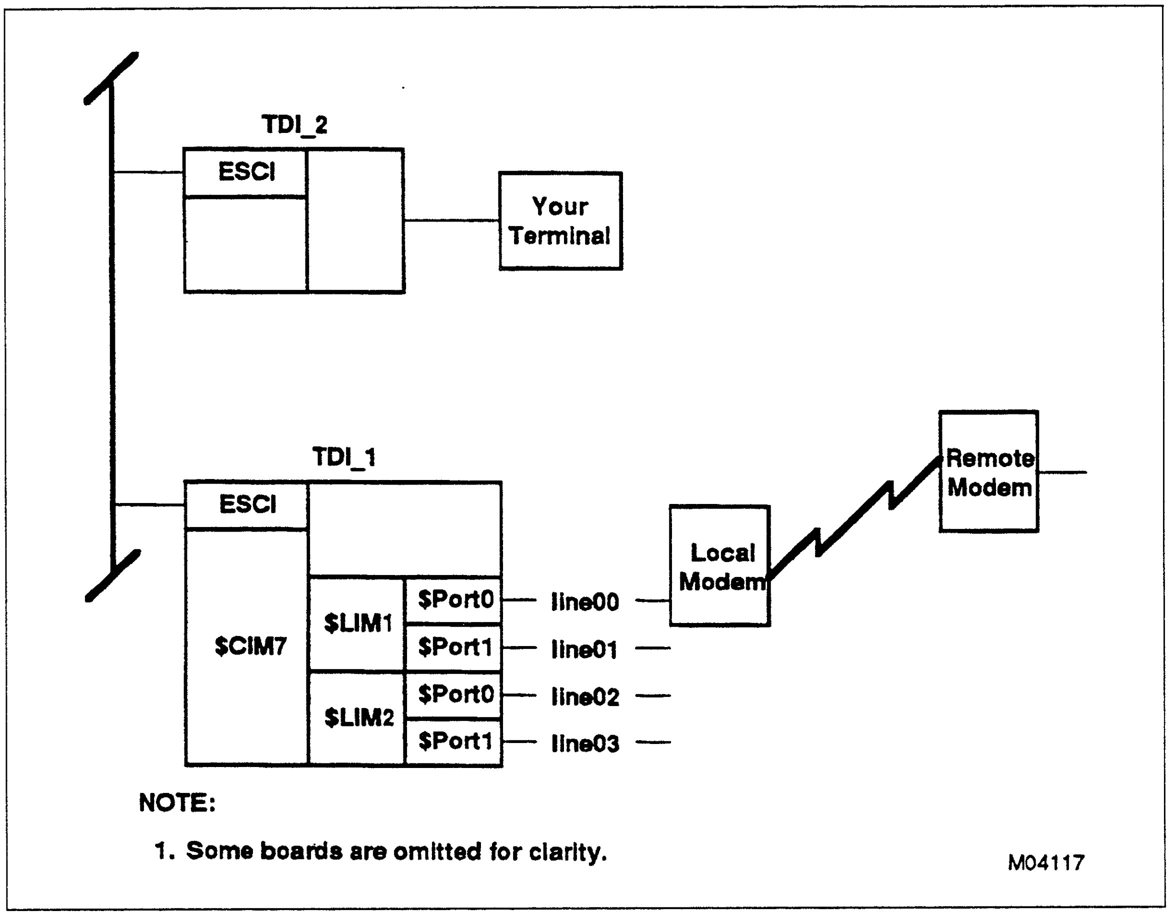


Figure 6-43. Example 3 - Testing Remote Modem Using CML/VE

Responses for Intelligent Modem Test Commands or Menu Selections Failures

Table 6-29 lists the responses to expect after initiating a SEND_DIAGNOSTIC_TEST command or making an intelligent modem test menu selection. A success response indicates the test started. An error response indicates a problem you must correct before running the test. The table includes corrective actions for errors.

Table 6-29. Command Responses for Intelligent Modem Test

Type of Response	Message and Recommended Action
Success	See previous examples for success responses. ACTION: Perform next desired troubleshooting activity.
Error	`--ERROR-- Device $LIMx_PORTx not installed in system` ACTION: The port could not be located in the designated slot (x). Check for the correct device name parameter.
Error	`--ERROR-- Device $LIMx_PORTx not in "DOWN" state` ACTION: The port in slot x is not in the DOWN state. Put the port in DOWN state before retrying.
Error	`--ERROR-- Configured line not async` ACTION: Line is not asynchronous. The command works only on asynchronous lines.
Error	`--ERROR-- Aborted trying to start up line` ACTION: The line cannot be started to send data. Run the port test before trying again.
Error	`--WARNING-- Response data not received` ACTION: Indicates that response data was not returned to the LIM port within a reasonable time period. Check modems and communications lines.

6

How to Run Onboard Tests 7

How to Run Onboard Tests 7

The onboard diagnostics reside in read-only memory within the DI and provide initial testing prior to booting of system software. This chapter describes the onboard tests and is organized as follows:

- How to Troubleshoot with Onboard Diagnostics - Describes how to run diagnostics and interpret the results. Also includes corrective actions.
- Onboard Diagnostics and DI Initialization Sequence - Includes reference information that explains each stage of the diagnostic and DI initialization sequence.

How to Troubleshoot with Onboard Diagnostics

The following procedure describes how to troubleshoot the DI using onboard diagnostics. Start with step 1 of the procedure and continue until the problem is found. After taking corrective action, retest the DI to ensure it is operating properly. Use procedures in chapter 9 to replace parts. See chapter 10 for part numbers. For an explanation of how the diagnostics work, refer to the Onboard Diagnostics and DI Initialization Sequence topic, later in this chapter.

CAUTION

To prevent possible loss of customer data, notify all users before taking any actions that might affect the operation of the network. Be sure to include users on the other side of HDLC and X.25 lines.

Step 1 - Perform Preliminary Checks Before Starting Diagnostics

Complete the checklist in table 7-1 before initiating the onboard diagnostics.

Table 7-1. DI Preliminary Checklist

___ 1. Verify that all applicable field change orders are installed (see Verifying FCO Level of Equipment, in chapter 10) and that all boards are at the proper part number level (see Logic Board Interchangeability in chapter 10).

___ 2. Verify all switch settings are set as shown in chapter 3 (use the site configuration map if it is available).

___ 3. Set MPB switch 5 (Short Power-Up) to Off before running onboard diagnostics. If this switch is On, the DI skips some MPB and SMM checks following a power-on reset. Set the switch to its original position following testing.

___ 4. Verify that all boards are in the correct slots and seated properly.

___ 5. Ensure that all internal cables are installed properly.

___ 6. Ensure that all external cables are connected (peripheral processor channel, transceiver, and terminal/modem). Disconnect external LIM cables that do not connect to external devices. Unterminated LIM cables may cause system and diagnostic failures.

___ 7. With the PWR DISCONNECT circuit breaker in the up position, check both cooling fans in back of the DI. If one is not working, replace the fan assembly. If both fans are not working or the circuit breaker trips, proceed to Troubleshooting DI Power Problems, in chapter 5.

___ 8. Verify that power is applied to all boards by checking the green light-emitting diode (LED) on the front of the DI cabinet (+5 V) and the green LED on the MPB board (±12 V and -5 V). Both LEDs should be On. If either is Off, proceed to Troubleshooting DI Power Problems, in chapter 5.

Step 2 - Reset Device Interface to Initiate Onboard Tests

Reset DI in one of the following ways:

Reset	Description
Manual Reset	Initiate by toggling the ATTN/RST switch to the RST position (figure 7-1). A manual reset initiates the MPB onboard diagnostic (MPBB). If it completes successfully, the MPB sends a software-initiated command to the other intelligent devices (CIM and ESCI), which then execute their respective onboard diagnostics. Note that if MPB switch 5 (Short Power-Up) is set to On, the DI skips some MPB and SMM tests.
Power-Up Reset	Initiate by applying power to the DI. Power-up reset operates the same as manual reset, but takes longer to run because it clears and rewrites the memory while running the diagnostics.
Remote Reset	Initiate by sending the DI a KILL_SYSTEM command (see appendix G). The KILL_SYSTEM command allows you to reset the DI from a remote site, providing the DI can respond to commands.

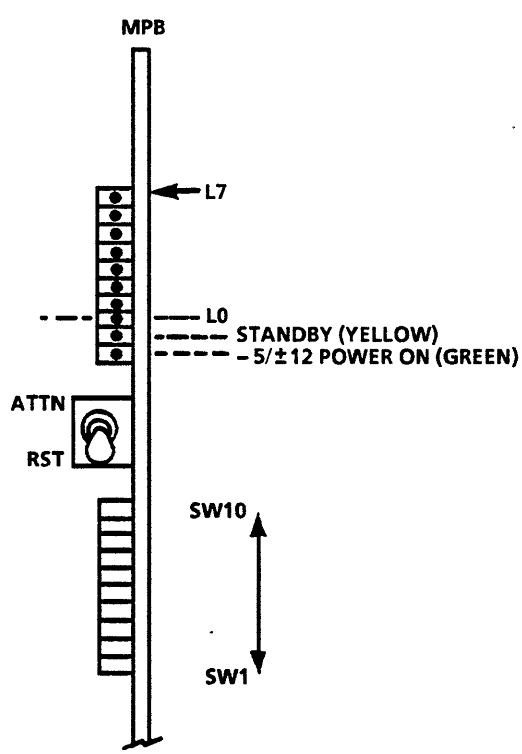


Figure 7-1. MPB Reset/Attention Switch

Step 3 - Observe MPB Board LEDs to Determine Results of Test

Compare MPB board LEDs with figure 7-2 to determine whether the diagnostics complete successfully. If there is a failure, proceed as follows:

Failing Stage	Action
Reset Stage	Go to Step 4 - Troubleshooting Reset Stage Failures.
Quicklook Stage	Go to Step 5 - Troubleshooting Quicklook Stage Failures.
Initialize stage or Idle State	Go to Step 6 - Troubleshooting Initialization Stage Failures.
Operational Stage	Go to step 7 - Troubleshooting Operational Stage Failures.

If the diagnostics run, but DIP reports an error message, refer to Using Diagnostic Initialization Processor Error Messages, later in this chapter.

MPB LEDS	RESET STAGE	QUICKLOOK STAGE	INITIALIZE STAGE	INITIALIZE IDLE STATE	OPERATIONAL STAGE
7	ON	ON	OFF	ON	OFF
6	ON	ON	ON	OFF	OFF
5	ON	BLINKS WHEN A POWER ON RESET IS RECEIVED	BLINKS DURING A BLOCK INPUT OR BLOCK OUTPUT	OFF	ON IF CPU BUSY OFF IN IDLE
4	ON	PHASE FAILURE CODE LED 4 = OFF | ON | ON | OFF LED 3 = ON | ON | OFF | OFF PHASE I | PHASE II	BOOT SOURCE CODE LED 4 = OFF | OFF | ON LED 3 = OFF | ON | ON NORMAL BOOT | NO BOOT SOURCE | UNEXPECTED INTERRUPT	IDLE REASON CODE CURRENTLY UNDEFINED	FAULT CODE LED 4 = OFF | OFF | ON LED 3 = OFF | ON | ON NO FAULT | FAULT NO TEST RUNNING | TEST RUN-NING
3	ON				
2	ON	PHASE 1 FAILURE CODES LED 2 = ON | OFF | ANY LED 1 = ON | OFF | OTHER LED 0 = OFF | ON | CODE SYSTEM ID | PPM | MPB PHASE II FAILURE CODES OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLE: LED 2 = ON LED 1 = OFF LED 0 = ON SLOT 5	OCTAL SLOT NUMBER OF BOOT SOURCE EXAMPLE: LED 2 = ON LED 1 = ON LED 0 = OFF SLOT 6	OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLES. LED 2 = ON | OFF LED 1 = OFF | OFF LED 0 = ON | OFF SLOT 5 | NO FAULT	OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLES: LED 2 = ON | OFF LED 1 = OFF | ON LED 0 = OFF | OFF SLOT 4 | SLOT 2
1	ON				
0	ON				
ON/OFF LINE YELLOW	ON	BLINKS DURING PMM AND PHASE II TESTING	BLINKS ONCE A SECOND WHILE ATTEMPTING TO BOOT	BLINKS ONCE A SECOND WHILE ATTEMPTING TO BOOT	
POWER ON GREEN	ON	ON	ON	ON	ON

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Notes:

1. URIs and 8-port RS-232 LIMs are not tested by the onboard diagnostics. Therefore, it is normal for the URI and 8-port LIM error LEDs to remain On until the software is loaded. If software is successfully loaded, online diagnostics for the 8-port LIMs and URIs are run automatically. This happens before the configuration file is processed.

2. When a failure is detected early in phase I, the MPB error LEDs are invalid and do not indicate a failing board. Here, all LED fault indicators on all boards remain ON, except the MPB. Usually, this is caused by a faulty MPB board. Refer to Step 5, Quicklook Stage Failures, to isolate the problem.

3. Error indicators must be read within 10 seconds after an error is detected. After 10 seconds (approximately), a deadman timeout (DMTO) occurs that restarts the diagnostic.

Figure 7-2. Device Interface Start-Up Stages

Step 4 - Troubleshooting Reset Stage Failures

When onboards hang up in the reset stage (figure 7-3), MPB LEDs do not indicate the problem and you must perform the procedure in figure 7-4.

MPB LEDS	RESET STAGE
7	ON
6	ON
5	ON
4	ON
3	ON
2	ON
1	ON
0	ON
ON/OFF LINE YELLOW	ON
POWER ON GREEN	ON

Figure 7-3. Reset Stage LEDs

```
                                          Troubleshooting Reset Stage Failures

1    Disconnect MPB/PMM cable and rerun onboards.  Does test still
     hang in reset stage?
      N     Y
      I     I
      I     I
      I     V
2     I     Replace MPB board and retest.  If error still exists go to step 5.
      I
      I
      V
3    Replace PMM Board, then reconnect cable and rerun onboards.
      I
      I
      V
4    Replace MPB/PMM cable and rerun onboards.
      I
      I
      V
5    Unseat but do not remove all boards except MPB, PMM, URIs, and LIMs.
     Rerun onboards and check LEDs.  Does test pass reset stage?
      N     Y
      I     I
      I     I
      I     V
6     I     Insert boards one at a time, running diagnostics after each. When
      I     error occurs, replace last board inserted and rerun onboards.
      I     I
      I_____I
      I
      I
      V
7    Replace main logic backpanel.
```

Figure 7-4. Troubleshooting Reset Stage Failures

Step 5 - Troubleshooting Quicklook Stage Failures

Determine if the failure occurs during phase I or phase II by checking LEDs 3 and 4 (figure 7-5).

- If diagnostics failed in phase I, proceed as directed in phase I troubleshooting procedure (figure 7-6).
- If diagnostics failed in phase II, proceed as directed in phase II troubleshooting procedure (figure 7-7).

NOTE

Certain errors may occur (for example, an open bus or address line) that affect all boards via the backpanel. The error indicators are then invalid and may indicate the wrong board. Always be certain that all boards and cables have been replaced before calling the next level of support.

<table>
<tr><th>MPB LEDS</th><th>QUICKLOOK STAGE</th></tr>
<tr><td>7</td><td>ON</td></tr>
<tr><td>6</td><td>ON</td></tr>
<tr><td>5</td><td>BLINKS WHEN A POWER ON RESET IS RECEIVED</td></tr>
<tr><td>4</td><td rowspan="2">PHASE FAILURE CODE
<table>
<tr><td>LED 4 =</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>LED 3 =</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td></td><td colspan="2">PHASE I</td><td colspan="2">PHASE II</td></tr>
</table></td></tr>
<tr><td>3</td></tr>
<tr><td>2</td><td rowspan="3">PHASE I FAILURE CODES
<table>
<tr><td>LED 2 =</td><td>ON</td><td>OFF</td><td>ANY</td></tr>
<tr><td>LED 1 =</td><td>ON</td><td>OFF</td><td>OTHER</td></tr>
<tr><td>LED 0 =</td><td>OFF</td><td>ON</td><td>CODE</td></tr>
<tr><td></td><td>SYSTEM ID</td><td>PMM</td><td>MPB</td></tr>
</table>
PHASE II FAILURE CODES
OCTAL SLOT NUMBER OF FAILING BOARD
<table>
<tr><td>EXAMPLE:</td><td>LED 2 =</td><td>ON</td></tr>
<tr><td></td><td>LED 1 =</td><td>OFF</td></tr>
<tr><td></td><td>LED 0 =</td><td>ON</td></tr>
<tr><td></td><td></td><td>SLOT 5</td></tr>
</table></td></tr>
<tr><td>1</td></tr>
<tr><td>0</td></tr>
<tr><td>ON/OFF LINE YELLOW</td><td>BLINKS DURING PMM AND PHASE II TESTING</td></tr>
<tr><td>POWER ON GREEN</td><td>ON</td></tr>
</table>

Figure 7-5. Quicklook Stage LEDs

```
                                   Troubleshooting Quicklook Phase I Failures

1    Do MPB LEDs indicate the correct system identification code?
      Y     N
      |     |
      |     |
      |     V
2     |    Reenter code using Entering the System Identifier procedure
      |    in chapter 3.
      |
      |
      V
3    Disconnect MPB/PMM cable and rerun onboards (if no PMM, skip to step 4).
     Does test pass quicklook phase I?
      Y     N
      |     |
      |     |
      |     V
4     |    Replace MPB board and retest.  If error still exists, go to step 7.
      |
      |
      V
5    Replace PMM Board, then reconnect cable and rerun onboards.
      |
      |
      V
6    Replace MPB/PMM cable and rerun onboards.
      |
      |
      V
7    Unseat but do not remove all boards except MPB, PMM, URIs, and LIMs.
     Rerun onboards and check LEDs.  Does test pass quicklook
     phase I?
       N     Y
       |     |
       |     |
       |     V
8      |    Insert boards one at a time, running diagnostics after each.  If
       |    error occurs, replace last board inserted and rerun onboards.
       |     |
       |_____|
       |
       |
       V
9    Replace main logic board backpanel.
```

Figure 7-6. Troubleshooting Quicklook Phase I Failures

```
                                   Troubleshooting Quicklook Phase II Failures

1    Replace board in slot number indicated by MPB LEDs.  Error LEDs should
     be lit on that board.  Rerun diagnostics and check LEDs. If test
     still fails quicklook phase II, proceed to step 2.
      |
      |
      V
2    Unseat but do not remove all boards except MPB, PMM, URIs, and LIMs.
     Rerun onboards and check LEDs.  Does test pass quicklook phase II?
      N     Y
      |     |
      |     |
      |     V
3     |     Insert boards one at a time, running diagnostics after each.  If
      |     error occurs, replace last board inserted.
      |     |
      |_____|
      |
      |
      V
4    Disconnect MPB/PMM cable and rerun onboards (if no PMM, skip to step 5).
     Does test pass quicklook phase II?
      Y     N
      |     |
      |     |
      |     V
5     |     Replace MPB board and retest.  If error still exists, go to step 8.
      |     |
      |_____|
      |
      |
      V
6    Replace PMM Board, then reconnect cable and rerun onboards.
      |
      |
      V
7    Replace MPB/PMM cable and rerun onboards.
      |
      |
      V
8    Replace main logic board backpanel.
```

Figure 7-7. Troubleshooting Quicklook Phase II Failures

Step 6 - Troubleshooting Initialization Stage Failures

When diagnostics fail in the initialization stage (figure 7-8), the MPB LEDs do not indicate the slot number of the failing board. They indicate only that a boot source cannot be found. Perform the procedure in figure 7-9 to isolate initialization stage failures.

NOTE

When the error LEDs indicate a load error (figure 7-8) and the error LEDs fail to indicate a specific board, the problem is probably caused by a software failure.

To observe this type of failure, you must watch the DI error LEDs when it resets. If the DI does not load, it resets and tries again. This cycle continues until the problem is fixed and the DI loads. Consult a system analyst.

<table>
<tr><th>MPB LEDS</th><th>INITIALIZE STAGE</th><th>INITIALIZE IDLE STATE</th></tr>
<tr><td>7</td><td>OFF</td><td>ON</td></tr>
<tr><td>6</td><td>ON</td><td>OFF</td></tr>
<tr><td>5</td><td>BLINKS DURING A
BLOCK INPUT OR
BLOCK OUTPUT</td><td>OFF</td></tr>
<tr><td>4
3</td><td>BOOT SOURCE CODE
<table><tr><td>LED 4 = OFF</td><td>OFF</td><td>ON</td></tr><tr><td>LED 3 = OFF</td><td>ON</td><td>ON</td></tr><tr><td>NORMAL BOOT</td><td>NO BOOT SOURCE</td><td>UNEXPECTED INTERRUPT</td></tr></table></td><td>IDLE REASON CODE
CURRENTLY
UNDEFINED</td></tr>
<tr><td>2
1
0</td><td>OCTAL SLOT NUMBER
OF BOOT SOURCE
EXAMPLE:<table><tr><td>LED 2 =</td><td>ON</td></tr><tr><td>LED 1 =</td><td>ON</td></tr><tr><td>LED 0 =</td><td>OFF</td></tr><tr><td></td><td>SLOT 6</td></tr></table></td><td>OCTAL SLOT NUMBER
OF FAILING BOARD
EXAMPLES:<table><tr><td>LED 2 =</td><td>ON</td><td>OFF</td></tr><tr><td>LED 1 =</td><td>OFF</td><td>OFF</td></tr><tr><td>LED 0 =</td><td>ON</td><td>OFF</td></tr><tr><td></td><td>SLOT 5</td><td>NO FAULT</td></tr></table></td></tr>
<tr><td>ON/OFF
LINE
YELLOW</td><td>BLINKS ONCE A SECOND
WHILE ATTEMPTING
TO BOOT</td><td>BLINKS ONCE A SECOND
WHILE ATTEMPTING
TO BOOT</td></tr>
<tr><td>POWER
ON
GREEN</td><td>ON</td><td>ON</td></tr>
</table>

Figure 7-8. Initialization Stage LEDs

```
                        Troubleshooting Initialization Stage Failures Sheet 1

 1    Check boot switches on the MPB to ensure they are set to indicate the
      correct boot source (see Setting the MPB Switches for Normal Operation
      in chapter 3).  Also check the switches on the boot source board
      to ensure they are set properly (see appropriate switch setting
      procedure in chapter 3).
       |
       |
       V
 2    Is PMM or SMM error LED On?
       N     Y
       |     |
       |     |
       |     V
 3     |    Replace board.
       |
       |
       V
 4    Is ESCI, CIM, or MCI error LED On?
       N     Y
       |     |
       |     |
       |     V
 5     |    Proceed to appropriate procedure as follows:
       |    - For a CIM, go to Step 8 - Troubleshooting CIM Board Failures.
       |    - For an ESCI, go to Step 9 - Troubleshooting ESCI Board Failures.
       |    - For an MCI, go to Step 10 - Troubleshooting MCI Board Failures.
       |
       |
       V
 6    Replace SMM boards one at a time, retesting each time.
       |
       |
       V
 7    Check cables, modem, transceiver, channel and so on that connect to
      boot source board.
       |
       |
       V
 8    Replace board used as boot source (board could be bad even if LED is Off).
      If boot source is CIM and replacing CIM does not correct problem, also
      replace LIM.
       |
       |
       V
   To A on Sheet 2
```

Figure 7-9. Troubleshooting Initialization Stage Failures

(Continued)

(Continued)

```
                              Troubleshooting Initialization Stage Failures Sheet 2
 From A on Sheet 1
     |
     |
     V
9    Disconnect MPB/PMM cable and rerun onboards (if no PMM, skip to step 10).
     Does test pass initialization stage?
     Y    N
     |    |
     |    |
     |    V
10   |    Replace MPB board and retest.  If error still exists, go to step 13.
     |
     |
     V
11   Replace PMM Board, then reconnect cable and rerun onboards.
     |
     |
     V
12   Replace MPB/PMM cable and rerun onboards.
     |
     |
     V
13   Unseat but do not remove all CIM, LIM, ESCI, and MCI boards not being used
     as the boot source.  Rerun onboards and check LEDs.  Does test pass
     initialization stage?
     N    Y
     |    |
     |    |
     |    V
14   |    Insert boards one at a time, running diagnostics after each.  When
     |    error occurs, replace last board inserted and rerun onboards.
     |
     |
     V
15   Place boot source board in a different slot.  Set MPB switches
     to indicate new boot source location (see Setting the MPB Switches
     for Normal Operation in chapter 3).  Rerun onboards.
     |
     |
     V
   To B on Sheet 3
```

Figure 7-9. Troubleshooting Initialization Stage Failures

(Continued)

(Continued)

```
                               Troubleshooting Initialization Stage Failures Sheet 3
  From B on Sheet 2
        |
        |
        V
16      Does test pass initialization stage?
        N    Y
        |    |
        |    |
        |    V
17      |    Replace main logic backpanel.
        |
        |
        V
18      Call next level of support.
```

Figure 7-9. Troubleshooting Initialization Stage Failures

Step 7 - Troubleshooting Operational Stage Failures

When the DI reaches this stage, the software is loaded and Diagnostic Initialization Processor (DIP) messages are available. If MPB LEDs 3 and 4 indicate an error, isolate a failing board by one or more of the following methods:

- Examine DIP log entries (see Using Diagnostic Initialization Processor Error Messages, later in this chapter).
- Read LEDs 0, 1, and 2 on the MPB (figure 7-10).
- Look at error LEDs on boards (LED may light on failing board).

When you locate the failing board, proceed as described below.

NOTE

URIs and 8-port RS-232 LIMs are not tested by the onboard diagnostics. Therefore, it is normal for the URI and 8-port RS-232 error LEDs to remain on until the software is loaded. The online diagnostics for the 8-port LIMs and URIs are then automatically run. If software does not load, disregard all URI and 8-port error LEDs.

DIP or LED Indication	Action
PMM failure	Replace PMM.
SMM failure	Replace SMM.
CIM failure	Go to Step 8 - Troubleshooting CIM Board Failures.
ESCI failure	Go to Step 9 - Troubleshooting ESCI Board Failures.
MCI failure	Go to Step 10 - Troubleshooting MCI Board Failures.

MPB LEDS	OPERATIONAL STAGE
7	OFF
6	OFF
5	ON IF CPU BUSY OFF IN IDLE
4	FAULT CODE LED 4 = OFF / OFF / ON LED 3 = OFF / ON / OFF NO FAULT / FAULT NO TEST RUNNING / TEST RUNNING
3	
2	OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLES: LED 2 = ON / OFF LED 1 = OFF / ON LED 0 = OFF / OFF SLOT 4 / SLOT 2
1	
0	
ON/OFF LINE YELLOW	OFF
POWER ON GREEN	ON

Figure 7-10. Operational Stage LEDs

Step 8 - Troubleshooting CIM Board Failures

Compare the fault LEDs on the CIM (figure 7-11) with table 7-2, and take recommended actions.

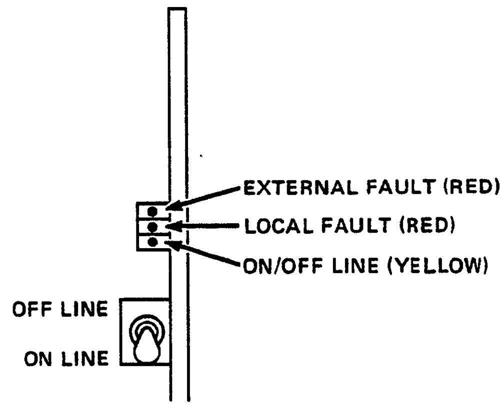

Figure 7-11. CIM LED Indicators

NOTE

1. Do not use table 7-2 to troubleshoot URI failures.
2. When you replace an RS-449 LIM, set jumpers on the new board to match the jumper setting on the board being replaced. Refer to chapter 3 for information on the proper jumper settings and cable length requirements.

Table 7-2. Interpreting CIM and LIM Error LEDs

CIM External Fault LED	CIM Local Fault LED	LIM Fault LED	Actions
ON	OFF	All ON or all OFF	1. Replace CIM board. 2. Disconnect CIM/LIM cable on one LIM board and rerun test. If problem disappears, replace disconnected LIM. Repeat for all LIMs. 3. Replace CIM/LIM cable. 4. Replace LIM backpanel.[1]

(Continued)

Table 7-2. Interpreting CIM and LIM Error LEDs *(Continued)*

CIM External Fault LED	CIM Local Fault LED	LIM Fault LED	Actions
ON	OFF	One LED ON	1. Replace LIM with LED ON. 2. Disconnect CIM/LIM cable on one LIM board and rerun test. If problem disappears, replace disconnected LIM. Repeat for all LIMs. 3. Replace CIM board. 4. Replace CIM/LIM cable. 5. Replace LIM backpanel.[1]
ON	OFF	More than one but not all	1. Replace LIM in lowest slot number with LED ON. 2. Disconnect CIM/LIM cable on one LIM board and rerun test. If problem disappears, replace disconnected LIM. Repeat for all LIMs. 3. Replace CIM board. 4. Replace CIM/LIM cable. 5. Replace LIM backpanel.[1]
ON	ON	Any combination	1. Disconnect CIM/LIM cable on CIM board and rerun test. If same error occurs, replace CIM board. 2. Disconnect CIM/LIM cable on one LIM board and rerun test. If problem disappears, replace disconnected LIM. Repeat for all LIMs. 3. Replace CIM/LIM cable. 4. Replace main logic board backpanel.[1]

1. Before replacing either backpanel, place the failing board in a different slot and rerun the diagnostics. If the error disappears, replace the backpanel.

Step 9 - Troubleshooting ESCI Board Failures

Compare the fault LEDs on the ESCI board (figure 7-12) with table 7-3 and take recommended actions.

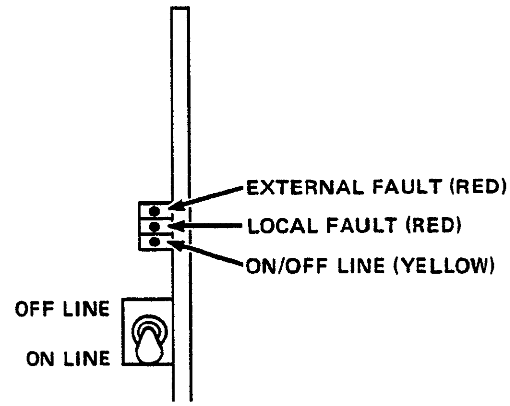

Figure 7-12. ESCI LED Indicators

Table 7-3. Interpreting ESCI Error LEDs

External Fault LED	Local Fault LED	Actions
ON	ON	1. Replace ESCI board. 2. Replace transceiver. 3. Replace external transceiver cable. 4. Replace internal ESCI cable. 5. Replace main logic board backpanel.[1]
ON	OFF	1. Verify transceiver is cabled to ESCI board. 2. Replace transceiver.[2] 3. Replace ESCI board. 4. Replace external transceiver cable. 5. Replace internal ESCI cable. 6. Replace main logic board backpanel.[1] 7. Check cable and terminators.[3]
OFF	ON	1. Replace ESCI board. 2. Replace main logic board backpanel.[1]

1. Before replacing backpanel, place ESCI board in a different slot and rerun diagnostics. If error disappears, replace backpanel.

2. Check the transceiver power-on LED before changing transceiver. If it is out, the fuse on ESCI board may have blown. Corrective action depends on whether the ESCI is a version that has fuse F2 installed. F2 is a self-healing fuse that resets itself about 3 seconds after an overload condition is removed. The Installing ESCI Board in DI Cabinet procedure, in chapter 3, has an illustration showing the location of F2. If fuse F2 is not installed, replace the ESCI in addition to the transceiver. If F2 is installed, do not replace the board until the transceiver is eliminated as the possible source of the problem.

3. A bad cable or terminator usually causes more than one DI on the cable to display a fault condition. See Testing Segment Cable in chapter 5 for methods of testing the segment cable and terminators.

Step 10 - Troubleshooting MCI Board Failures

Compare the fault LEDs on the MCI board (figure 7-13) with table 7-4, and take recommended actions.

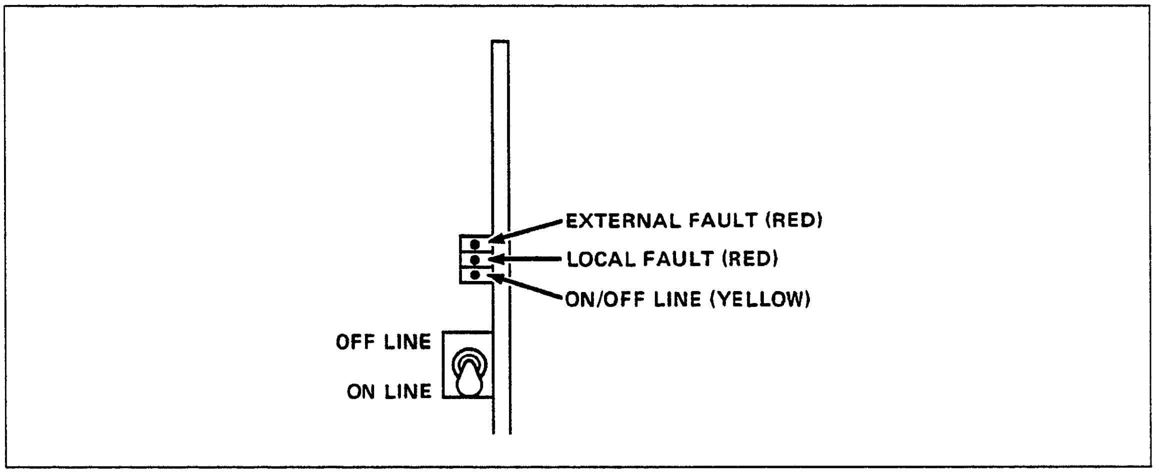

Figure 7-13. MCI LED Indicators

Table 7-4. MCI Error Indicator LEDs

External Fault LED	Local Fault LED	Action
OFF	ON	1. Replace MCI board. 2. Replace main logic board backpanel.[1]
ON	ON	1. Under NOS/VE, you or system operator check device status at system console to ensure LCU state for that MDI is ON. Under NOS, verify that EST for MDI is on. 2. Replace MCI board. 3. Replace MCI cable. 4. Test peripheral processor and channel (refer to applicable manual and run host diagnostics). 5. Replace channel cables. 6. Replace main logic board backpanel.[1]
ON	OFF	1. Test peripheral processor and channel (run host diagnostics). 2. Replace channel cables. 3. Replace MCI cable.

1. Before replacing the backpanel, place the MCI board in a different slot and rerun the diagnostics. If the error disappears, replace the backpanel.

Using Diagnostic Initialization Processor Error Messages

The Diagnostic Initialization Processor (DIP) generates a log message for any error that occurs after DI software is loaded and started. Check these messages in any of three ways:

- Use NPA to view the appropriate reports (see chapter 8).
- Use DISPLAY_ALARM_HISTORY command (see appendix G). The DIP log messages are also default alarms so the alarm history will include DIP error messages.
- Use DISPLAY_TEST_STATUS command (see appendix G).

An example DIP log message is shown below. Enter NPA (see chapter 8) and use the EXPLAIN_CDCNET_LOG_MESSAGES command (see appendix G) to get information on other messages.

```
Message Number = 337

dip_bd_fail
```

After onboard diagnostics have completed, the status of all large DI boards are checked. If any boards failed onboard diagnostic testing, this message is issued. Solid MPB board failures are not included in this check, since a solid MPB failure would preclude entering operational mode.

```
--CATASTROPHIC--  Board failed onboard testing.
type= PMM
slot number= 1
status= 0001(16)
```

Onboard Diagnostics and DI Initialization Sequence

This topic describes the diagnostic routines that comprise the onboard diagnostics and also explains each stage of the DI initialization sequence.

The following areas are covered.

- What is Tested by Onboard Diagnostics?
- How to Start Onboard Testing and DI Initialization
- DI Testing and Initialization Sequence
- Diagnostic Initialization Processor (DIP) Error Logging

What is Tested by Onboard Diagnostics?

The onboard diagnostics have five main routines, each of which tests a portion of DI hardware. The routines and areas they test are as follows:

Test Name	Description
MPBB	Always the first test run. Verifies the main processor board and the private memory module board (MPBB).
SMMB	Verifies system main memory boards. This test immediately follows the MPBB test.
CIMB	Verifies communications interface module and line interface module boards (not including URIs or 8-port LIMs).
ESCB	Verifies all available ESCI boards and transceivers.
MCIB	Verifies all available mainframe channel interface boards. BOOT_DSEQ is part of the MCIB diagnostic and verifies boot capabilities.

In addition to testing hardware on each board, the diagnostics also check interfaces between boards. The URIs and 8-port RS-232 LIMs are not tested by the onboards because they are not used as boot sources by the DI. However, online diagnostics for the 8-port LIMs and URIs run automatically after software is loaded. This occurs before the configuration file is processed.

How to Start Onboard Testing and DI Initialization

Resetting the DI starts the testing and initialization sequence. You can reset the DI in any of the following ways:

Reset	Description
Manual Reset	Initiate by toggling the ATTN/RST switch to the RST position (figure 7-14). A manual reset initiates the MPB onboard diagnostic (MPBB). If it completes successfully, the MPB sends a software-initiated command to the other intelligent devices (CIM and ESCI), which then execute their respective onboard diagnostics. Note that if MPB switch 5 (Short Power-Up) is set to On, the DI skips some MPB and SMM tests.
Power-Up Reset	Initiate by applying power to the DI. Power-up reset operates the same as manual reset, but takes longer to run because it clears and rewrites the memory while running the diagnostics.
Remote Reset	Initiate by sending the DI a KILL_SYSTEM command (see appendix G). The KILL_SYSTEM command allows you to reset the DI from a remote site, providing the DI can respond to commands.

DI Testing and Initialization Sequence

The DI is tested and initialized in four stages. These stages and the order in which they occur are as follows:

1. Reset stage
2. Quicklook stage
3. Initialize stage (initialize idle state is part of this stage)
4. Operational stage

You can monitor the sequence by watching the LEDs on the MPB board. Figure 7-14 shows the LEDs and figure 7-15 shows the LED indications for each stage. Figure 7-16 is a flow chart of the sequence.

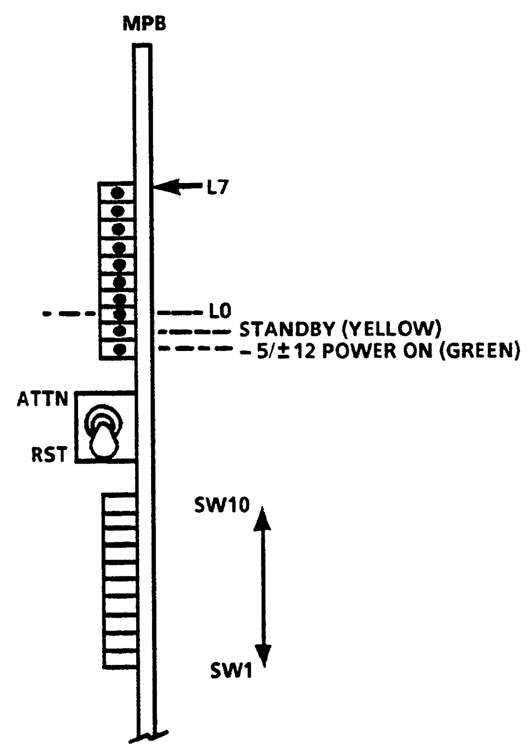

Figure 7-14. MPB Reset/Attention Switch

MPB LEDS	RESET STAGE	QUICKLOOK STAGE	INITIALIZE STAGE	INITIALIZE IDLE STATE	OPERATIONAL STAGE
7	ON	ON	OFF	ON	OFF
6	ON	ON	ON	OFF	OFF
5	ON	BLINKS WHEN A POWER ON RESET IS RECEIVED	BLINKS DURING A BLOCK INPUT OR BLOCK OUTPUT	OFF	ON IF CPU BUSY OFF IN IDLE
4	ON	PHASE FAILURE CODE LED 4 = OFF, ON, ON, OFF LED 3 = ON, ON, OFF, OFF (ON/ON, ON/ON = PHASE I; OFF/OFF = PHASE I I)	BOOT SOURCE CODE LED 4 = OFF, OFF, ON LED 3 = OFF, ON, ON NORMAL BOOT, NO BOOT SOURCE, UNEXPECTED INTERRUPT	IDLE REASON CODE CURRENTLY UNDEFINED	FAULT CODE LED 4 = OFF, OFF, ON LED 3 = OFF, ON, ON NO FAULT, FAULT NO TEST RUNNING, TEST RUN-NING
3	ON				
2	ON	PHASE 1 FAILURE CODES LED 2 = ON, OFF, ANY LED 1 = ON, OFF, OTHER LED 0 = OFF, ON, CODE SYSTEM ID, PPM, MPB PHASE I I FAILURE CODES OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLE. LED 2 = ON LED 1 = OFF LED 0 = ON SLOT 5	OCTAL SLOT NUMBER OF BOOT SOURCE EXAMPLE: LED 2 = ON LED 1 = ON LED 0 = OFF SLOT 6	OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLES LED 2 = ON, OFF LED 1 = OFF, OFF LED 0 = ON, OFF SLOT 5, NO FAULT	OCTAL SLOT NUMBER OF FAILING BOARD EXAMPLES: LED 2 = ON, OFF LED 1 = OFF, ON LED 0 = OFF, OFF SLOT 4, SLOT 2
1	ON				
0	ON				
ON/OFF LINE YELLOW	ON	BLINKS DURING PMM AND PHASE I I TESTING	BLINKS ONCE A SECOND WHILE ATTEMPTING TO BOOT	BLINKS ONCE A SECOND WHILE ATTEMPTING TO BOOT	
POWER ON GREEN	ON	ON	ON	ON	ON

M04118

Figure 7-15. Device Interface Start-Up Stages

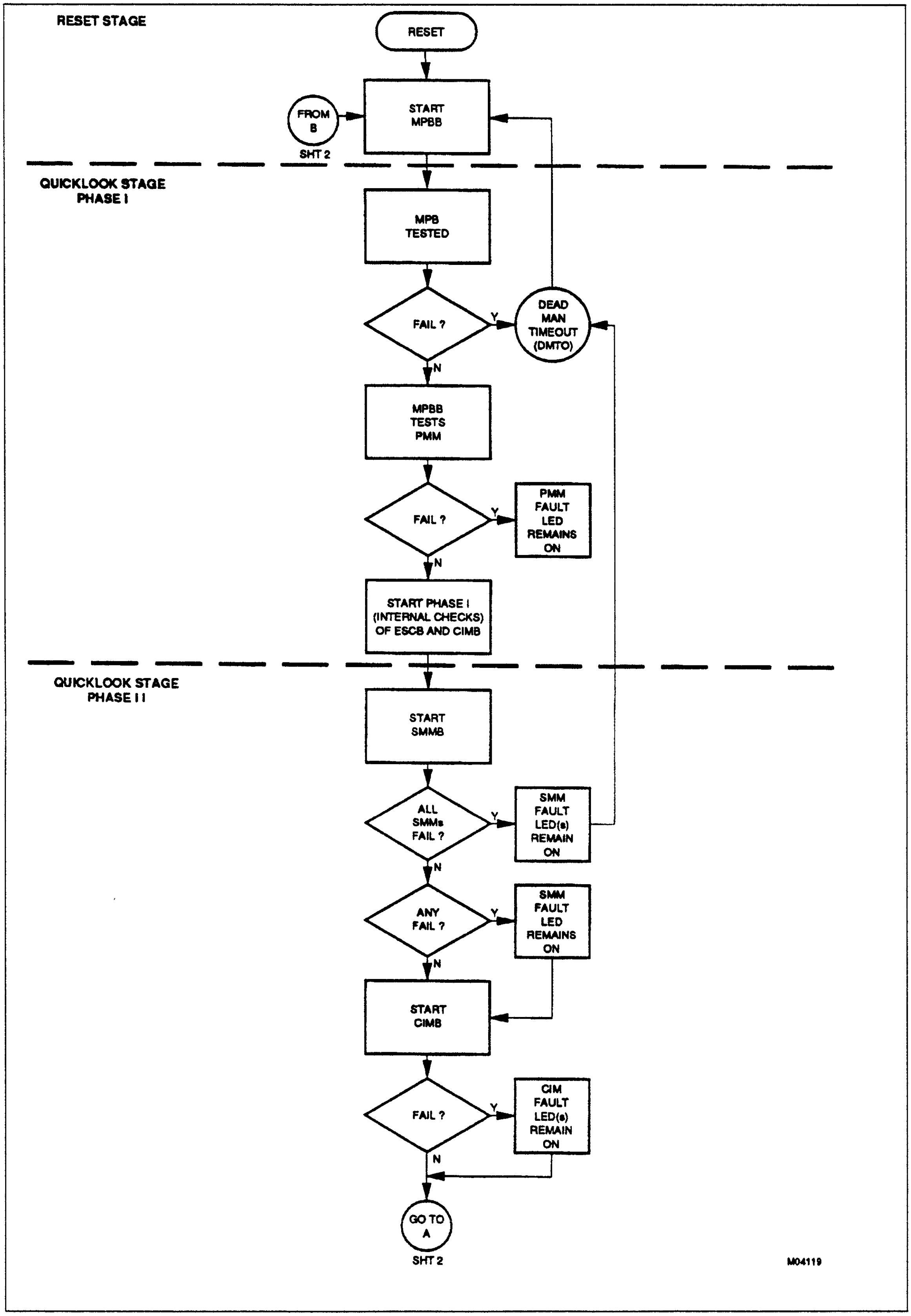

Figure 7-16. Onboard Diagnostic Flow chart

(Continued)

(Continued)

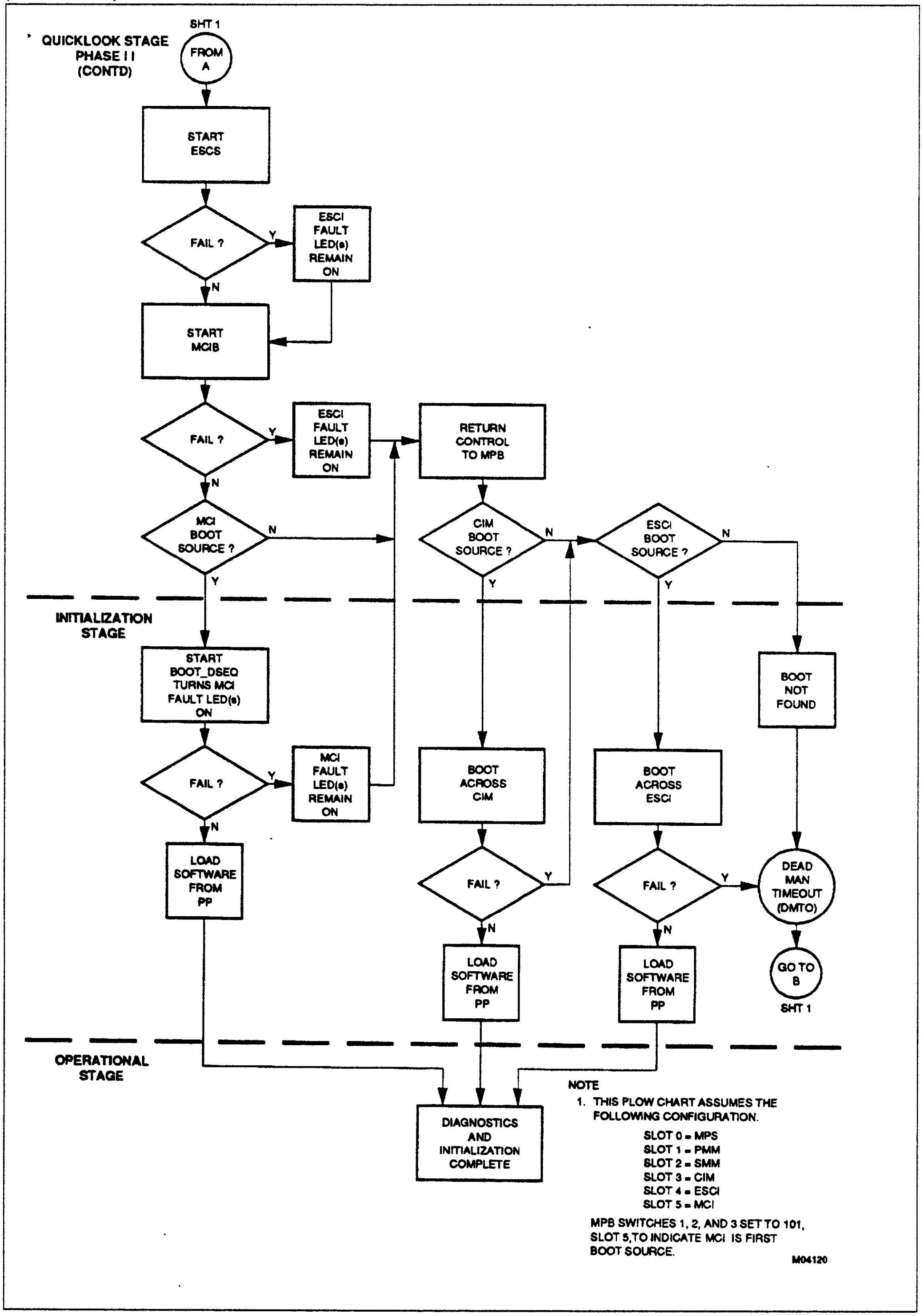

Figure 7-16. Onboard Diagnostic Flow chart

Reset Stage

When the DI receives a reset, all the red error LEDs on the MPB are ON (figure 7-15). The MPB indicators remain ON until the quicklook stage begins. Also, all the red error LEDs and the yellow Online/Offline LED on the other boards are ON (PMM and LIM boards do not have the yellow LED).

Quicklook Stage

When the quicklook stage begins, MPB indicators 6 and 7 remain ON and indicator 5 begins to blink if the reset is a power-on (figure 7-15). The quicklook stage runs MPBB, SMMB, CIMB, ESCB, and MCIB in two phases.

Quicklook Phase I

Phase I tests the internal operation of the intelligent boards (those with a processor) and begins with the MPBB routine. The intelligent boards are the MPB, ESCI, and CIM. The MPBB routine starts by testing the MPB and then checks the PMM (if there is one). MPBB also initiates the first part of ESCB and CIMB, which test ESCI and CIM internal hardware.

When errors occur in phase I of the quicklook stage, diagnostics stop unless the failure occurred during the PMM test (refer to figure 7-15). Instead, a deadman timeout (DMTO) occurs in 10 seconds and the diagnostics are reset to MPBB. To isolate the failure, watch the error indicators on the MPB prior to the reset.

Quicklook Phase II

Phase II tests the nonintelligent boards (those without a processor. The nonintelligent boards are the SMM, MCI, and LIMs. Phase II also runs furither checks on the intelligent boards and checks the interfaces between boards (not including loopback through modems).

SMMs are the first boards tested in phase II. SMMs are tested one at a time, in slot number order, by the SMMB routine. When SMMB is complete, testing progresses to the board in the next higher slot.

When errors occur during phase II testing, the error indicator on the failing board remains On and testing continues. However, some phase II failures cause a dead man timeout to occur, which restarts diagnostics from MPBB.

MPBB Diagnostic

This diagnostic is always the first to be run. The MPBB diagnostic performs the following:

- Tests MPB features and internal MPB random access memory
- Performs a checksum of the initialization system identification if switch 6 on the MPB board is left OFF (normal operation)
- Tests PMM
- Initializes and builds a board map table in MPB random access memory
- Enables intelligent boards (boards with their own processor including the CIM and ESCI) to execute their phase I diagnostics
- Tests SMM using SMMB code read from SMM
- Monitors intelligent boards (CIM and ESCI) for completion of their phase I diagnostics
- Assists in phase II with other diagnostics
- Initializes the MPB as required by boot software

When the MPBB diagnostic begins, LED indicator 5 (figure 7-15) begins blinking (power-on reset only). As testing progresses, the MPBB diagnostic tests the PMM board. If the test runs without error, the fault LED on the PMM is turned OFF (figure 7-17).

When a failure occurs in the MPB, MPBB attempts to increment an error counter. This is indicated by LEDs 3 and 4 (figure 7-15) being on for 10 seconds. The section that failed is indicated by LEDs 0, 1, and 2 (figure 7-15). If the PMM fails, MPB attempts to continue testing, but leaves the PMM error LED set to ON.

NOTE

An early MPB or PMM failure in phase I may result in a hang condition. In this case, the (not yet updated) MPB indicators are invalid. A DMTO occurs and the sequence of DMTO/reset is repeated without error logging.

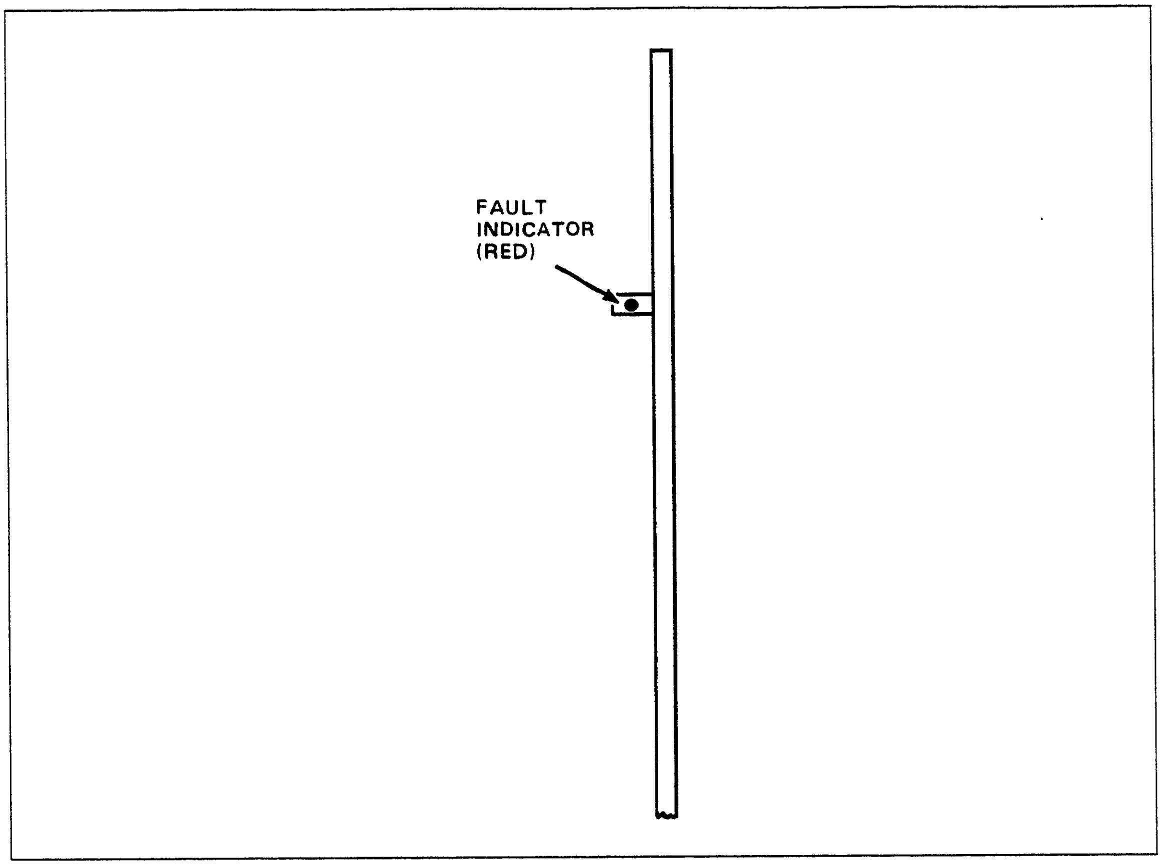

Figure 7-17. PMM LED Indicator

SMMB Diagnostic

The SMMB diagnostic tests the SMM boards and the internal system bus (ISB). The ISB is the interface between the SMM and MPB.

When the SMMB diagnostic begins, the Online/Offline LED on both the MPB and SMM board being tested blinks at 1-second intervals. If the test runs without any errors, the red fault indicator on the SMM board is turned OFF. If the SMM board is online, the Online/Offline LED (figure 7-18) is turned OFF at the completion of the test. The diagnostic then tests the next SMM (if it is available). This continues until all SMMs are tested.

If an error occurs, the remaining diagnostics attempt to continue using the remaining SMMs, but leave the fault indicator ON for the SMM that failed. If there is not enough available functioning memory, the DI cannot boot and the diagnostics do not advance past the initialization stage. A DMTO occurs and the diagnostics are restarted. This loop continues until the error is corrected.

If testing continues and completes a successful boot, DIP provides an error message indicating the failure.

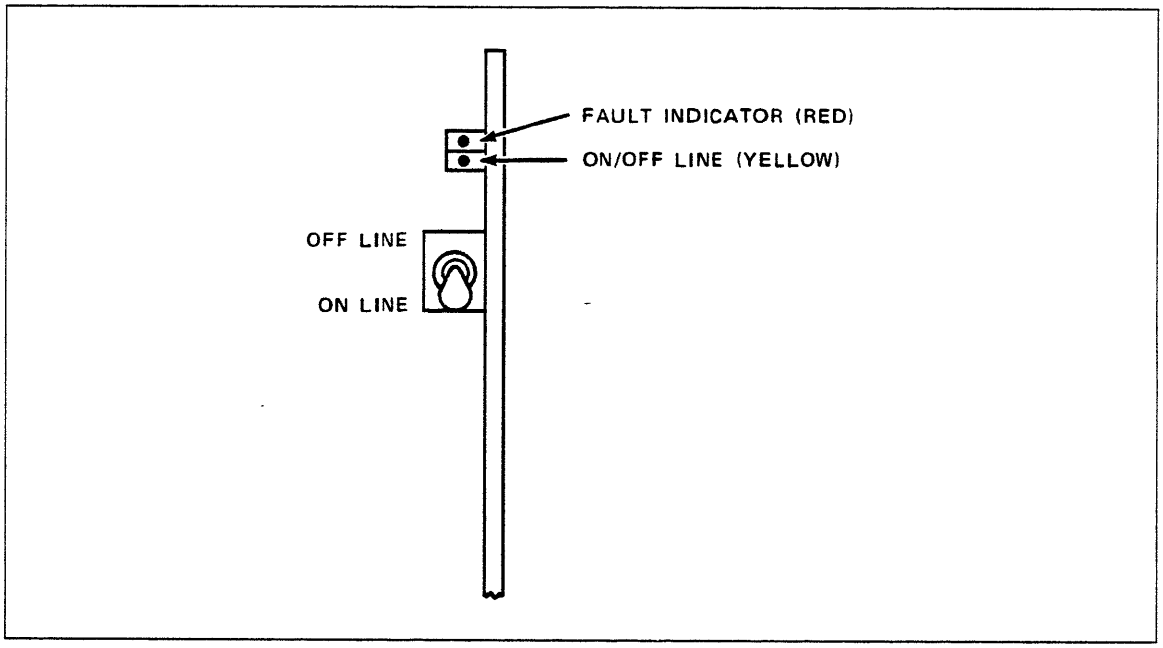

Figure 7-18. SMM LED Indicators

CIMB Diagnostic

The CIMB diagnostic tests:

- CIM boards
- Interface between the CIM and the MPB (ICB)
- Interface between the CIM and SMM (ITB)
- LIM boards (excluding URIs and 8-port LIMs) connected to the CIM being tested

The CIMB diagnostic begins when the board in the slot to the left completes its testing. If the CIMB diagnostic completes without failure, CIM and LIM board (not including URIs and 8-port LIMs) fault LEDs (figure 7-19) are turned OFF. If the CIM is online, the Online/Offline LED is turned OFF.

If an error occurs, testing continues but the fault indicator(s) on the CIM remain ON. If an error occurs on a LIM board, testing continues but the fault indicator on the failing LIM remains ON. If the DI loads the software, DIP provides an error message indicating the failure.

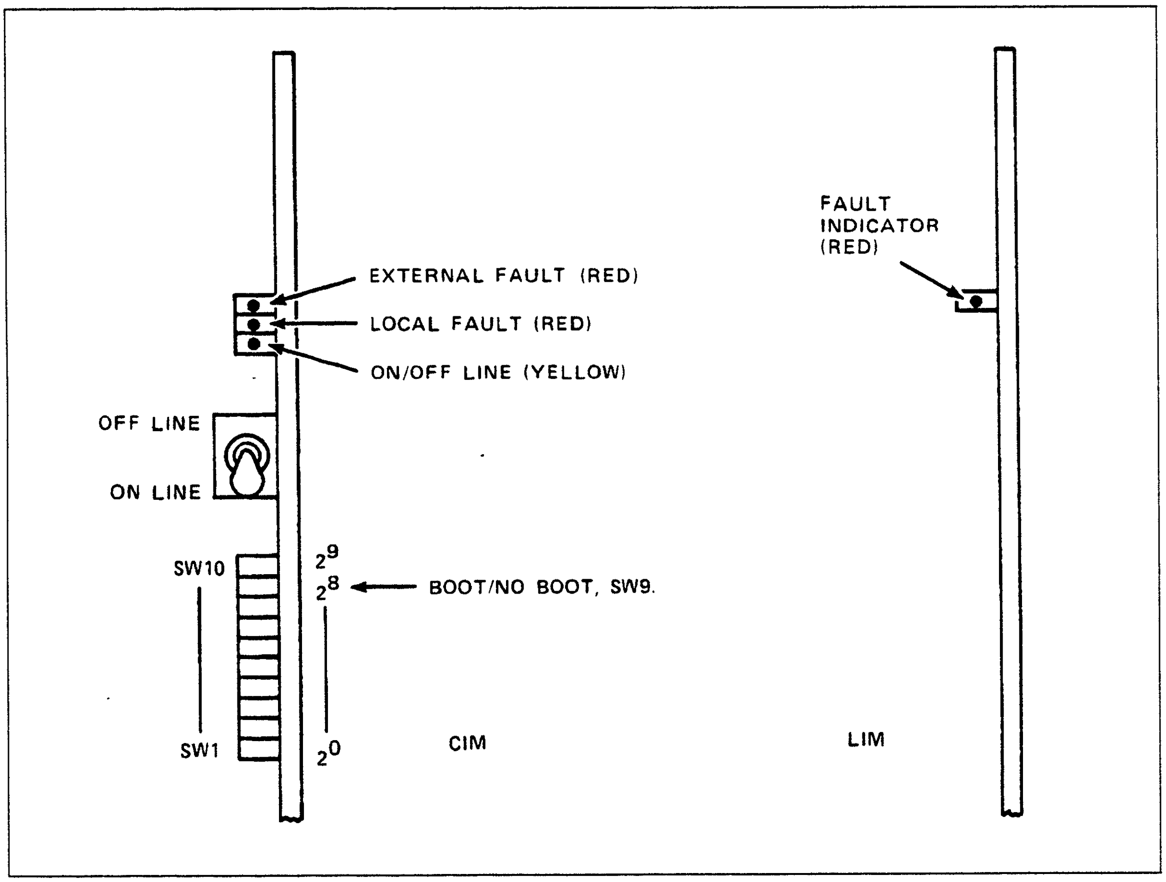

Figure 7-19. CIM and LIM LED Indicators

ESCI Diagnostic

The ESCI diagnostic tests the following:

- ESCI boards
- Interface between the ESCI and the MPB (ICB)
- Interface between the ESCI and the SMM (ITB)
- Interface between Ethernet and the SMM (direct memory access)
- Ethernet transceiver and transceiver cable

The ESCB diagnostic begins when the board in the slot to its left completes its testing. If the ESCB diagnostic runs without failure, the fault LEDs are turned OFF (figure 7-21). If the ESCI board is online, the Online/Offline LED is turned OFF.

If an error occurs, testing continues but the fault indicator(s) remain ON. If the DI loads the software, DIP provides an error message indicating the failure.

NOTE

A transceiver must be connected to the ESCI board or the external fault LED stays ON.

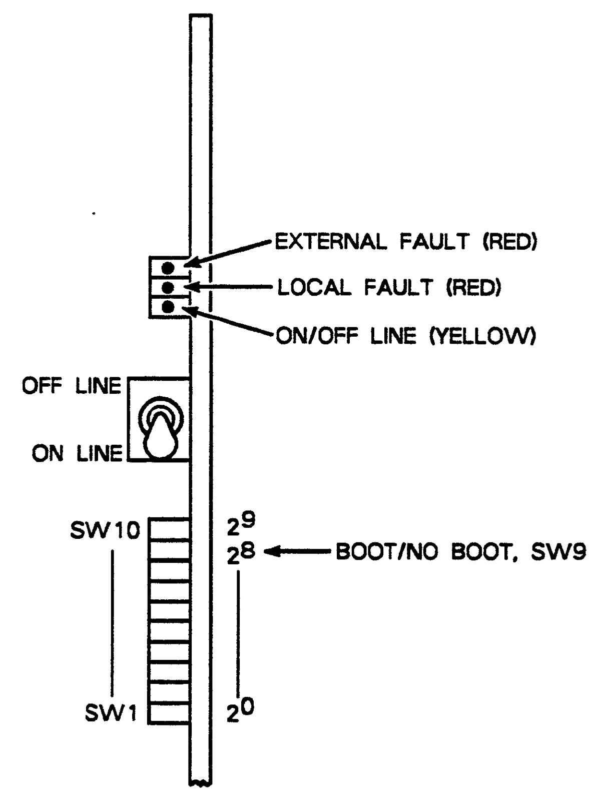

Figure 7-20. ESCI LED Indicators

MCIB Diagnostic

The MCIB diagnostic tests the following hardware:

- MCI boards
- MPB to MCI interface (ICB)
- MCI to SMM interface (ITB)

The MCIB diagnostic begins when the board in the slot to the left completes its testing. If the MCIB diagnostic runs without failure, the fault LEDs are turned OFF (figure 7-21). If the MCI board is online, the Online/Offline LED is turned OFF.

If an error occurs, testing continues but the fault indicator(s) remain ON. If the DI loads the software, DIP provides an error message indicating the failure.

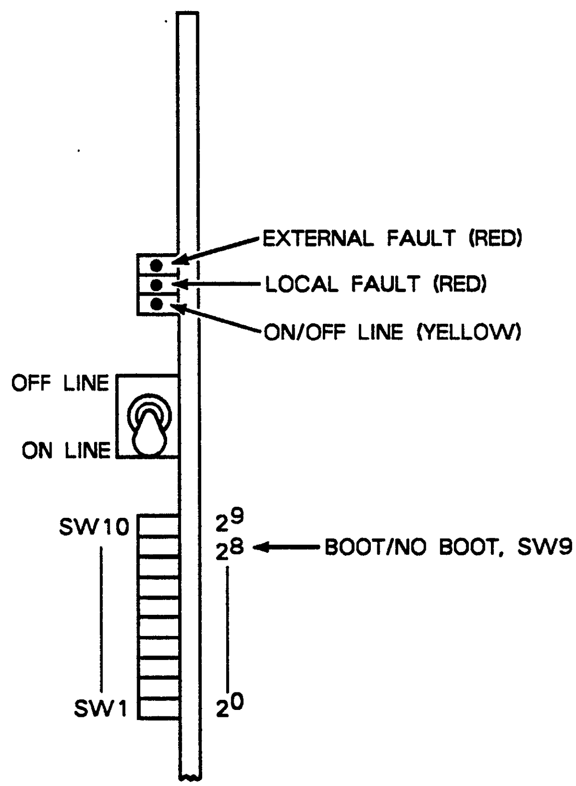

Figure 7-21. MCI LED Indicators

Initialize Stage

This stage boots the software from the host to the DI. When the MCI board is selected as the primary boot source (refer to chapter 3 for switch-setting procedures), this stage runs the BOOT_DSEQ segment of the MCIB diagnostic. If BOOT_DSEQ fails or the MPB is unable to load across the MCI, control is returned to the MPB. The MPB then checks (starting with the lowest to highest slot number) for another board to use as the secondary boot source.

When the initialize stage begins, MPB LED 7 is turned OFF and LED 6 remains ON (figure 7-15). When loading begins, LEDs 0 through 5 begin to blink successively (table 7-1) and continue blinking until either loading completes, or an error is detected.

The initialize idle state is part of the initialization stage. This state occurs when certain failures or delays prevent the DI from loading software.

Table 7-5. Initialization Stage During Loading

MPB LEDs	Initialization Stage While Loading
7	OFF
6	ON
5	Blink successively during load
4	Blink successively during load
3	Blink successively during load
2	Blink successively during load
1	Blink successively during load
0	Blink successively during load
On/Off line yellow	OFF
Power-on green	ON

BOOT_DSEQ is a part of the MCI ROM-resident boot code that boots software from the PP to the DI. When BOOT_DSEQ begins, it turns both MCI board fault lights (figure 7-21) back ON at the start of execution (these were turned OFF during the MCIB segment of this diagnostic). If the test completes without error, the MCI fault lights are turned back OFF. BOOT_DSEQ must run successfully before the host attempts to load the DI. In order for the host to load, the Equipment Status Table (EST) must be ON for NOS and the Communication Element Device (CED) must be ON for NOS/VE.

The BOOT_DSEQ diagnostic tests the following:

- CYBER peripheral processor MCI board interface
- CYBER channel control
- Data pack/unpack network
- Peripheral Processor/SMM data transfers with data terminal communication chaining
- Error status generation

If this stage fails to initialize the software, then the next possible boot source is selected. If all possible boot sources fail, then no boot source code is displayed on the MPB error LEDs (figure 7-15).

Operational Stage

This is the final stage of the DI start-up. When this stage completes successfully (software is loaded), all MPB indicator LEDs are OFF except LED 5 (figure 7-15), and the DI is online and ready for use. If any errors occurred during testing, the DI cabinet fault LED remains ON and DIP provides an error message to the log file describing the failure. The error message is retrieved by NPA.

Diagnostic Initialization Processor (DIP) Error Logging

When the diagnostics have completed, the DI attempts to load software across the board selected as the boot source. If successful (certain errors may prohibit the load), the software provides further error reporting for the onboard diagnostics with the Diagnostic Initialization Processor program.

The Diagnostic Initialization Processor (DIP) is part of the Diagnostic Management Services software that resides in the DI. DIP is activated following completion of the load and start-up of online software. If errors are detected, DIP generates an error message to the log file that is used to isolate the failure. The error message is retrieved by the Network Performance Analyzer commands. If no errors are detected, no messages are logged and DIP turns the DI cabinet fault indicator to OFF. DIP log messages are also default alarm messages and may be retrieved with the DISPLAY_ALARM_HISTORY command (see the CDCNET Commands Reference manual for format). The following examples show typical DIP messages.

Example 1:

After onboard diagnostics have completed, the status of all major DI boards is checked. If any boards failed onboard testing, this message is issued. The MPB board is not included in this check, since an MPB failure would preclude entering operational mode.

```
Board failed onboard testing.
type= PMM
slot number= 1
status= 0001(16)
```

Example 2:

After onboard diagnostics have completed, a field containing the number of MPB fatal errors before successful initialization is logged if it is nonzero.

```
MPB failed onboard testing
before initialization was successful.
slot number= 0
fatal errors= 172
```

How to Use the Network Performance Analyzer 8

How to Use the Network Performance Analyzer 8

This chapter shows you how to initiate NPA (Network Performance Analyzer) reports and use them to troubleshoot a network. It also explains how to get help information for log messages. The areas covered are as follows:

- What NPA reports are available?
- Using NPA through CML/VE
- Using NPA through CMSI
- Using NPA in command mode
- Getting help with log messages
- Using NPA to troubleshoot a network

This chapter provides only basic information on NPA. For more information, see the CDCNET Network Operations and Analysis manual.

What NPA Reports are Available?

Table 8-1 lists all the available NPA reports. Figures 8-1 and 8-2 show an example report.

Table 8-1. NPA Reports

Keyword	Description
CONFRP1	Configuration report on an hourly status of DI hardware and software.
CONNRP1	Hourly connection report on the number of connections initiated and terminated.
CONNRP2	Daily connection report on the number of connections initiated and terminated.
DIOSRP1	Hourly device operating report on central processor unit (CPU) and memory utilization statistics.
DIOSRP2	Daily device operating report on CPU and memory utilization statistics.
DIOSRP3	Hourly device operating report on memory state transitions statistics.
DIOSRP4	Daily device operating report on memory state transitions statistics.
ETHRRP1	Hourly Ethernet report on transmit and collision channel statistics.
ETHRRP2	Hourly Ethernet report on frames and error statistics.
EVNTRP1	Event log report sorted by date and time.
EVNTRP2	Event log report sorted by severity.
EVNTRP3	Event log message frequency and severity summary.
EVNTRP4	Event log message frequency and severity summary reported by DI.
HDLCRP1	Hourly HDLC report on usage.
HDLCRP2	Daily HDLC report on usage.
HDLCRP3	Hourly HDLC report on error statistics.
HRDWRP1	Hardware message report sorted by date and time.
HRDWRP2	Hardware message report sorted by severity.
HRDWRP3	Hardware log message frequency and severity summary.
HRDWRP4	Hardware log message frequency and severity summary reported by a DI.

(Continued)

Table 8-1. NPA Reports *(Continued)*

Keyword	Description
LOADRP1	Hourly loader statistics report.
MCISRP1	Hourly MCI report on input/output block statistics.
MCISRP2	Daily MCI report on input/output block statistics.
MCISRP3	MCI report on bad/good block input/output statistics.
SESSRP1	Hourly session statistics report on PDUs received and transmitted.
SFTWRP1	Software message report sorted by date and time.
SFTWRP2	Software message report sorted by severity.
SFTWRP3	Software log message frequency and severity summary.
SFTWRP4	Software log message frequency and severity summary reported by a DI.
TERMRP1	Hourly terminal report on good/bad block input/output statistics.
TERMRP2	Hourly terminal statistics report online characters input/output.
USERRP1	Unsorted user message report.
X25CRP1	X.25 connection statistics report for number of connections terminated and initiated, average connect time, and maximum connect time.
X25CRP2	Daily X.25 connection statistics report for number of connections initiated, terminated, average connect time, and maximum connect time.

```
                                                        87/09/15





                 NETWORK PERFORMANCE ANALYZER
                    VERSION 1.10/3403

                  CDCNET HARDWARE MESSAGES
                  SORTED BY DATE AND TIME

                      HRDWRP1 REPORT

          TIME PERIOD = 00/01/01 0000 - 99/12/31 2400

                  SYSTEM ID = 080025000000
```

Figure 8-1. HRDWRP1 Report Heading Page

```
REPORT DAY: 86/01/01                                                    PAGE     1
                                   HRDWRP1 REPORT
                                START TIME = 0000 HOURS

  DATE      TIME       SYSTEM ID     LOG ID SEVERITY
======== =========== ============  ====== ============

86/01/01 00.00.00927 0800253000A2     338     ERROR
--ERROR--  MPB FAILED ON-BOARD TESTING
BEFORE INITIALIZATION WAS SUCCESSFUL.
SLOT NUMBER= 0
FATAL ERRORS= 7

86/01/01 00.00.00930 0800253000A2     340     ERROR
--ERROR--  PMM HAD RECOVERED PARITY ERRORS
DURING ON-BOARD TESTING.
SLOT NUMBER= 1
ERRORS= 39168
FIRST FAILING ADDRESS= 00010000

86/01/01 00.00.00933 0800253000A2     341     ERROR
--ERROR--  SMM SINGLE BIT ERRORS OCCURRED
DURING INITIALIZATION.
SLOT NUMBER= 2
ERRORS= 1942
ERROR LOG= 0648

86/01/01 00.00.00935 0800253000A2     342     ERROR
--ERROR--  SMM MULTIPLE BIT ERRORS OCCURRED
DURING INITIALIZATION.
SLOT NUMBER= 2
ERRORS= 11671
ERROR LOG= 0473

86/01/01 00.00.55028 0800253000A2      19  INFORMATIVE
CONFIGURATION COMPLETE,
CONFIGURATION FILE SOURCE:
NETWORK ID: 41454646, SYSTEM ID: 0800253000BE
```

Figure 8-2. HRDWRP1 Report Data Page

Using NPA Through CML/VE

If your system operates under NOS/VE, use the Concurrent Maintenance Library/Virtual Environment (CML/VE) to generate NPA reports. CML/VE provides a set of menus from which to select the desired tasks. Figure 8-3 shows the NPA related menus and the procedure below shows how to use them. For detailed information on CML/VE, refer to How to Use CML/VE, in chapter 4.

1. Have someone with access to the NPA private log file (usually the network administrator) execute the REFORMAT_CDCNET_LOG_FILE (REFCLF) command. REFCLF puts the log files into the proper format (see the CDCNET Network Operations and Analysis manual for more information).

2. Enter CML/VE as described under Starting CML/VE, in chapter 4.

3. Choose option 6 from CML/VE Main Menu. This takes you to the NPA menu (CML_600).

4. Choose desired option from the NPA menu (CML_600). Each option is explained below.

   1 Initiates NPA in expert mode. This gives you the / prompt and allows you to enter NPA commands. Entering `quit` returns you to this menu.

   2 Displays a menu of NPA reports (CML_630) which can be built from the $SYSTEM.CDCNET.LOG file. A REFORMAT_CDCNET_LOG_FILE is performed to extract data from that file.

   3 Displays a menu of NPA reports (CML_630) which can be built from the $SYSTEM.CDCNET.ANALYSIS DATA_FILES file.

   4 Displays a prompt for the CDCNET log message number for which a description is desired (see Getting Help with Log Messages, later in this chapter).

5. Choose desired option from CML_630. Each option is explained below.

   1-7 See table 8-1 for definitions of these reports.

   8 Routes all generated reports to the site default printer.

   9 Builds and prints reports for items 1 through 6.

   10 Selects a catalog value for the location of the CDCNET log files. This option is available only when menu item 3 is selected from menu CML_600.

   Figures 8-1 and 8-2 show an example of an NPA report.

```
        -------------------------------------
        CML_000 - CML/VE MAIN MENU - VERSION XX
        -------------------------------------
        1. MALET/VE (PERIPHERAL DIAGNOSTICS).
        2. HPA/VE (HARDWARE ERROR REPORTS).
        3. DVS (MAINFRAME DIAGNOSTICS).
        4. CONFIGURATION UTILITY (DISPLAY HARDWARE/SOFTWARE
           CONFIGURATION DATA).
        5. TERMINAL/USER DEFINITION UTILITY (DISPLAY/ALTER TERMINAL
           USER DEFINITION).
    ___[6. NPA (NETWORK PERFORMANCE ANALYZER).
   |    7. CDCNET UTILITY (ONLINE DIAGNOSTICS AND STATUS DISPLAYS).
   |    8. CML/VE TOOLBOX (SITE/LOCAL GENERATED MAINTENANCE PROCEDURES).
   |    9. QUIT/END (EXIT CML/VE).
   |
   |___________
               |
               |
        -----------------
        CML_600 - NPA MENU
        -----------------
        1. EXECUTE NPA IN EXPERT (COMMAND MODE).
    ___[2. BUILD AND DISPLAY INDIVIDUAL NPA REPORTS FROM $SYSTEM LOGFILE.
   |___[3. BUILD AND DISPLAY INDIVIDUAL NPA REPORTS FROM EXISTING
   |       NPA DATA_FILES.
   |    4. EXPLAIN CDCNET LOG MESSAGES.
   |
   |
   |___________
               |
               |
        ------------------------
        CML_630 - NPA REPORT MENU
        ------------------------
        1.  BUILD AND DISPLAY MCI STATISTIC REPORT (MCISRP3).
        2.  BUILD AND DISPLAY ESCI STATISTIC REPORT (ETHRRP2).
        3.  BUILD AND DISPLAY HDLC STATISTIC REPORT (HDLCRP3).
        4.  BUILD AND DISPLAY LINE STATISTIC REPORT (TERMRP1).
        5.  BUILD AND DISPLAY HARDWARE ERROR REPORT (HRDWRP2).
        6.  BUILD AND DISPLAY SOFTWARE ERROR REPORT (SFTWRE2).
        7.  BUILD AND DISPLAY EVENT_LOG REPORT FOR TODAY ONLY (EVNTRP2).
        8.  PRINT ALL REPORTS PREVIOUSLY BUILT.
        9.  BUILD AND PRINT ALL CML/VE SUPPORTED NPA REPORTS (EXCEPT EVNTRP2).
       *10. SET LOG_CATALOG VALUE FOR DATABASE FILES LOCATION.


* Appears only when this menu is entered from option 3 on CML_600.
```

Figure 8-3. CML/VE Menus for NPA

Using NPA Through CMSI

If your system operates under NOS, use the Common Maintenance Software Interface (CMSI) to generate NPA reports. CMSI has a set of menus similar to CML/VE. Figure 8-4 shows the NPA related menus and the procedure below shows how to use them. For detailed information on CMSI, see How to Use CMSI, in chapter 4.

1. Have someone with access to the NPA private log file (usually the network administrator) execute the REFORMAT_CDCNET_LOG_FILE (REFCLF) command. REFCLF puts the log files into the proper format (see the CDCNET Network Operations and Analysis manual for more information).
2. Enter CMSI as described under Starting CMSI, in chapter 4.
3. Choose option 1 from CMSI main menu. This takes you to the ANALYSIS INTERFACE menu (CMSI100).
4. Choose option 1 from the ANALYSIS INTERFACE menu. This takes you to the CDCNET NPA INTERFACE menu (CMSI120).
5. Choose desired option from CDCNET NPA INTERFACE menu (CMSI120). Each option is explained below.

1-4	See table 8-1 for definitions of these reports.
5	Builds and displays a combined report that contains reports 1 through 4.
6	Allows you to use the CREATE_CDCNET_ANALYSIS_REPORT (CRECAR) command to create a report. See appendix G for more information on the CRECAR command.
7	Returns you to main CMSI menu.

Figures 8-1 and 8-2 show an example of an NPA report.

```
    ---------------------------------------------------
    CMSI - COMMON MAINTENANCE SOFTWARE INTERFACE - CMLLEV
    ---------------------------------------------------
 ___[1. ANALYSIS INTERFACE     - HPA/NPA/MTPLOT-DSPLOT
|     2. DIAGNOSTICS INTERFACE - MALET/CPU/MST/T10/REGEN/LCN/CDCNET
|     3. DUMP INTERFACE        - DSDI/MCDUMP/MCDUMP/ANALDMP
|     4. UTILIITIES INTERFACE  - CMLUTIL/EST TABLE/MOD CMLINST
|     5. REINITIALIZE CMSI     - RESET ANY CMSI PARAMETERS
|     6. EXIT TO NOS           - EXIT TO THE NOS OPERATING SYSTEM
|     7. LOGOFF                - TERMINATE THIS TERMINAL SESSION
|
|--------------
              |
              |
    ----------------------------------
    CMSI - ANALYSIS INTERFACE - CMSI100
    ----------------------------------
     1. HPA INTERFACE
 ___[2. NPA CDCNET INTERFACE
|    3. MTPLOT/DSPLOT INTERFACE
|    9. -----RETURN TO MAINFRAME MENUS
|
|--------------
              |
              |
    ------------------------------------
    CMSI - CDCNET NPA INTERFACE - CMSI120
    ------------------------------------
     1. NPA MCI STATISTICS REPORT - MCISRP3
     2. NPA ESCI STATISTIC REPORT - ETHRRP2
     3. NPA LINE STATISTIC REPORT - TERMRP2
     4. NPA HARDWARE ERROR REPORT - HRDWRP2
     5. NPA REPORT OF 'ALL' FORMATS
     6. USER ACCESS TO NPA REPORT GENERATOR CRECAR
     9. -----RETURN TO MAIN CMSI MENU
```

Figure 8-4. CMSI Menus for NPA

Using NPA in Command Mode

This topic explains how to use NPA commands rather than CML/VE or CMSI menu selections to produce the desired reports. The procedure below assumes you are entering comand mode from the / prompt in either NOS or NOS/VE. The procedure is followed by an example.

1. Have someone with access to the NPA private log file (usually the network administrator) execute the REFCLF command for you. The REFORMAT_CDCNET_LOG_FILE REFCLF puts the log files into the proper format. See the CDCNET Network Operations and Analysis manual for more information.

2. On NOS/VE only, enter the following command to make NPA available to your job:

   ```
   CREATE_COMMAND_LIST_ENTRY $SYSTEM.CDCNET.VERSION_INDEPENDENT.COMMAND_LIBRARY
   ```

3. Access NPA by entering (shaded information):

   ```
   /npa
   ```

   The np/ prompt appears on NOS/VE. On NOS, the / prompt remains.

   You may now enter NPA commands as well as system commands. The NPA command does all of the setup necessary to run NPA. The default attribute file NPAATTR is made local along with the necessary library files needed for NPA command execution.

4. Create desired reports using CREATE_CDCNET_ANALYSIS_REPORT command (see appendix G). You can also enter other NPA commands (see the CDCNET Network Operations and Analysis manual for more information).

5. Exit NPA as follows:

   - On NOS/VE, enter quit. The np/ prompt is replaced by the / prompt.

   - On NOS, simply enter the next desired non-NPA command. For example, entering netou takes you out of NPA and into NETOU.

Example Using NPA Commands

NOTE

The following example assumes that NPA software has been loaded into the CDCNET system and all necessary NPA databases have been defined.

This example uses NOS to create a hardware status report (HRDWRP1) similar to the one shown in figures 8-1 and 8-2.

1. Have someone who has access to the private log file execute the REFCLF command.

2. Log in to your terminal.

3. Access NPA by entering (shaded information):

   ```
   /npa
   ```

   The NPA command does all the setup necessary to run NPA. The default attribute file NPAATTR is made local with this command along with the necessary library files needed for NPA command execution.

4. Create the NPA hardware status report (HRDWRP1) using the line mode command entry procedure (for examples in screen mode, see the CDCNET Network Operations and Analysis manual) by entering (shaded information):

   ```
   /CRECAR,RN=HRDWRP1 DBFUN=NETADMN
   ```

5. The hardware report HRDWRP1 is created and stored in file CREOUT. To view the report on your terminal, enter (shaded information):

   ```
   /FSE,CREOUT
   ```

Getting Help with Log Messages

The following two NPA commands provide help information on log messages.

- EXPLAIN_CDCNET_LOG_MESSAGES (EXPCLM) - Gives you more information about log messages. You can also get this information using option 4 of CML/VE menu CML_600 (see Using NPA Through CML/VE).

- EDIT_CDCNET_LOG_MESSAGE (EDICLM) - Allows you to add comments to the message that are applicable to the specific site.

Both commands are explained in appendix G. Refer to the CDCNET Network Operations and Analysis manual for more information.

Using NPA to Troubleshoot a Network

When errors are reported by NPA, you must first determine if the error requires immediate attention. This can be determined by monitoring your daily NPA reports for network deterioration. If you decide to troubleshoot the failure, perform the following steps.

Step 1, Generate Hardware Message Reports

Generate the hardware message reports HRDWRP1, HRDWRP2, HRDWRP3, and HRDWRP4. These reports provide the location, nature, and severity of hardware errors occurring in your CDCNET. Implement the required maintenance indicated by these reports. Refer to Getting Help with Log Messages (Using the Log Message Help Utilities) to determine what action is required.

Step 2, Generate Event Log Message Reports

Generate the event log message reports EVNTRP3 and EVNTRP4. These reports provide a summary of the network log messages. Then generate the EVNTRP1 and EVNTRP2 reports on individual DIs. Implement the required maintenance indicated by these reports. Refer to Getting Help with Log Messages (Using the Log Message Help Utilities) to determine what action is required.

Step 3, Generate Software Message Reports

Generate the software message reports SFTWRP3 and SFTWRP4. These reports provide a summary of all software errors. Then generate the SFTWRP1 and SFTWRP2 software reports on individual DIs. Implement the required maintenance indicated by these reports. Refer to Getting Help with Log Messages (Using the Log Message Help Utilities) to determine what action is required.

Step 4, Generate NPA Statistics Reports

Generate the NPA statistics reports. The order of statistic report generation depends on the problem reported by the customer. For example, if you suspect transmission problems on the ESCI, you should generate the ESCI statistic reports first. Implement the required maintenance indicated by these reports. Retain information for the next level of support.

Step 5, Run Online Diagnostics

Run the online diagnostics, as described in chapter 6, on the DI you suspect of being faulty.

Step 6, Run MCI Inline Diagnostic

If the hardware status reports or the statistics reports indicate that an MCI board is failing, run the MCI inline diagnostic as described in chapter 6.

Step 7, Run Onboard Diagnostics

As a last resort, run the onboard diagnostics as described in chapter 7.

Removing and Replacing Parts 9

Removing and Replacing Parts 9

This chapter describes how to replace the major field replaceable parts contained in the CDCNET local area network. Part numbers are given in chapter 10.

CAUTION

To avoid possible loss of customer data, notify the system administrator before doing any repairs on the network. This applies particularly to the DI because you must turn off power before replacing any parts (except the batteries or battery holder), and this downs all communications lines on that DI.

CAUTION

Static electricity can damage electronic components. Always wear a static discharge wrist strap when handling logic boards or replacing cables. Ground wrist strap to lug on the DI power supply as shown in figure 9-1. Use the fan guard or other suitable ground when working on the LIMs and other components that you must access from the back of the DI.

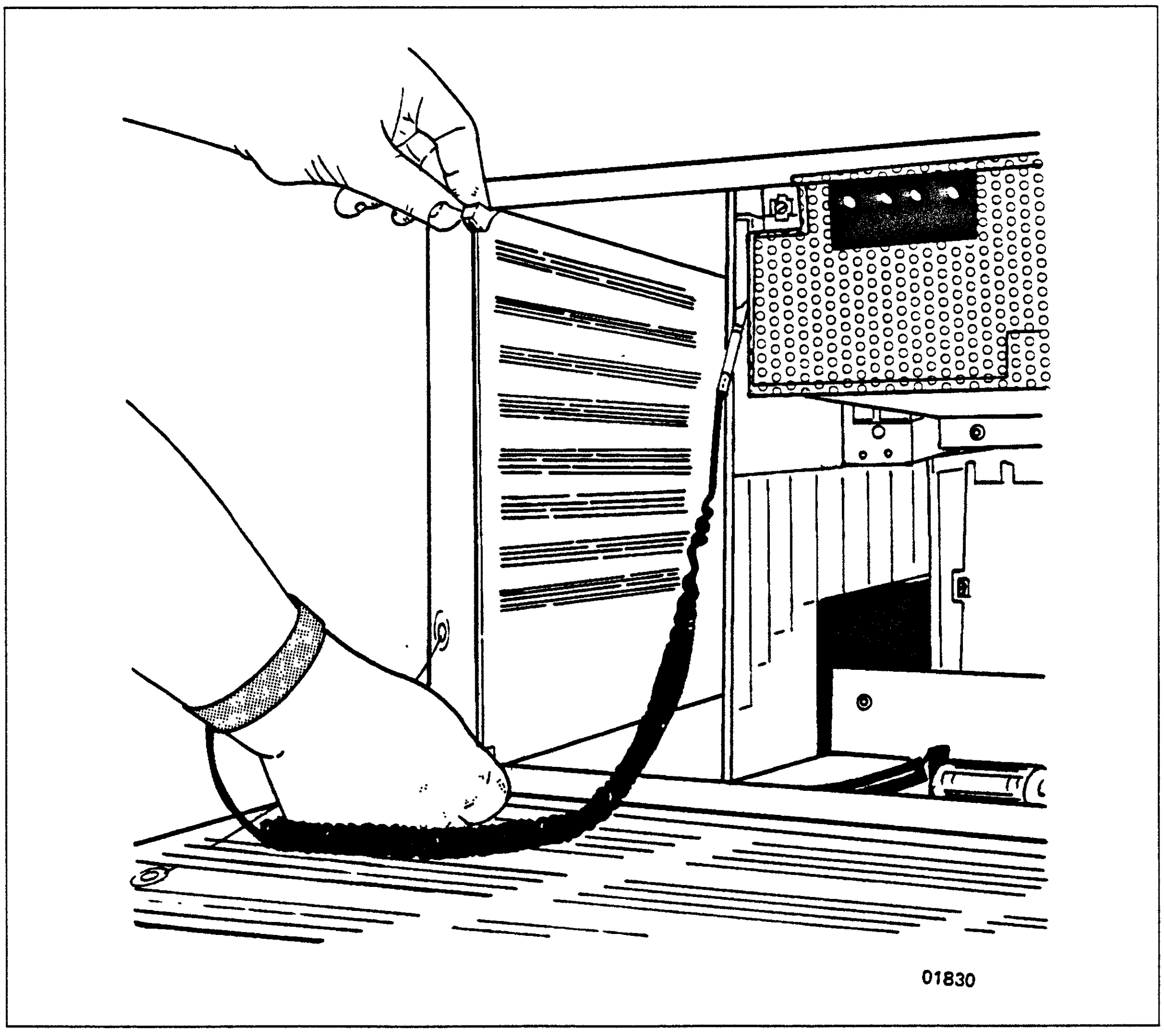

Figure 9-1. Static Control Wrist Strap

Replacing DI Main Logic Boards

The main logic boards include those shown in figure 9-2. You can reach all of them by opening the DI front panel.

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.

2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.

3. Disconnect all cables attached to front of main logic board being replaced (figure 9-2).

4. Remove board by rotating upper and lower cams on board being replaced (figure 9-2).

Replacement

1. Set switches on replacement board to same as board being replaced (switch settings are described in chapter 3).

   CAUTION

   When replacing MPB/PMM cable or ESCI cable, red stripe on cable must be up. When replacing CIM/LIM cable, red stripe must be up on CIM end and down on LIM end.

2. Reverse removal steps.

   NOTE

   If the MPB was removed:

   - Reload system identifier per Entering the System Identifier procedure, in chapter 3.

   - Reset DI clock per step 3 or 4 below, depending on whether you are using NOS or NOS/VE (see Network Operations and Analysis Manual for more information).

3. If you using NOS/VE, set DI clock to proper time as follows:

   a. Synchronize DI clock to proper time with SYNCHRONIZE_CLOCK command.

   b. Reset DI.

4. If you are using NOS, set DI clock to proper time as follows:

   a. Determine which DI contains master clock by using DISPLAY_SYSTEM_OPTIONS command (or checking site configuration map).

   b. If your DI has the master clock, use SET_DATE_AND_TIME command to reset date and time. After resetting master clock, synchronize all other DIs by using SYNCHRONIZE_CLOCK command.

   c. If your DI does not have the master clock, use SYNCHRONIZE_CLOCK command to synchronize clock in your DI to master clock.

   d. Reset DI.

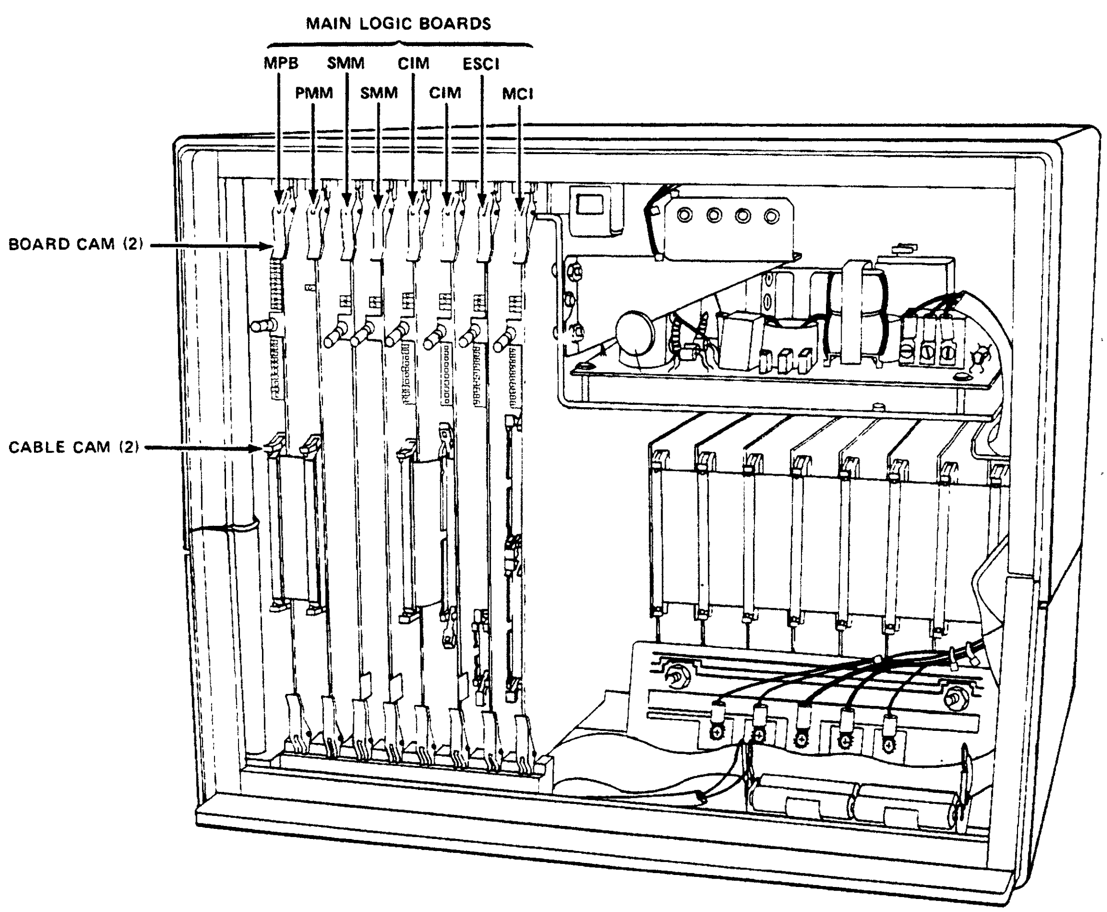

Figure 9-2. Main Logic Boards in a Typical DI (Front View)

Replacing LIM/URI Boards

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Disconnect external cables on back of LIM/URI board being replaced.
3. Remove two Phillips screws from LIM/URI board retainer plate in back of DI (figure 9-3).
4. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
5. Rotate upper and lower cams (figure 9-4) on CIM/LIM interconnect cable on the faulty LIM/URI board, and push board out the back of DI.

Replacement

1. Set any configuration straps, on replacement board, to the same positions as those on the board being replaced.
2. Insert board into backpanel.
3. Replace two screws on board retainer plate.
4. Reconnect external cables to back of LIM/URI board.
5. With the red stripe DOWN, push cable into LIM/URI board until cams rotate down automatically.

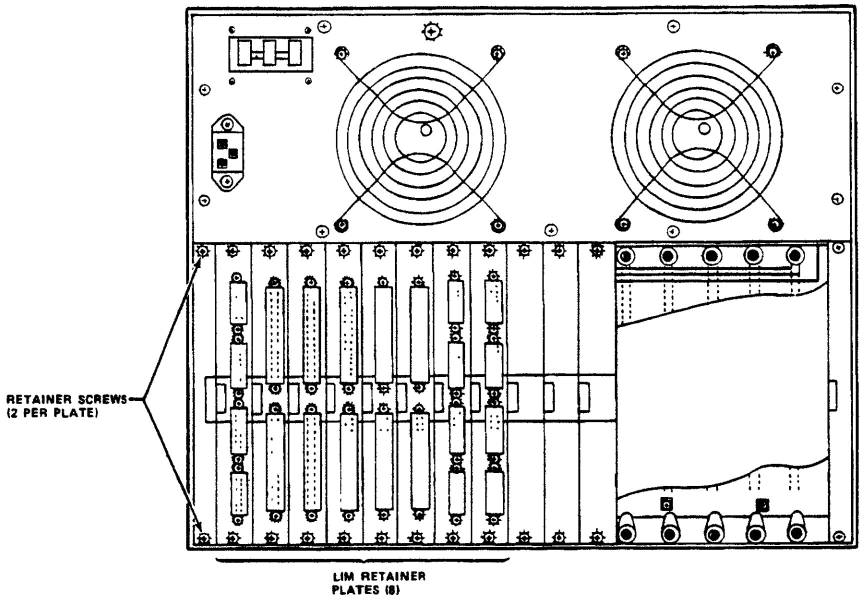

Figure 9-3. LIM Board Filler/Retainer Plates

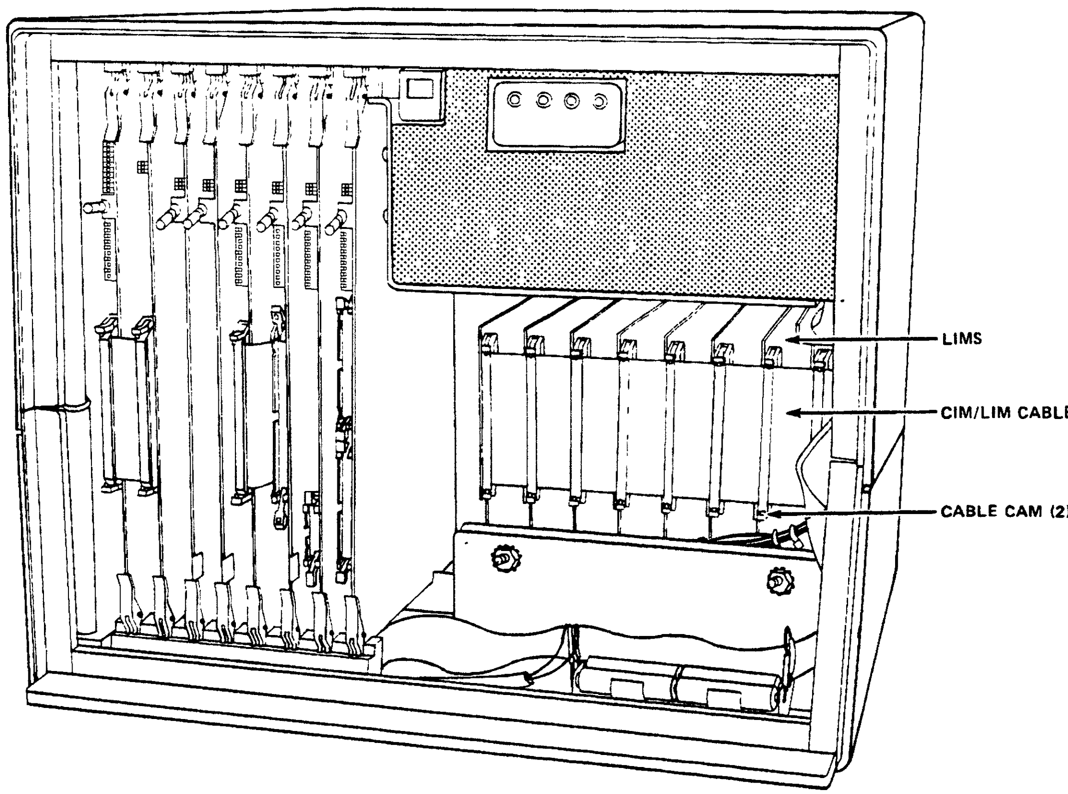

Figure 9-4. CIM/LIM Interconnect Cable

Replacing Fan Assembly

Removal

WARNING

To prevent potential electrical shock, place the PWR DISCONNECT circuit breaker (figure 9-5) in the down (Off) position and unplug the power cord.

1. Remove 11 screws that attach fan assembly to back of DI base (figure 9-5).
2. Slowly pull out fan assembly until connector J2 is visible (figure 9-6).
3. Disconnect cable attached to connector J2. Remove safety ground wire (part of cable J2).
4. Remove fan assembly.

Replacement

Replacement consists of reversing the removal procedure.

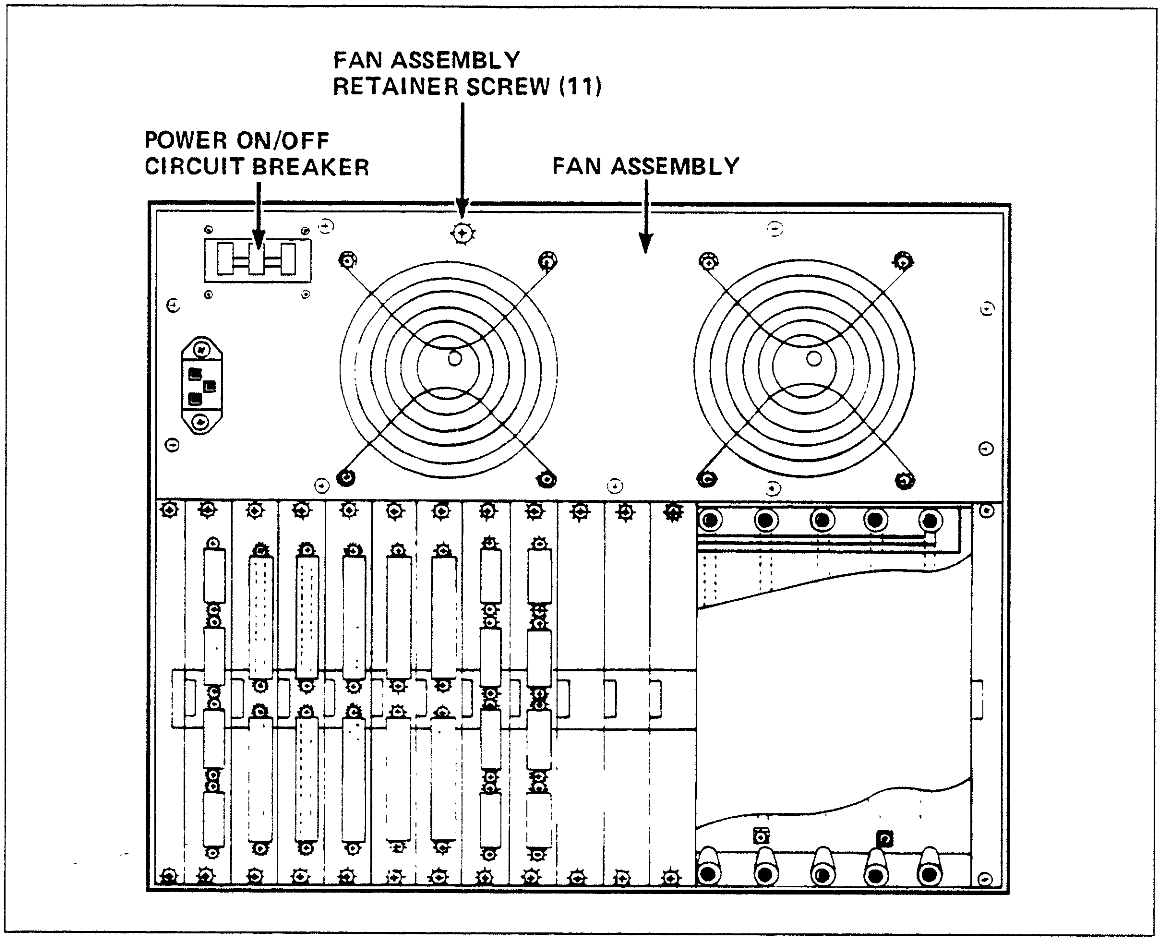

Figure 9-5. Fan Assembly (Back View)

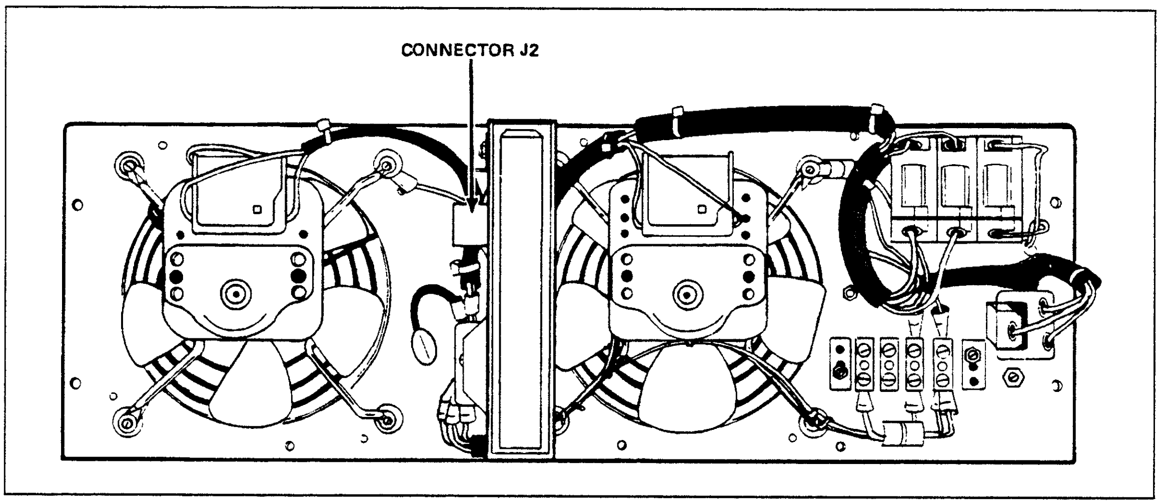

Figure 9-6. Inside Fan Assembly

Replacing DI Power Supply

WARNING

To prevent potential electrical shock, place the PWR DISCONNECT circuit breaker (figure 9-5) in the down (Off) position and unplug the power cord.

Removal

1. Remove fan assembly (refer to procedure 9-3). This exposes back of the power supply.
2. Loosen 10 screws on top of TB2 on back of power supply (figure 9-7). Label (for easy reassembly) and remove wires.
3. Remove two power supply retainer screws on back of power supply that connect it to DI base (figure 9-7).
4. Open DI front panel by inserting an 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
5. Remove the safety screen from front of power supply by removing two screws that connect it to DI base (figure 9-8).
6. Remove power supply track retainer screw from front on power supply (figure 9-8).
7. Loosen three screws on top of TB1, on front of power supply. Label (for easy reassembly) and remove wires (figure 9-8).
8. Remove two screws on left side of LED bracket (figure 9-8). Carefully (wires are still attached to bracket) reposition bracket (hold up) so it does not hinder power supply removal.
9. Grasp front of power supply and pull toward you.

Replacement

CAUTION

Before installing a new power supply, set it to the proper voltage level (110 V for a GH120B or 220 V for a GH121A) by attaching the jumper wire (J2 on figure 9-8) to the pin marked with the proper voltage level.

Replacement consists of reversing the removal procedure.

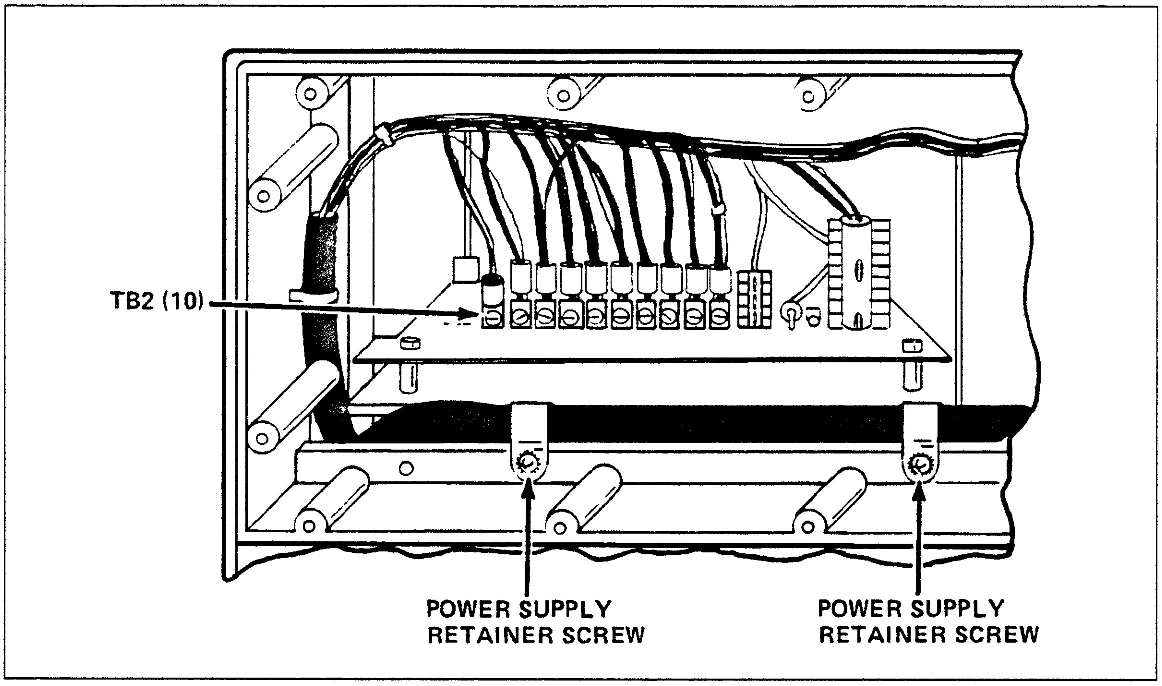

Figure 9-7. Power Supply (Back View)

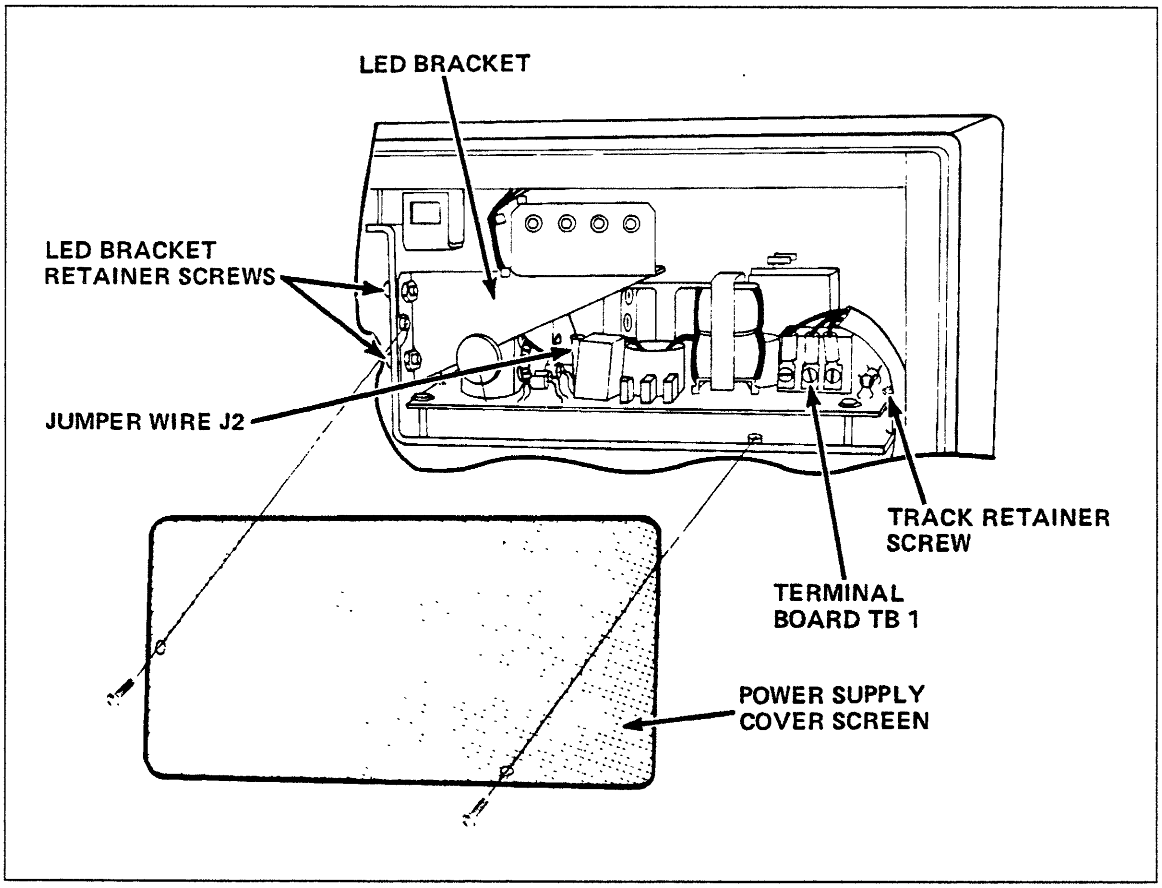

Figure 9-8. Power Supply (Front View)

Replacing DI Main Logic Backpanel

The DI main logic backpanel is the one to which all the main logic boards connect (figure 9-9).

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to the 0 (Off) position and removing the power cord.

2. Open DI front panel by inserting an 3/16-inch hex wrench into the hex nut and turning it counterclockwise.

3. Disconnect all cables (label each cable for easy reassembly) on front of main logic boards. Cables present vary with each configuration. Figure 9-9 shows typical cabling.

4. Remove all main logic boards (label board slot number for easy reassembly) by rotating upper and lower cams (figure 9-9) simultaneously.

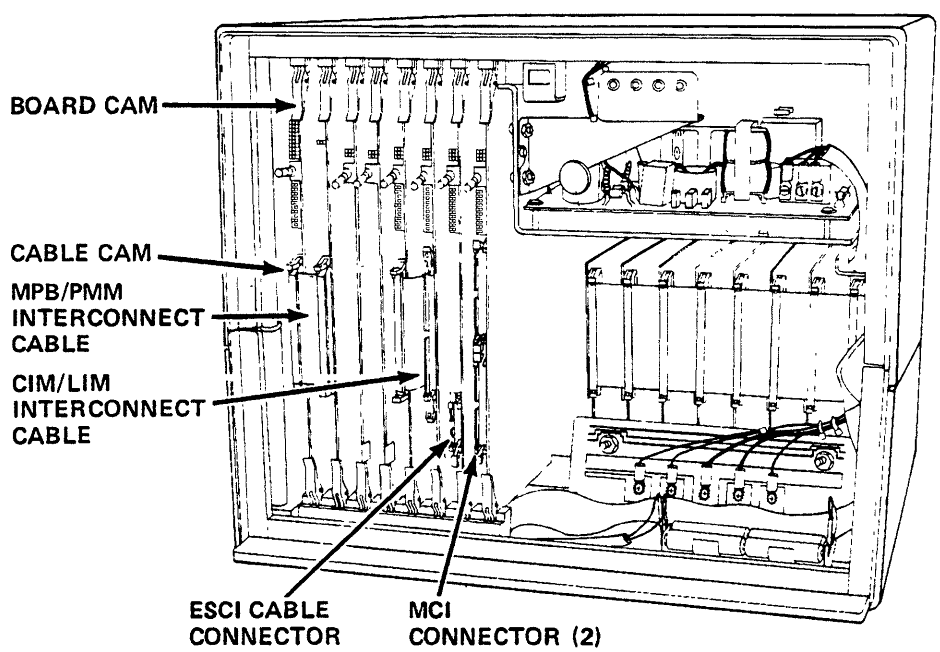

Figure 9-9. Main Logic Board Typical Cabling

5. Remove the fan assembly as described in Replacing Fan Assembly procedure earlier in this chapter.

6. Remove eight filler/retainer plates on back of DI by removing two screws (per plate) that attach each filler/retainer plate to DI base (figure 9-10).

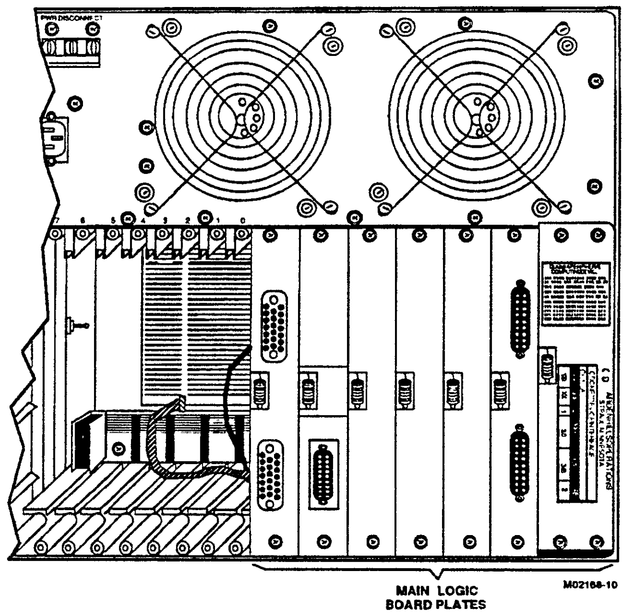

Figure 9-10. Main Logic Board Filler/Retainer Plates

7. Loosen seven screws from power bus (figure 9-11). Label (for easy reassembly) and remove the seven wires.

8. Unplug keyed cable P1 attached to pins AB2 through AB5 on backpanel (figure 9-11).

9. Remove nine screws that connect backpanel to DI base (figure 9-11) and carefully remove backpanel.

10. Remove eight guide pins from top inside of backpanel by removing eight nuts on back of backpanel (figure 9-11).

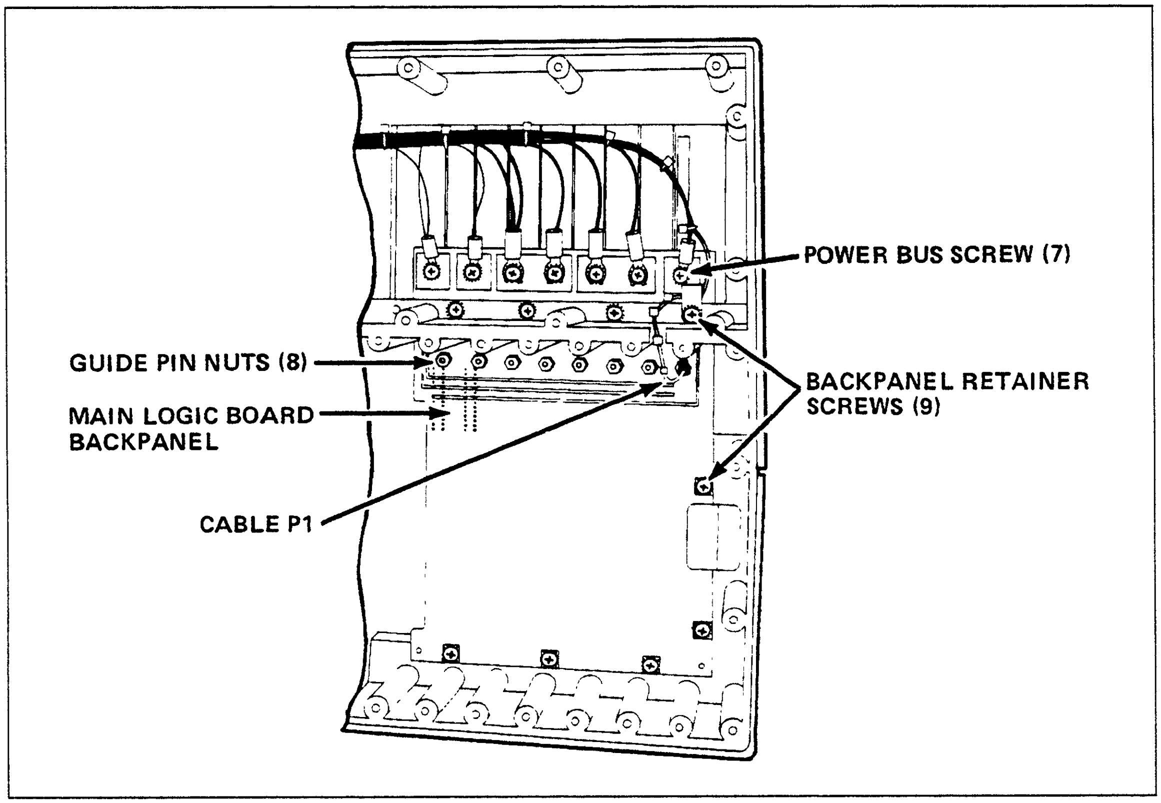

Figure 9-11. Main Logic Board Backpanel

Replacement

1. Reverse removal steps.

2. Reload system identifier per Entering the System Identifer procedure, in chapter 3.

   NOTE

   Reset DI clock per step 3 or 4 below, depending on whether you are using NOS or NOS/VE (see Network Operations and Analysis Manual for more information).

3. If you using NOS/VE, set DI clock to proper time as follows:

   a. Synchronize DI clock to proper time with SYNCHRONIZE_CLOCK command.

   b. Reset DI.

4. If you are using NOS, set DI clock to proper time as follows:

   a. Determine which DI contains master clock by using DISPLAY_SYSTEM_OPTIONS command (or checking site configuration map).

   b. If your DI has the master clock, use SET_DATE_AND_TIME command to reset date and time. After resetting master clock, synchronize all other DIs by using SYNCHRONIZE_CLOCK command.

   c. If your DI does not have the master clock, use SYNCHRONIZE_CLOCK command to synchronize clock in your DI to master clock.

   d. Reset DI.

Replacing LIM Backpanel

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position and unplugging power cord.
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Remove LIM backpanel cover plate (figure 9-12) by removing two nuts (11/32) that connect it to LIM backpanel.
4. Loosen five screws on front of LIM backpanel (figure 9-12). Label (for easy reassembly) and remove five wires.
5. On back of DI, remove two retainer screws from all LIM board retainer plates (figure 9-13) or filler plates if board slot is empty, but do not attempt to remove boards until step 6.
6. To remove LIM boards, rotate cams on CIM/LIM interconnect cable (figure 9-12) simultaneously, and push board out back of DI. Label board slot number for easy reassembly.
7. From the back of DI, locate two LIM backpanel retainer screws (figure 9-14). Loosen two screws and carefully lift up and remove backpanel.

Replacement

1. Insert new LIM backpanel and tighten two retaining screws.
2. Insert all LIM boards into DI. Insert two screws to each filler/retainer plate to secure to DI base.

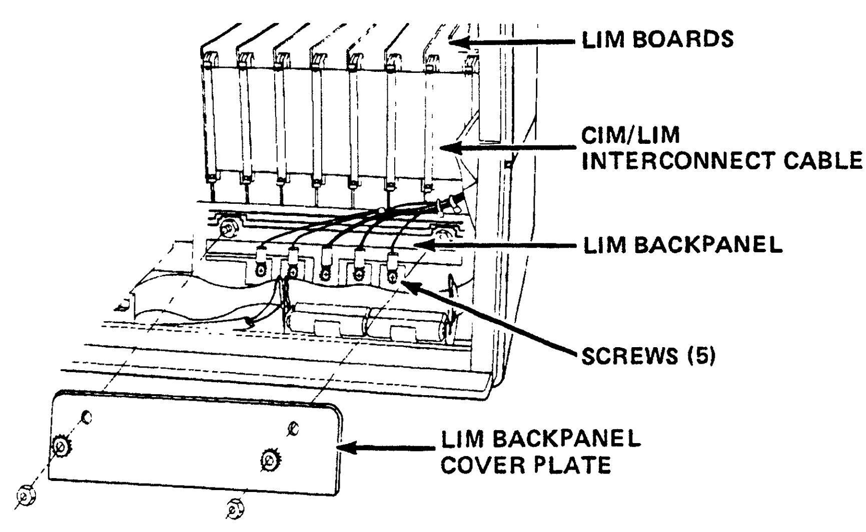

Figure 9-12. LIM Backpanel (Front View)

3. Replace CIM/LIM cable strap with red stripe DOWN (from front of DI). Cams automatically close when cable is inserted.
4. Replace five wires on front of LIM backpanel and tighten five screws.
5. Replace LIM backpanel cover plate and replace two nuts that secure it to backpanel.
6. Close DI front panel and tighten hex nut. Restore power to DI.

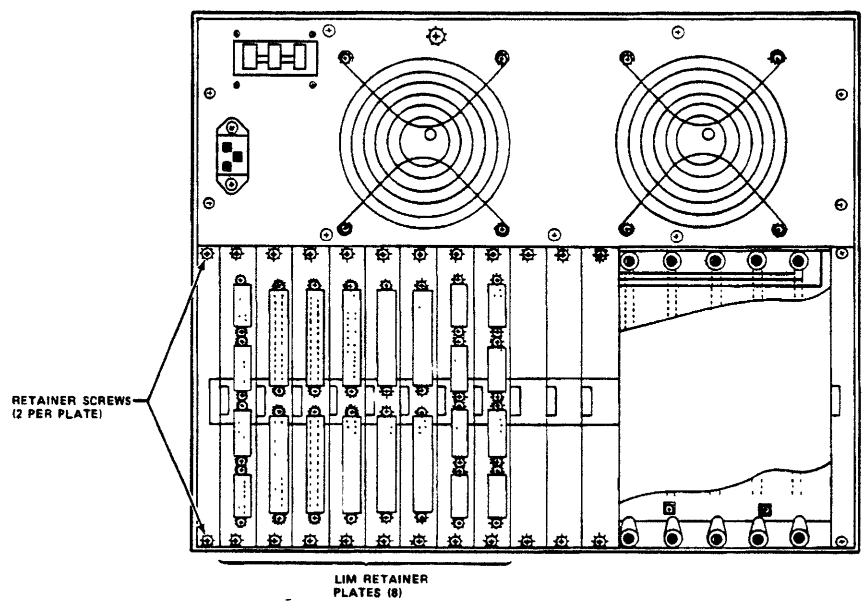

Figure 9-13. LIM Board Filler/Retainer Plates

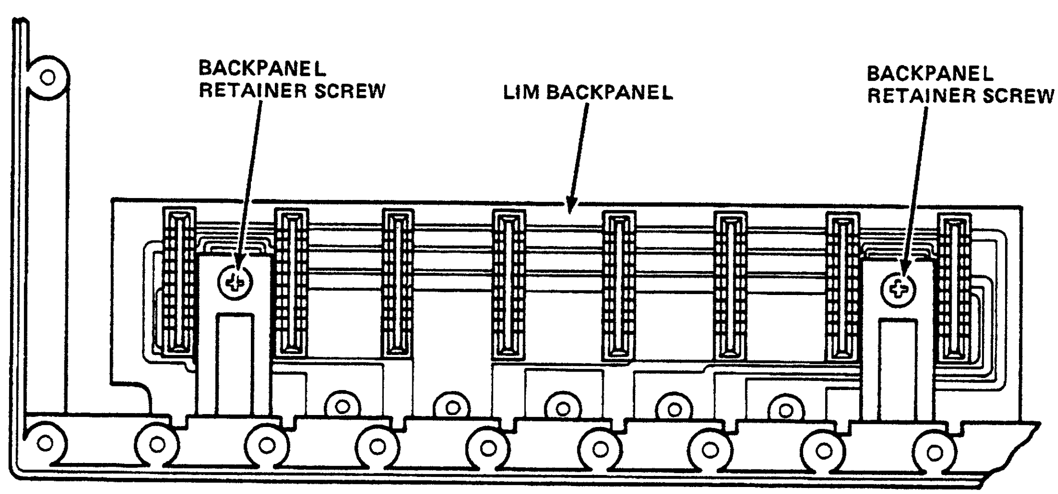

Figure 9-14. LIM Backpanel (Back View)

Replacing DI Batteries

NOTE

If this procedure is performed with power off, you must re-enter the system identification after power-up (see Entering the System Identifier, in chapter 3). Also, the DISPLAY_DI_SYSTEM_STATUS command incorrectly displays the date and time of the last reset, so you must reset the DI clock. Reset clock using the method given in the Replacing DI Main Logic Boards procedure, earlier in this chapter.

Removal

1. Turn on DI power by setting PWR DISCONNECT circuit breaker to 1 (On).
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Remove batteries from holder (figure 9-15).

Replacement

Replace batteries according to polarity indicator labels on battery holder.

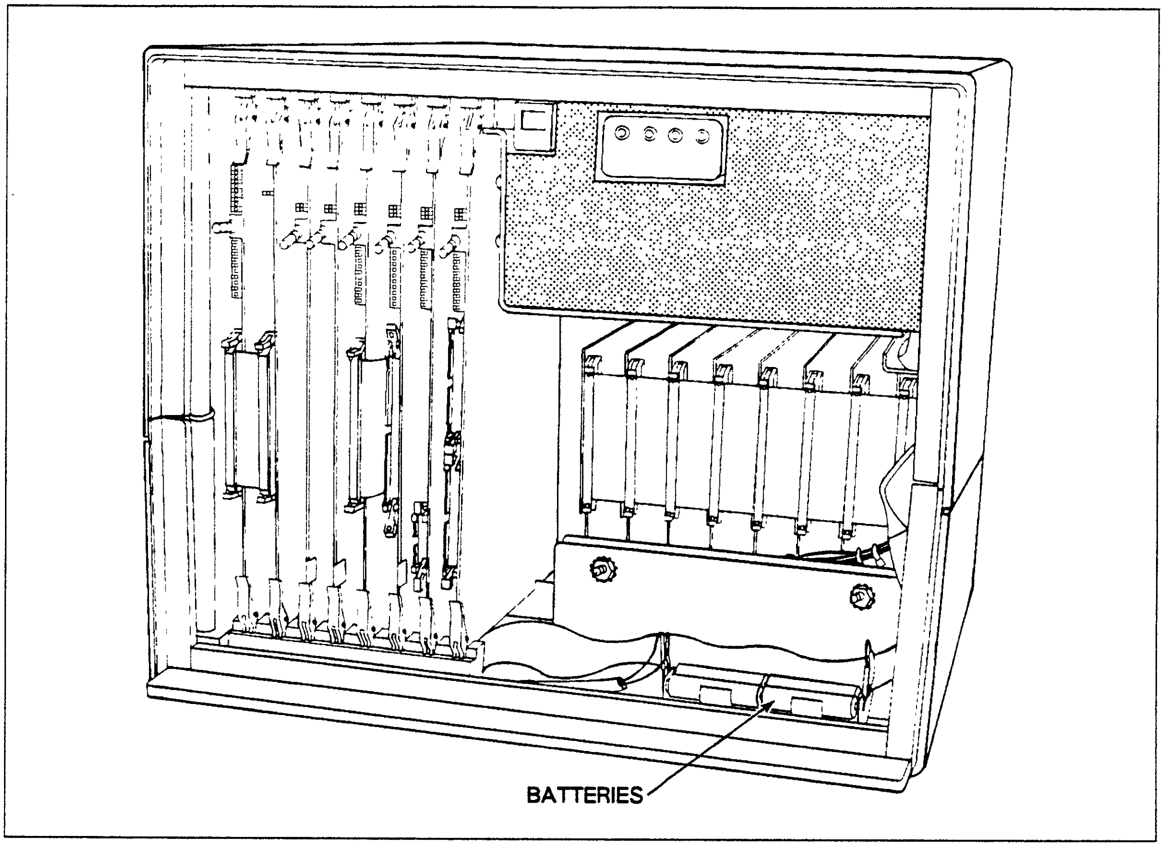

Figure 9-15. Batteries

Replacing DI Battery Holder

NOTE

If this procedure is performed with power off, you must re-enter the system identification after power-up (see Entering the System Identifier, in chapter 3). Also, the DISPLAY_DI_SYSTEM_STATUS command incorrectly displays the date and time of the last reset, so you must reset the DI clock. Reset clock using the method given in the Replacing DI Main Logic Boards procedure, earlier in this chapter.

Removal

1. Turn on DI power by setting PWR DISCONNECT circuit breaker to 1 (On).
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Remove batteries from holder (figure 9-16).

   CAUTION

   Battery power cable pins are fragile. Be careful not to damage them when removing and replacing the cable.

4. Remove battery power cable (be careful, pins are fragile) from MPB connector J4 pins 1 through 4 (figure 9-16). Cable is keyed for easy reassembly.
5. Remove two screws that secure holder to DI base (figure 9-16).
6. Remove battery holder.

Replacement

Replacement consists of reversing the removal procedure.

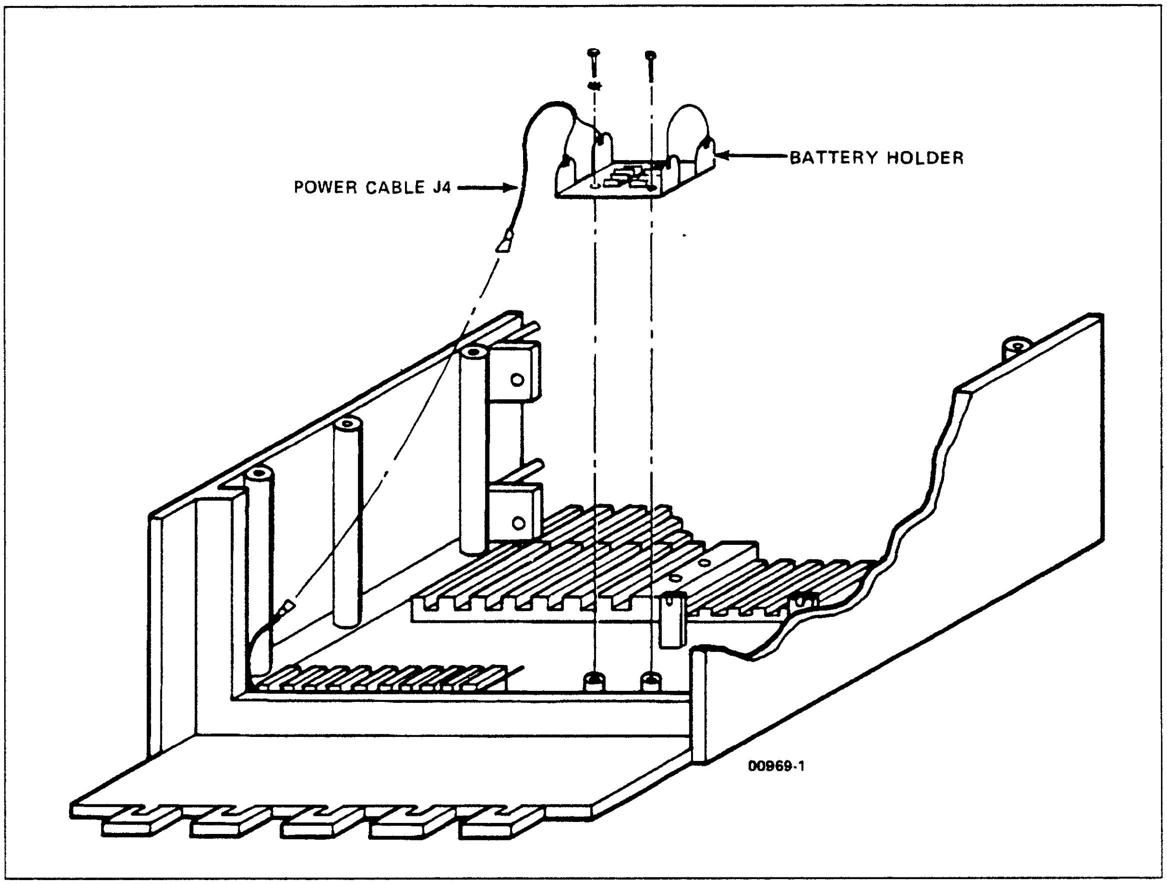

Figure 9-16. Battery Holder

Replacing DI Indicator Panel LEDs (Light-Emitting Diodes)

Removal

1. Turn off DI power, by setting PWR DISCONNECT circuit breaker to 0 (Off) position and removing power cord.
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Remove safety screen from front of power supply by removing two screws that connect it to DI base (figure 9-17).
4. Remove two retainer screws (figure 9-17) from left side of LED bracket.
5. Remove two slip-on wires (label for easy reassembly) from back of LED (figure 9-18).
6. Using a needle-nose pliers, remove O-ring (figure 9-18) from back of LED.
7. Snap diode out by pushing from front to back. The clip (figure 9-18) remains in place.

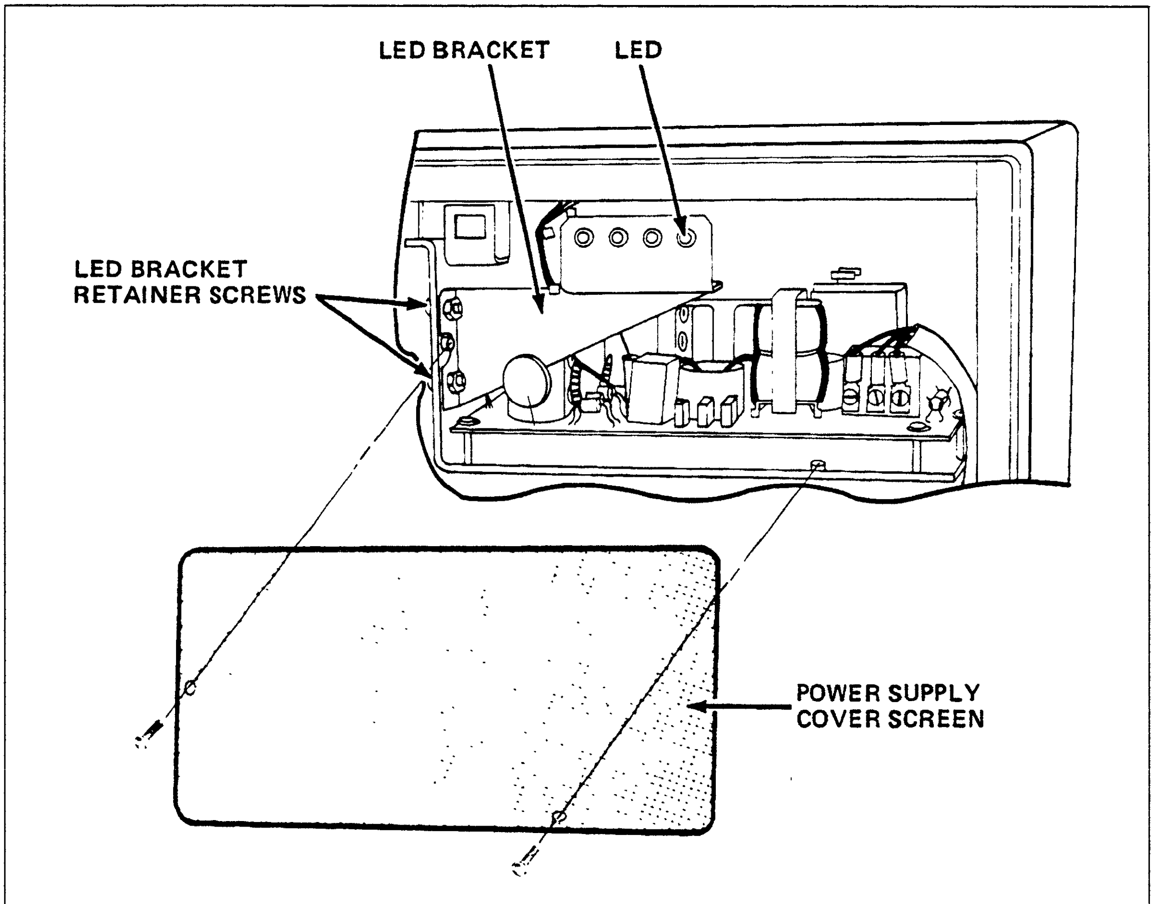

Figure 9-17. LED Bracket (Front View)

Replacement

1. Insert new LED from the back with the positive long lead in the left position (figure 9-18) and the negative lead, indicated by a flat edge on the LED, in the right position.

2. Cut both lead wires to 0.25 in (6.3 mm).

3. Reverse the removal procedure.

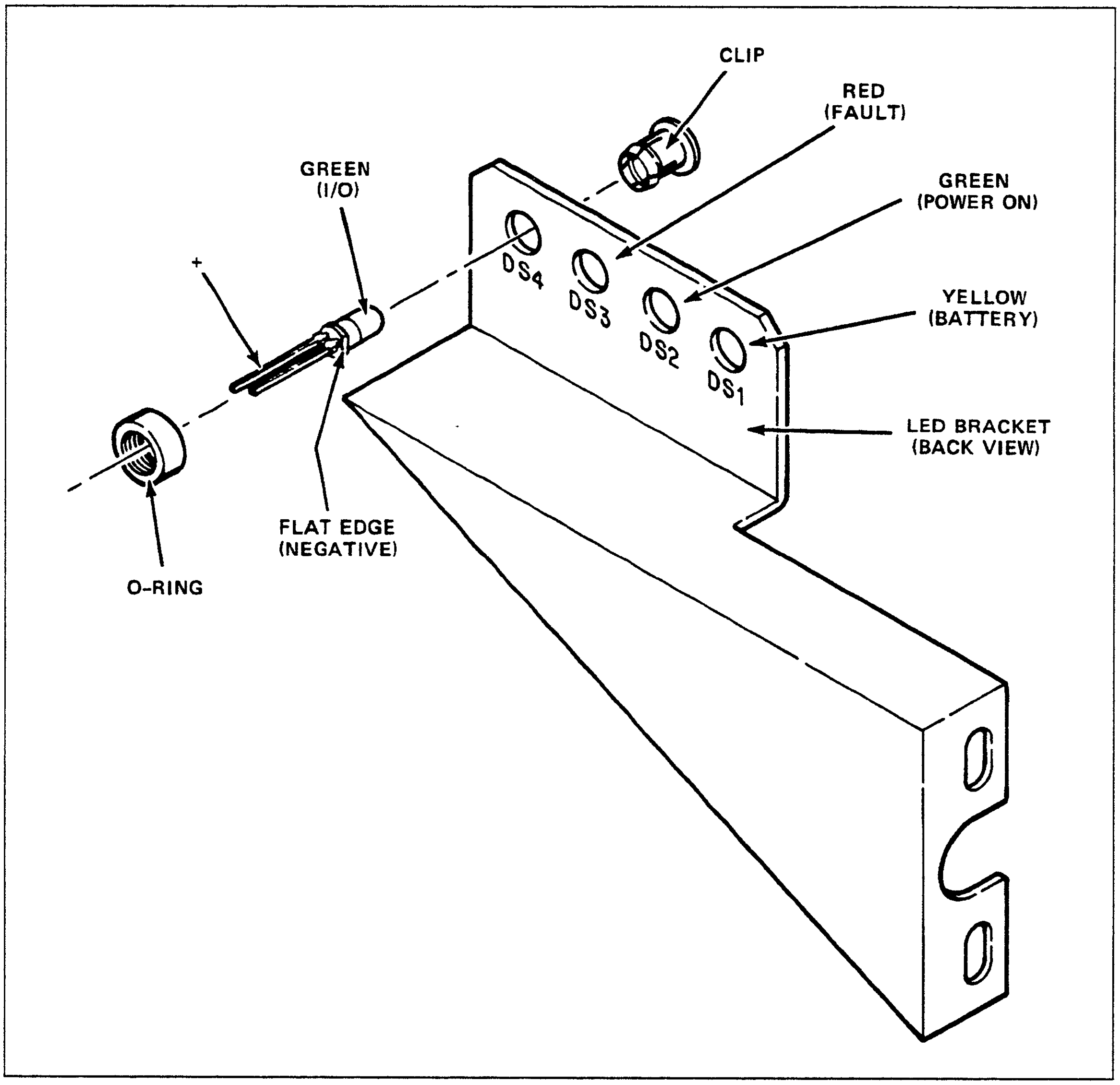

Figure 9-18. LED Bracket (Back View)

Replacing MPB/PMM Cable

Removal

1. Turn off DI power, by setting PWR DISCONNECT circuit breaker to 0 (Off) position.

2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.

3. Release MPB/PMM cable from boards by rotating upper and lower cams on connectors (figure 9-19) and remove cable.

Replacement

CAUTION

When replacing the cable, the red stripe must be up or serious damage can result.

Replacement consists of reversing the removal procedure.

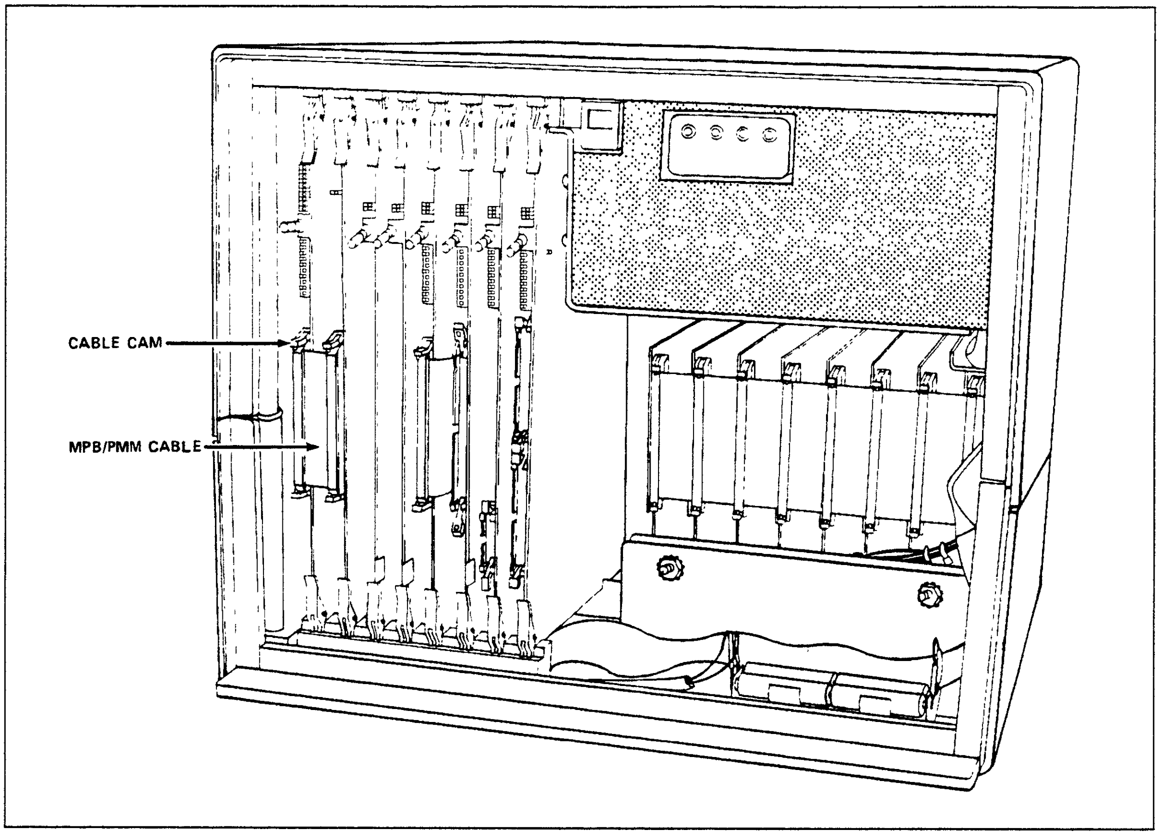

Figure 9-19. MPB/PMM Cable

Replacing MCI Internal Interconnect Cable

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Disconnect MCI internal interconnect cable connectors (P02 and P03 on figure 9-20) on front of MCI board by rotating upper and lower cams simultaneously (figure 9-21).
4. Remove external peripheral processor channel cables (figure 9-20) from back of MCI cable retainer plate (figure 9-21).
5. Remove two retainer screws from MCI board retainer plate in back of DI (figure 9-21).
6. Carefully remove internal MCI cable (do not pull on the wires) by pulling retainer plate (cable is attached to retainer plate) from back of DI.

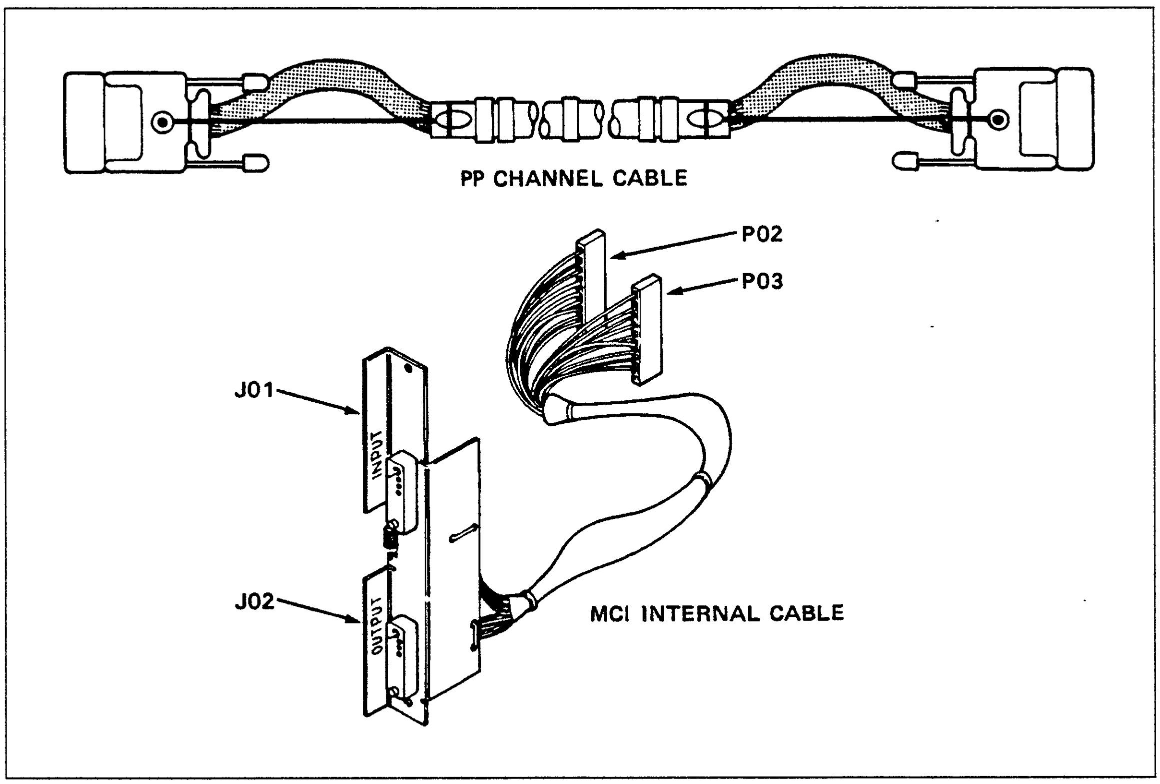

Figure 9-20. MCI Internal Interconnect Cable

Replacement

NOTE

When replacing cable, be sure P02 goes to the top MCI connector and P03 goes to the bottom. Replacement may be easier if you remove the board in slot 7 before replacing the cable.

Replacement consists of reversing the removal procedure.

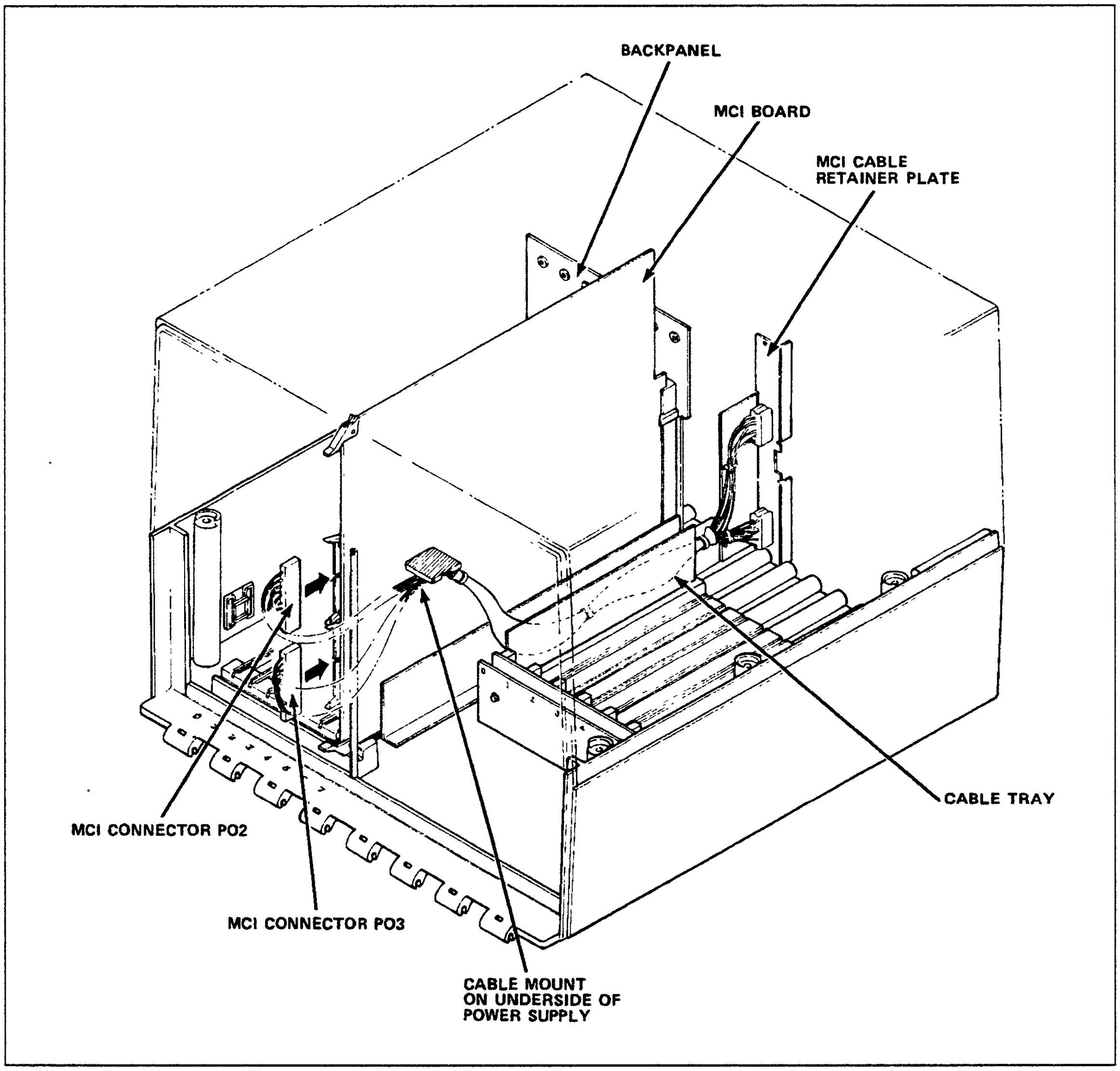

Figure 9-21. Replacing MCI Board

Replacing CIM/LIM Interconnect Cable

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.

2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.

3. Disconnect CIM/LIM cable from all attached LIM boards (figure 9-22) by rotating upper and lower cams simultaneously.

4. Disconnect CIM/LIM cable from CIM board (figure 9-22) by rotating upper and lower cams simultaneously.

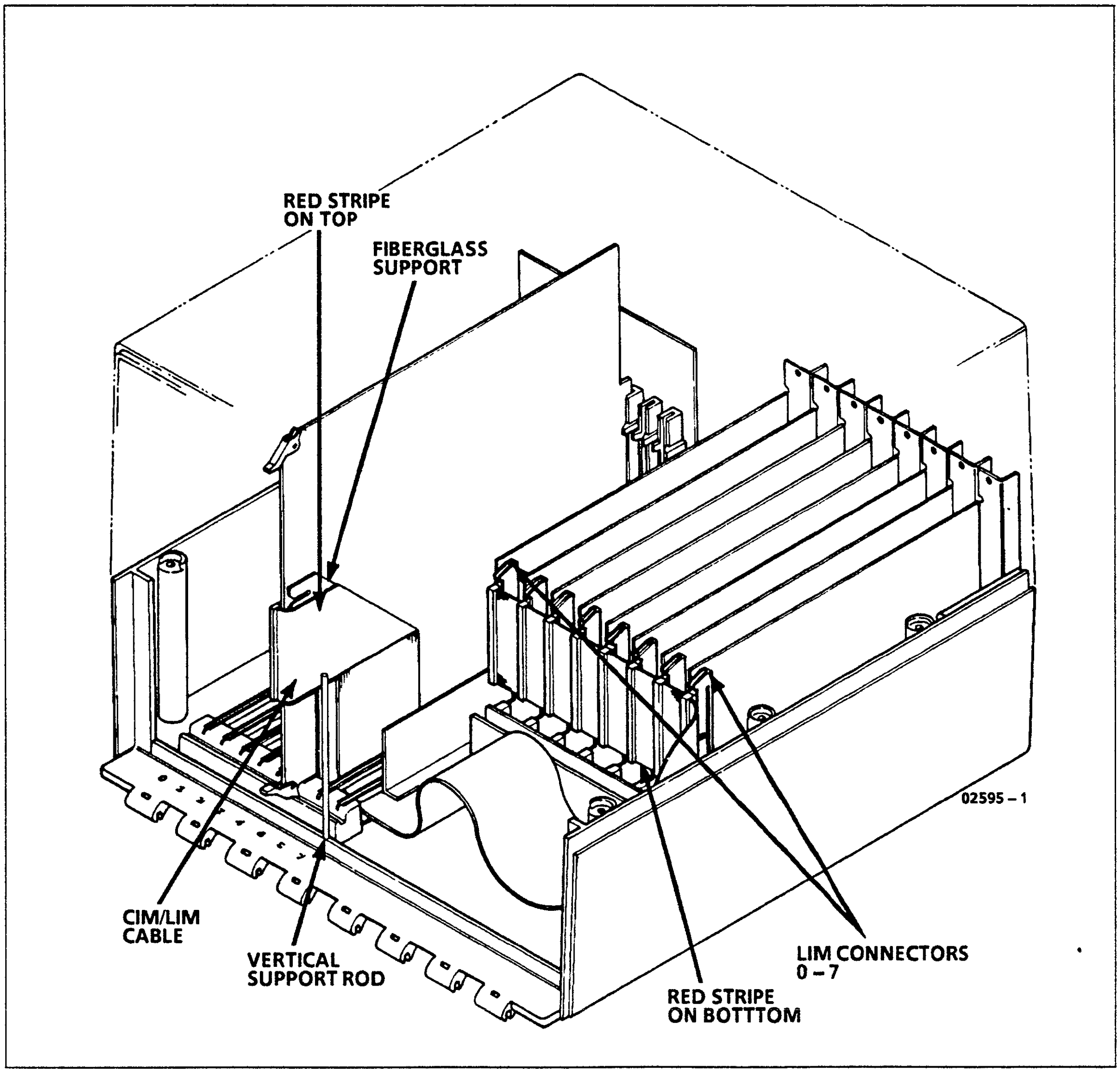

Figure 9-22. CIM/LIM Interconnect Cable

5. Remove all boards to right of CIM board and place on antistatic surface.
6. Lift front of large board tracks (figure 9-23) to right of CIM board and pull cable out from under tracks.

Replacement

CAUTION

When replacing the cable, the red stripe MUST be UP on the CIM board and DOWN on the LIM board (figure 9-22), or serious damage can result.

Be sure the fiberglass cable support (on the CIM end of the cable) is in the slot between the board tracks. Be sure the board tracks are firmly back in place, or the board may not line up with the backpanel connector.

Replacement consists of reversing the removal procedure.

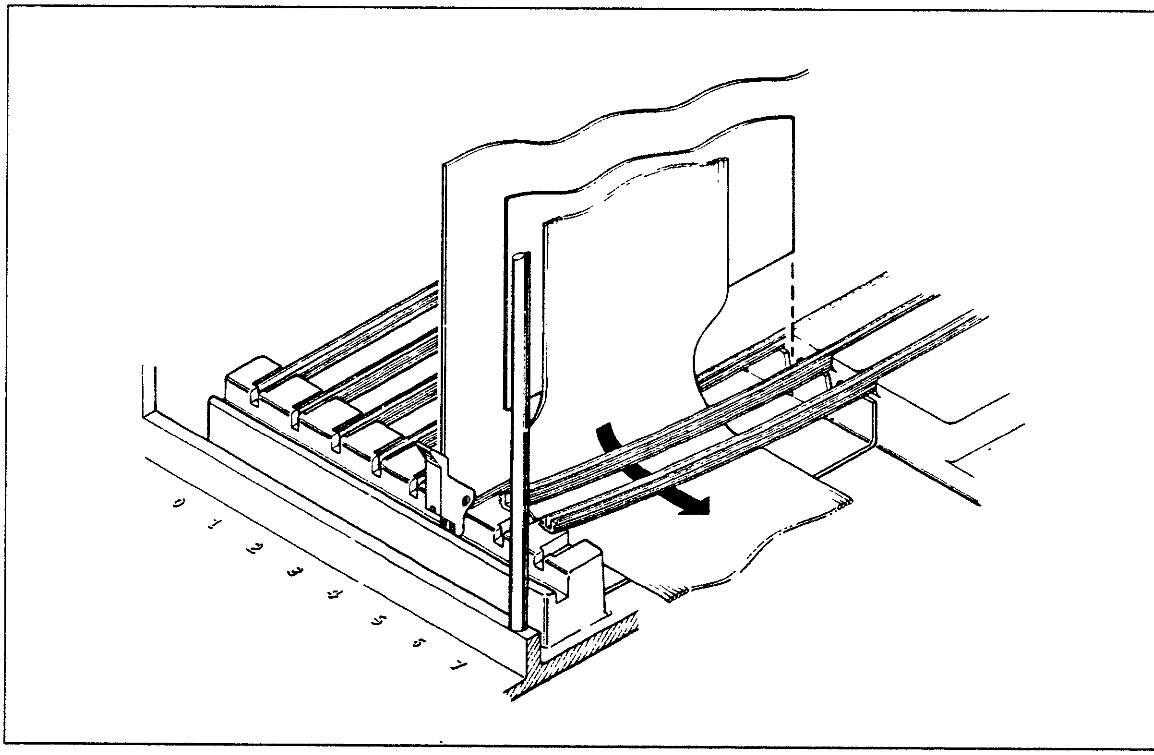

Figure 9-23. Board Tracks

Replacing ESCI Internal Cable

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Disconnect internal ESCI cable (figure 9-24) by rotating upper and lower cams on front of ESCI board (figure 9-25).
4. Remove external cable from back of ESCI retainer plate (figure 9-26).
5. Remove two screws from retainer plate in back of DI (figure 9-26).
6. Remove all boards to right of ESCI board.
7. Carefully remove cable by pulling retainer plate (cable is attached to retainer plate) from back of DI.

Replacement

CAUTION

When replacing the cable, the red stripe must be up or serious damage can result.

Replacement consists of reversing the removal procedure.

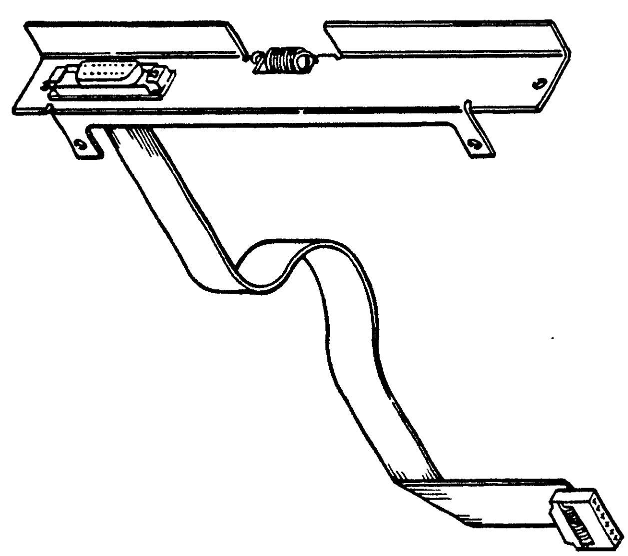

Figure 9-24. ESCI Internal Cable

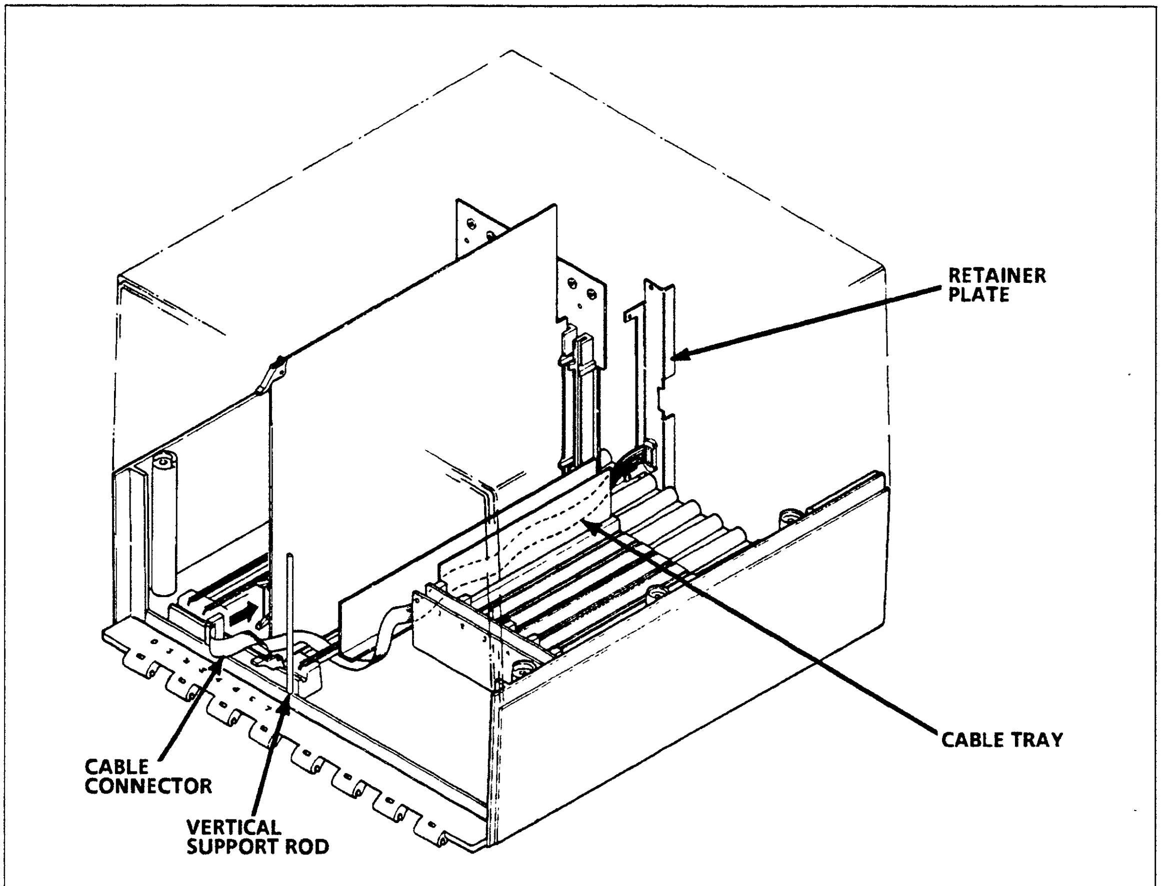

Figure 9-25. Replacing ESCI Cable

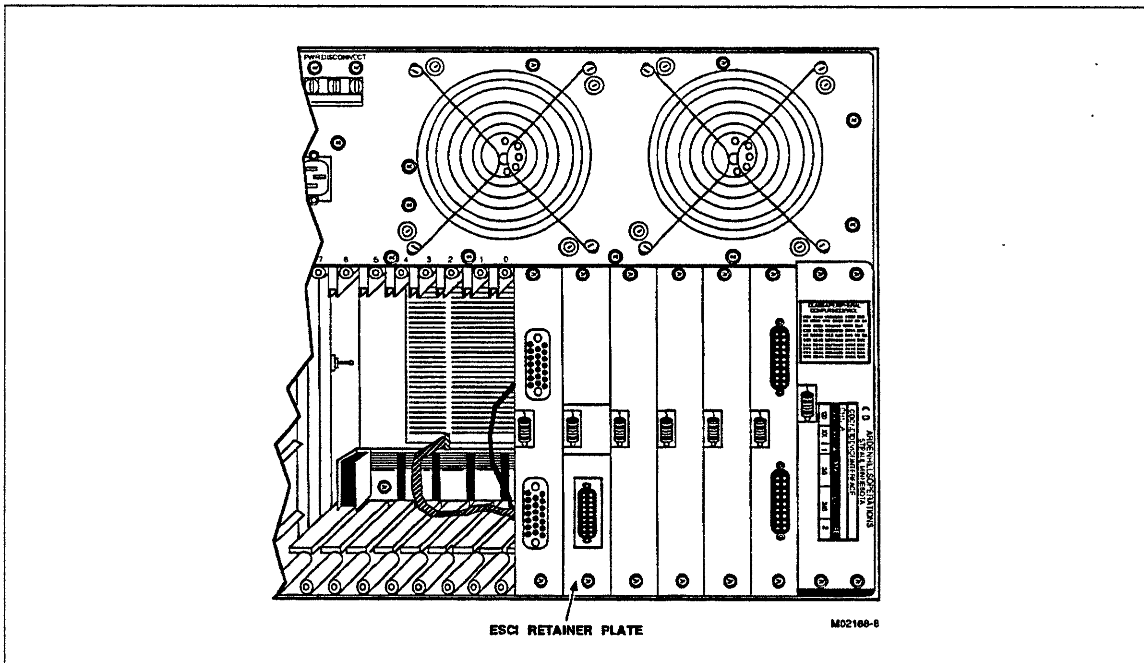

Figure 9-26. ESCI Board Retainer Plate

Replacing DI Maintenance Console Option

Removal

1. Turn off DI power by setting PWR DISCONNECT circuit breaker to 0 (Off) position.
2. Open DI front panel by inserting a 3/16-inch hex wrench into the hex nut and turning it counterclockwise.
3. Disconnect maintenance console option (figure 9-27) from front of MPB board on connector J4.
4. Disconnect external cable on back of MPB retainer plate (figure 9-28).
5. Remove two plates from back far right corner of DI (figure 9-28).
6. Pull cable from back of cabinet through rectangular opening exposed by removing plates.

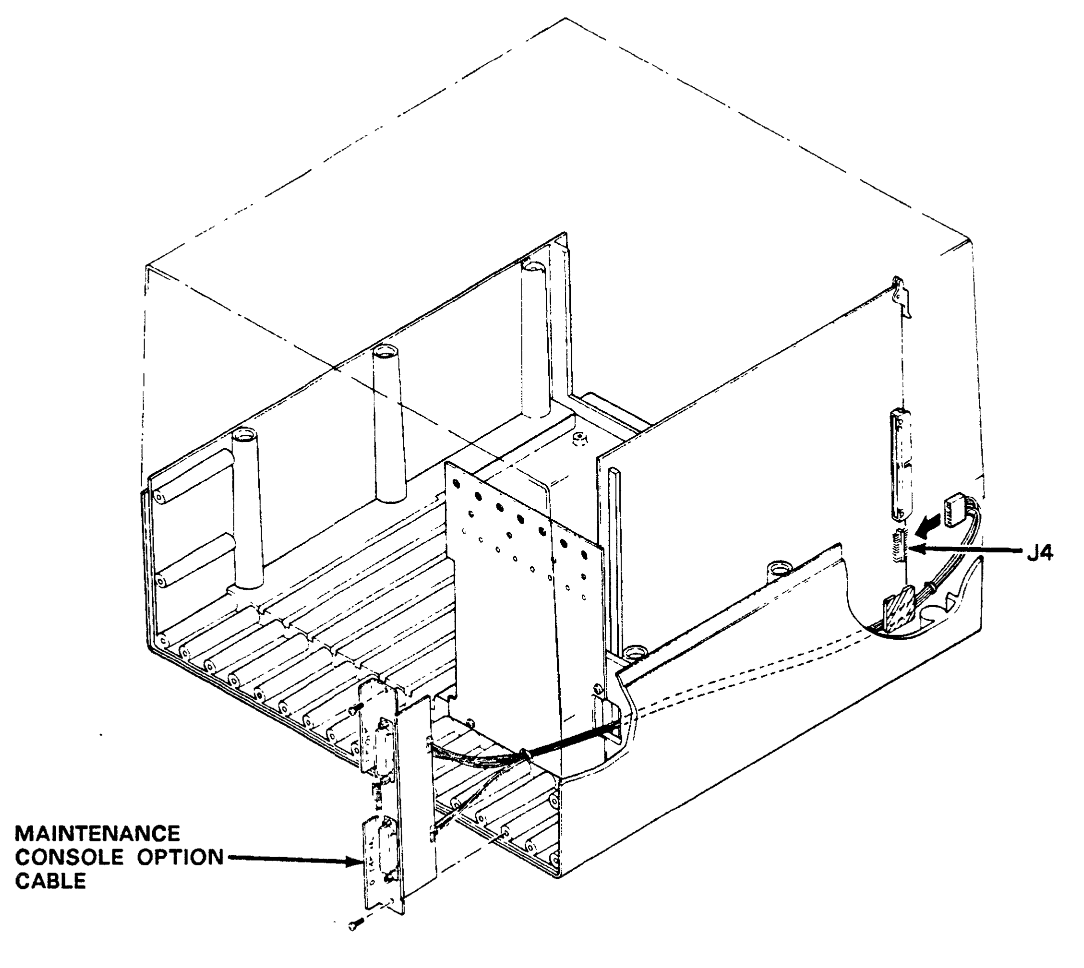

Figure 9-27. Maintenance Console Option

Replacement

It may be easier to replace the cable if the MPB is removed first. But if you remove the MPB, you must reload the system identifier after power up and reset the DI clock (see Replacing DI Main Logic Boards procedure, earlier in this chapter).

Replacement consists of reversing the removal procedure.

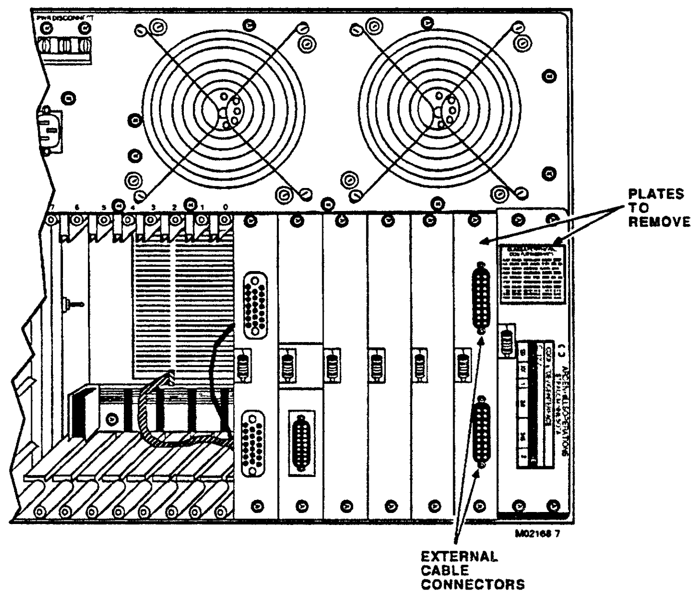

Figure 9-28. Retainer/Filler Plates (Back View)

Replacing Transceivers

The following procedures describe how to remove transceivers. If you have to replace the tap block along with the transceiver, see the next procedure. If you are installing a new transceiver and tap block, see chapter 2 of this manual.

Replacing TN111A Transceivers

Removal

1. Remove insulating material from transceiver and tap block.
2. Disconnect external transceiver cable (figure 9-29) from transceiver by rotating slide latches (one up and one down).
3. Unscrew (clockwise) transceiver from tap block (figure 9-29).

Replacement

CAUTION

The transceiver stinger is fragile. Handle it with care. Damage can affect reliability and is not covered under warranty.

---

1. Unscrew protective F-connector covering stinger on new transceiver.
2. Install O-ring onto threads of new transceiver.
3. Hold transceiver at right angle to tap block, screw it into the access hole, and finger tighten. Do not overtighten.
4. Connect transceiver interface cable to transceiver and lock in place with slide latches on cable connector.
5. Provide strain relief for transceiver by tie-wrapping transceiver interface cable to segment cable.

CAUTION

Transceiver, tap, and connectors must be insulated from ground or network will not operate properly.

---

6. Insulate transceiver, tap block, and connectors with insulating material ensuring that no metal parts are left exposed. Tap block must be isolated from ground (for example, metal ducts, conduits).

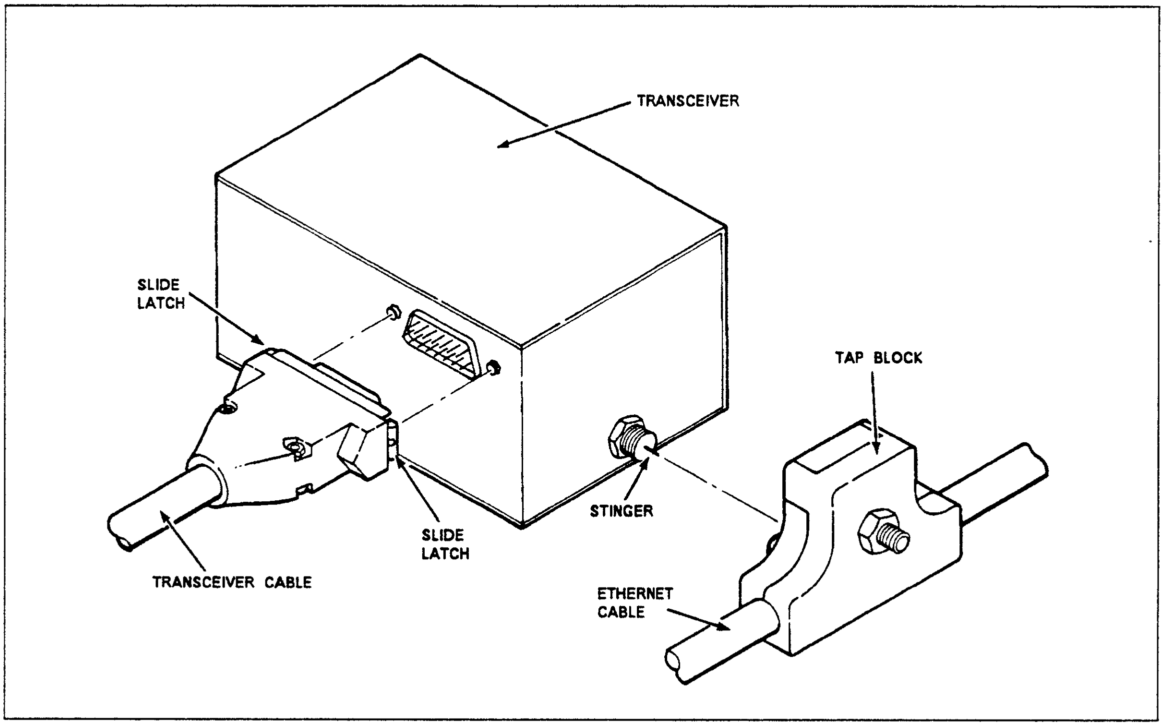

Figure 9-29. Ethernet Transceiver TN111A

Replacing TN111B Transceivers

Removal

1. Cut tie-wrap and disconnect external transceiver cable (figure 9-30) from transceiver by rotating slide latches (one up and one down).

2. Unscrew (counterclockwise) two flat head screws from transceiver to release it from tap block (figure 9-30). The tap block remains in place.

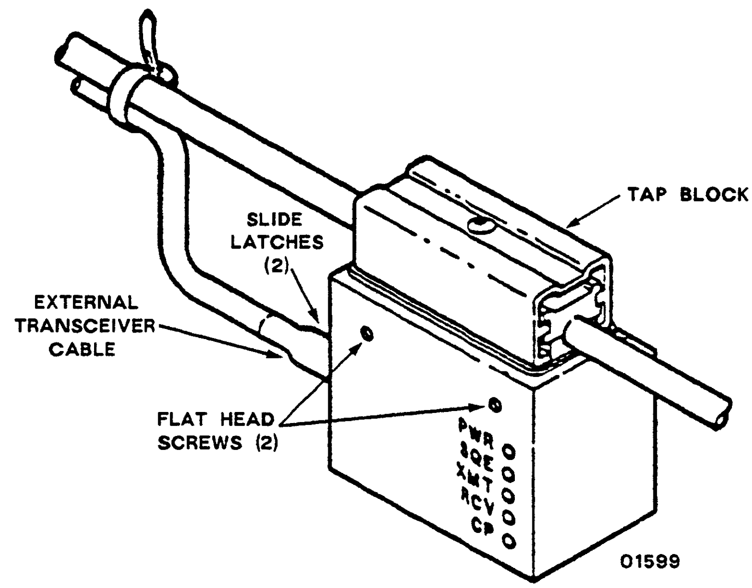

Figure 9-30. TN111B Transceiver

Replacement

1. Set SQE jumpers on new transceiver to the same position as the one being replaced. See transceiver installation procedure in chapter 2 for more information on setting the SQE jumper.

2. Check that tap center probe pin and braid pick pins are straight. If necessary, straighten them with a tweezers. Figure 9-31 is an exploded view that shows these pins. The pins are visible if you look into the open end of the tap.

   CAUTION

   Do not force tap into transceiver case. Very little pressure is necessary. If tap does not slide in easily, the pins in tap probably need to be aligned with their respective contacts on the transceiver board. If necessary straighten them as described in previous step.

3. Position open end of transceiver over tap and align screw holes.

4. Push screws through holes and tighten them.

5. Connect transceiver interface cable to transceiver and lock in place with slide latches on cable connector.

6. Provide strain relief for transceiver by tie-wrapping transceiver interface cable to segment cable about 15.24 cm (6 in) from transceiver.

   CAUTION

   Transceiver, tap, and connectors must be insulated from ground or network will not operate properly.

7. Insulate transceiver, tap block, and connectors with insulating material ensuring that no metal parts are left exposed. Tap block must be isolated from ground (for example, metal ducts, conduits).

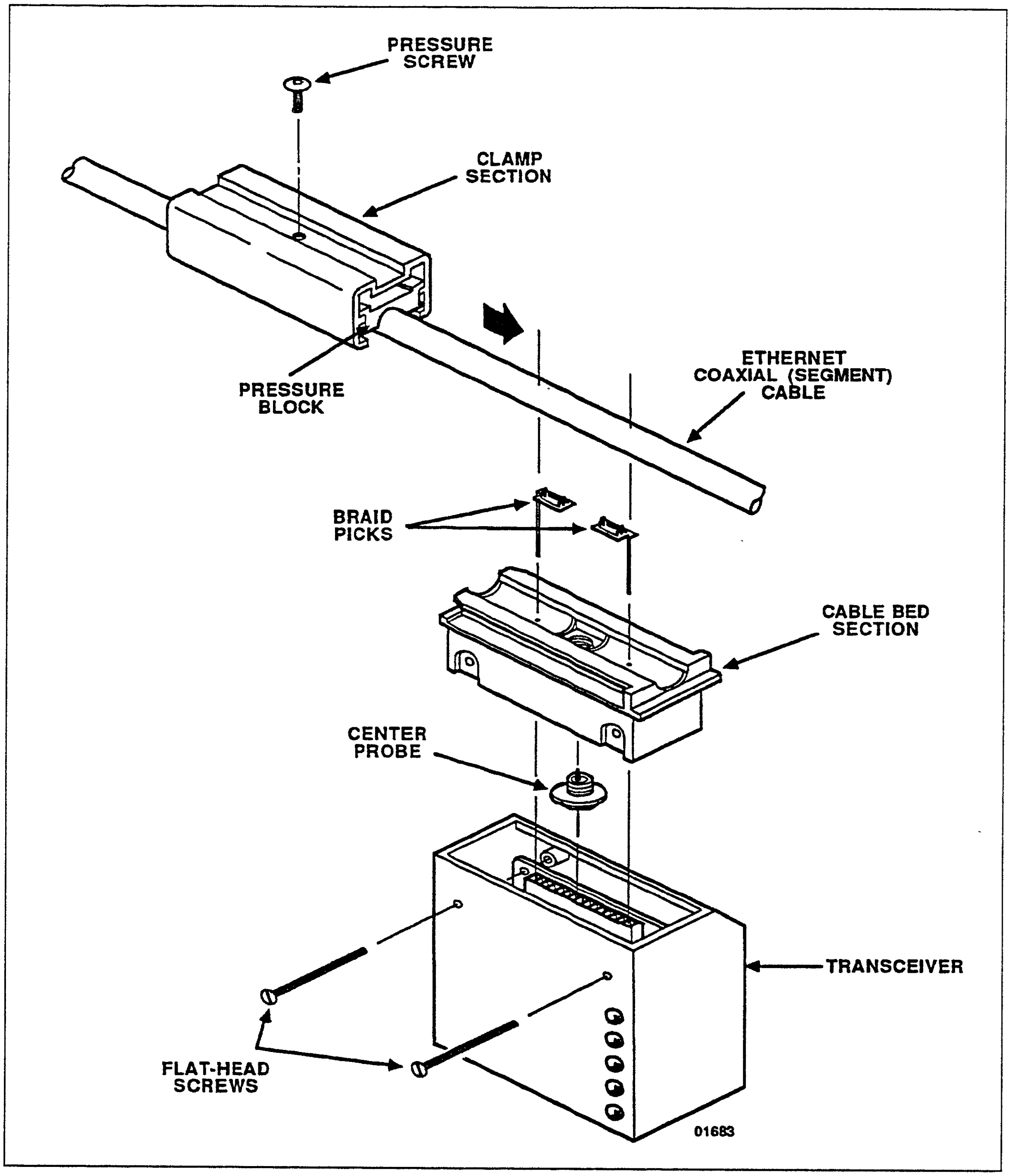

Figure 9-31. TN111B Transceiver and Tap Block

Replacing TN112C Multiplexers

Removal

1. Turn power off by pressing ON/OFF toggle switch in back of multiplexer and unplug power cord (figure 9-32).

2. Disconnect all cables connected to the multiplexer (figure 9-32).

Replacement

Refer to chapter 2, Installing TN112C Multiplexers, for replacement instructions.

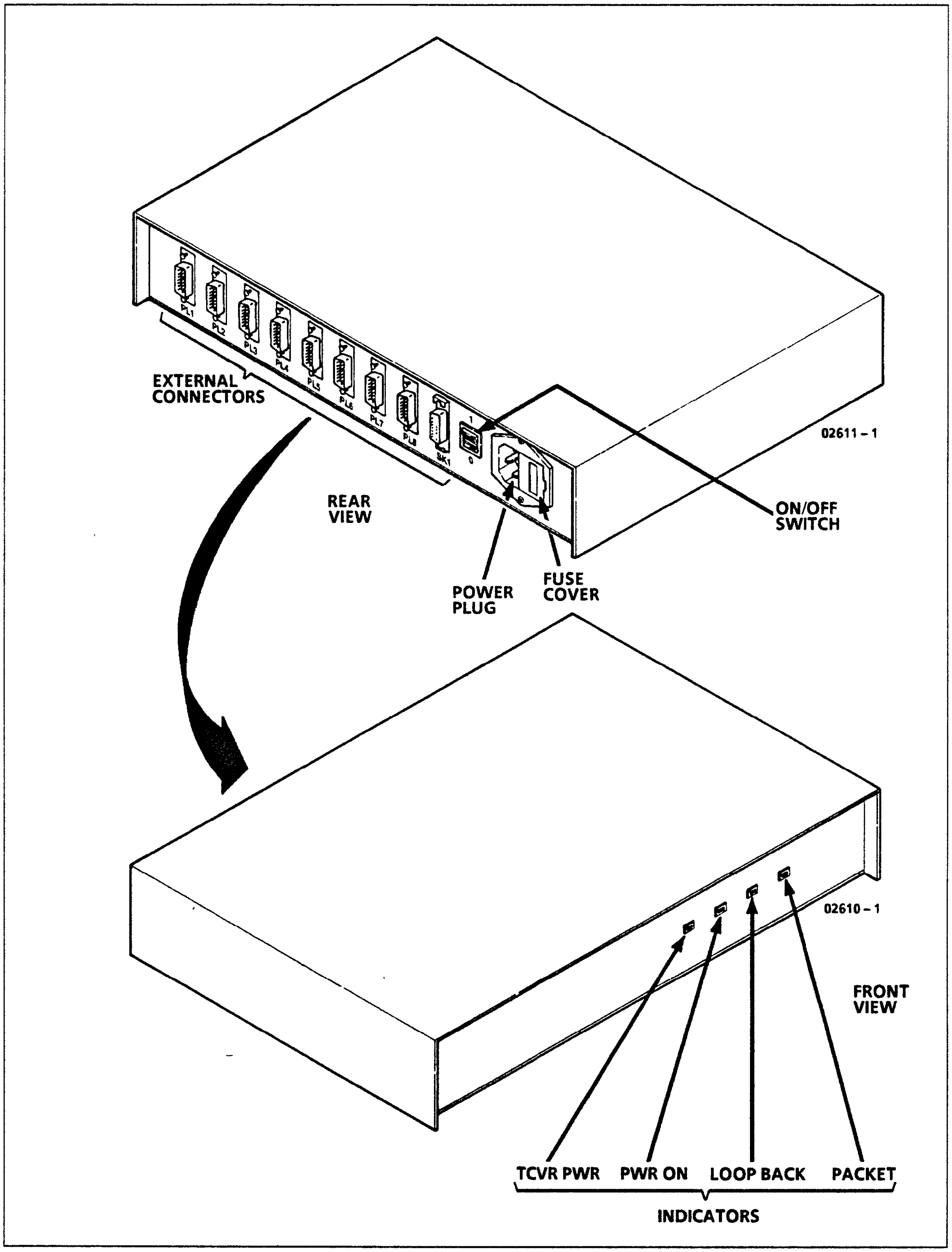

Figure 9-32. TN112C Multiplexer

Replacing TN114B Repeaters

Removal

1. Turn power off by pressing ON/OFF toggle switch in back of repeater and unplug power cord (figure 9-33).

2. Disconnect two cables connected to back of repeater.

Replacement

Refer to chapter 2, Installing TN114B Repeaters, for replacement instructions.

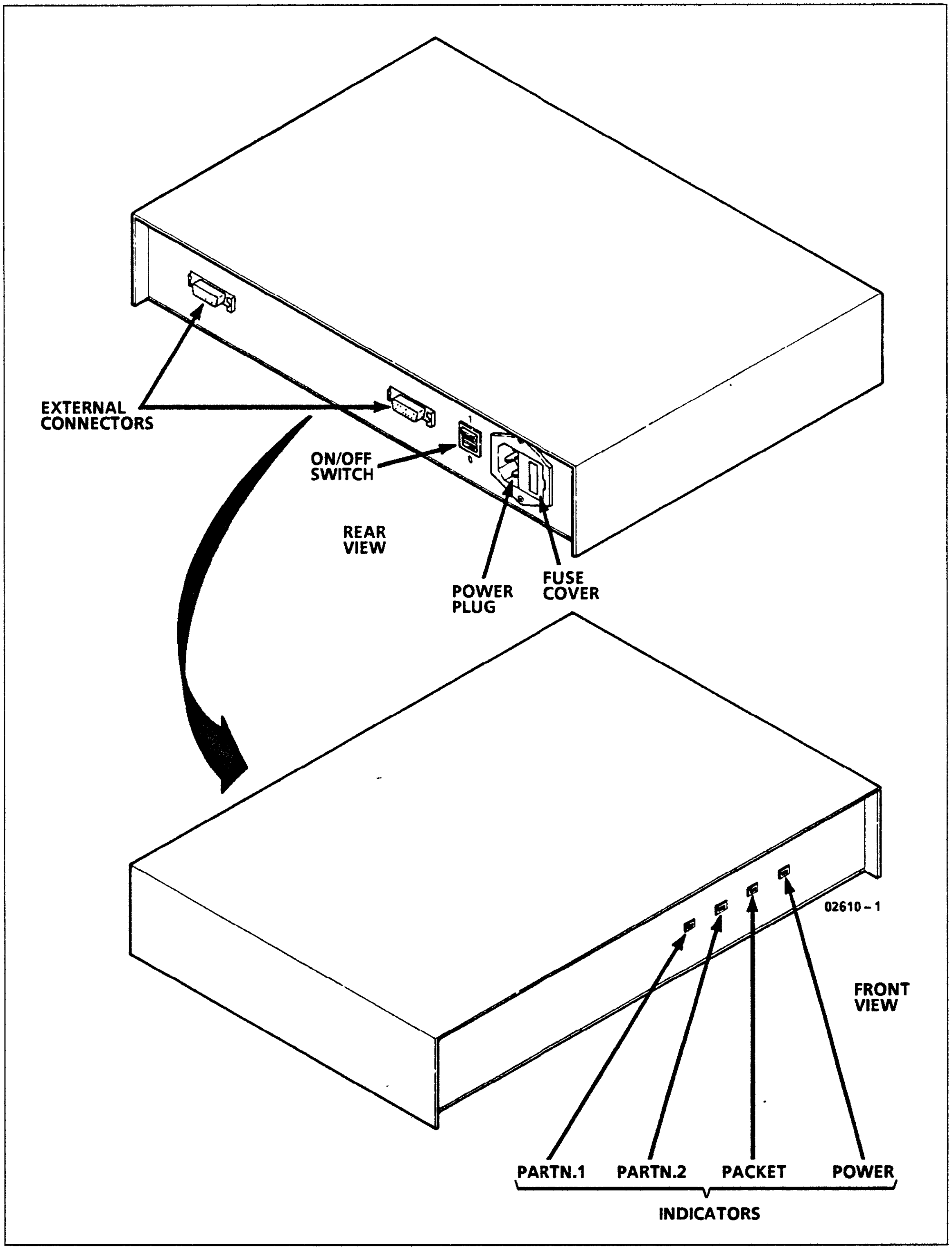

Figure 9-33. TN114B Repeater

Replacing Segment Cable

The following describes how to repair a bad section of segment cable. To install new sections, see Installing the Segment Cable and Components in chapter 2.

1. Notify users that network will be interrupted.

2. Locate convenient transceiver tap marker on segment cable closest to cable location needing repair. The tap markers are annular rings spaced every 2.5 m (8.25 ft).

3. Locate nearest N-connector on each side of chosen tap marker. It may be quite a distance away depending on whether one long section of cable or a mixture of different lengths was used.

4. Perform the following on each of the N-connectors.

   a. Without touching metal shell of N-connector, cut tie-wraps on insulation sleeving.

   b. Draw back insulation sleeving to expose a small section of N-connector.

   WARNING

   If more than 30 V ac exists on connectors with respect to local ground potential, a problem exists and must be corrected before proceeding. The problem is very likely due to the cable being grounded at more than one point, resulting in a ground loop.

   c. Measure ac voltage on N-connector shell with respect to local ground potential.

   d. Draw back insulation sleeving to expose all of N-connector.

WARNING

A serious shock hazard exists if ground is not maintained with a jumper between the two sections of cable during the following steps.

5. Jumper both N-connector shells together using a 16-gauge copper wire and alligator clips as a jumper lead.

6. If coaxial cable is damaged such that you do not have to remove any portion of cable, simply cut cable at that point. If you must remove a portion of damaged cable, you must cut cable at closest annular rings, which you located in step 2.

7. If you did not remove any damaged cable, or you removed cable between annular rings and are still able to reconnect ends, place a piece of insulation sleeving on one of the cut ends. If you must add a length of cable to reconnect ends, place insulation sleeving on both ends of cut cable.

8. Install male plug connectors (Control Data part number 15388611) on both ends of cut cable. Refer to chapter 2, Soldering N-Connectors to Ends of Cable Sections, for instructions. If both ends of cable can now be connected together, skip to step 10. Otherwise, if you must add a length of cable, perform step 9.

9. If you cannot reconnect the cable ends, you must add a 2.5-m (8.2-ft) length of coaxial cable and install male plug connectors (Control Data part number 15388611) on both ends of new cable. Refer to chapter 2, Soldering N-Connectors to Ends of Cable Sections, for instructions.

10. Install a female barrel connector (Control Data part number 15386110) between installed N-connectors on repaired ends of segment cable. The N-connectors should only be hand-tightened.

11. Slide insulation sleeving over newly installed N-connectors and secure with tie-wraps. No parts of N-connectors should be left exposed.

12. Remove jumper lead between N-connectors. Pull insulation sleeving back over N-connectors (no part of N-connectors should be left exposed) and secure with tie-wraps.

13. Verify integrity of repair.

14. Update site plan to indicate location of repaired segment cable.

Replacing N-Connectors

Perform the following procedure to replace a faulty N-connector (terminator, barrel connector, or plug connector) on the segment cable.

1. Notify users that network is going to be interrupted if system is running.

2. Locate nearest good connector on each side of faulty N-connector. It may be quite a distance away, depending on whether one long section of cable or a mixture of different lengths was used.

3. Perform the following on each of these connectors:

   a. Without touching metal shell of connector, cut tie-wraps on insulation sleeving.

   b. Draw back insulation sleeving to expose a small section of connector.

   WARNING

   If more than 30 V ac exists on connectors with respect to local ground potential, a problem exists and must be corrected before proceeding. The problem is very likely due to the cable being grounded at more than one point, resulting in a ground loop.

   c. Measure ac voltage on connector shell with respect to local ground potential.

   d. Draw back insulation sleeving to expose all of connector.

   WARNING

   A serious shock hazard exists if ground is not maintained with a jumper between the two sections of cable during the following steps.

   e. Jumper both N-connector shells together using a 16-gauge copper wire and alligator clips as a jumper lead.

4. At faulty connection, cut tie-wraps and slide back insulation sleeving. Then disconnect barrel connector or terminator from plug connectors attached to segment cable and proceed as follows.

   - If problem appears to be with barrel connector or terminator, replace appropriate item (hand-tighten only) and skip to step 10 of this procedure.

   - If problem appears to be with plug connector attached to segment cable, continue with this procedure at next step.

5. Cut connector from segment cable as close to connector as possible.

6. Place insulation sleeving onto cut end of segment cable.

7. Install new male plug connector (Control Data part number 15386115) onto cut end of cable. Refer to chapter 2, Soldering N-Connectors to Ends of Cable Sections, for instructions.

8. Reinstall barrel connector or terminator (removed in step 4) into plug connector(s) on segment cable. The N-connectors should only be hand-tightened.

9. Pull insulation sleeving over connectors and secure with tie-wraps. No parts of N-connectors should be left exposed.

10. Remove jumper lead between connectors. Pull insulation sleeving back over these connectors and secure with tie-wraps.

11. Verify integrity of repair.

Replacing Transceiver Tap Blocks

To replace a faulty transceiver tap block, perform the following steps.

1. Notify users that network is going to be interrupted if system is in operation.

2. Locate nearest good connector on each side of faulty tap block. It may be quite a distance away, depending on whether one long section of cable or a mixture of different lengths was used.

3. Perform the following on each connector:

   a. Without touching metal shell of connector, cut tie-wraps on insulation sleeving.

   b. Draw back insulation sleeving to expose a small section of connector.

   WARNING

   If more than 30 V ac exists on connectors with respect to local ground potential, a problem exists and must be corrected before proceeding. The problem is very likely due to the cable being grounded at more than one point, resulting in a ground loop.

   c. Measure ac voltage on connector shell with respect to local ground potential.

   d. Draw bac¹ insulation sleeving to expose all of connector.

WARNING

A serious shock hazard exists if ground is not maintained with a jumper between the two sections of cable during the following steps.

4. Jumper both connector shells together using 16-gauge copper wire as a jumper lead.

5. Cut tie-wrap and disconnect transceiver interface cable from transceiver at location of faulty tap block.

6. Unscrew transceiver from tap block.

7. Remove defective tap block from segment cable and proceed as follows.

   - If segment cable is not damaged, install a new tap block on segment cable per the appropriate transceiver and tap block installation procedure given in chapter 2.

   - If segment cable is damaged, cut and splice cable (see Replacing Segment Cable earlier in this chapter). Then install tap block at a different annular location mark on cable per procedure in chapter 2.

8. Reinstall transceiver and transceiver interface cable (see Replacing Transceivers earlier in this chapter).

9. Remove jumper lead between connectors. Pull insulation sleeving back over connectors (no part of connectors should be left exposed) and secure with tie-wraps.

10. Verify integrity of repair.

11. Update site plan to indicate any cable repair or relocation of tap block.

Replacement Parts Information 10

Replacement Parts Information 10

This chapter contains part numbers and other information necessary to identify and order field replaceable parts. The chapter is divided into five main topics:

- Part numbers for Field-Replaceable Units: Lists the Control Data part numbers for tools, accessories, and field-replaceable parts.
- Logic Board Interchangeability: Lists all boards that have been part of the DI and indicates which ones can still be used.
- Verifying FCO Level of Equipment: Lists the FCOs applicable to the DI and explains how to verify whether they are installed.
- Vendor Part Numbers: Lists vendors, other than Control Data, that supply network parts.
- Equipment/Product Cross-Reference: Cross-references Control Data equipment numbers to product numbers. This is often necessary in order to find the part number for a component.

Contact your CDCNET sales representative for parts ordering information.

Part Numbers for Field-Replaceable Units

This topic provides the part numbers for all field-replaceable units as well as the tools and test equipment needed to maintain your network. Table 10-1 lists the spare parts and their current part numbers as found in the spare parts kit. The site spare parts kit is located at the local site and its part number 24679501. Table 10-2 lists the spare parts that are located at the distribution center. Table 10-3 lists the static ground accessories.

Table 10-1. Site Spare Parts Kit List

Part Description	Part Number
Cable, Maintenance Console (TN113-B)	10322572
CDCNET Maintenance Kit (YA332-A)	22137345
Ethernet Multiplexer (TN112-C)	22120962
Ethernet Repeater (TN114-B)	22120963
Ethernet Transceiver (TN111-B)	22120964
Transceiver Tap Block Repair Kit for TN111B. The kit contains one probe (stinger), one screw, and four braid terminators (picks)	10322599
Transceiver Tap Block Assembly for TN111B	22137340
Logic Boards	See table 10-4
Plug, RS-232 (4-port) Loopback	67185537
Plug, RS-232 (8-port) Loopback	15387685
Plug, RS-449 Loopback	67185535
Plug, URI Loopback (Centronics)	22120985
Plug, URI Loopback (Data Products)	22120986
Plug, V.35 Loopback	20261835
Power Supply, Boschert	10126883
Tool, Coring	12263657
Tool, Ethernet Kit (2630-1/2630-2)	53585366
Tool, Ethernet Kit (2630-3/2630-4)	22137341
Tool, Ethernet Splice Kit (YA302-A)	53585364

(Continued)

Table 10-1. Site Spare Parts Kit List *(Continued)*

Part Description	Part Number
Tool, Ethernet Terminator Kit (YA301-A)	22183230
Tool, Ethernet Transceiver Tap Block	15386795
Tool, Ethernet Transceiver Tap Plug and O-Ring	15386796
Tool, Ethernet Transceiver Tap Block Shim	15386797
Tool, Insulation Piercing	12263665
Tool, Shield Extractor	12263663

Table 10-2. Distribution Center Spare Parts List

Part Description	Part Number
Backpanel, Line Interface Module	18989258
Backpanel, Main Logic Board	67046066
Battery, Alkaline, Size AA	22824450
Battery Holder, Size AA	22824400
Cable, ESCI Internal	53595486
Cable, CIM/LIM	67328087
Cable, Ethernet Coaxial (segment cable)	See appendix B
Cable, Line Interface Module (LIM)	See appendix B
Cable, MCI I/O Coax	19191600
Cable, MCI Interconnector (channel interface)	67328077
Cable, PMM/MPB Ribbon	67328076
Cable, Transceiver Interface	See appendix B
Connector, Ethernet Barrel	15386110
Connector, Ethernet N-Type	15386115
Extender Kit, ACN	24612790

(Continued)

Table 10-2. Distribution Center Spare Parts List *(Continued)*

Part Description	Part Number
Fan Assembly, 50 Hz, 220 V ac	24612798
Fan Assembly, 60 Hz, 120 V ac	53360704
Light-Emitting Diode (Green)	75810704
Light-Emitting Diode (Red)	75810701
Light-Emitting Diode (Yellow)	95968931
Modular Adapters for RS-232 8-Port LIM Cables	See appendix B
Power Cord, 60 Hz	15165427
Terminator, Ethernet, 50 Ohm	15386105

Table 10-3. Static Ground Accessories

Part Description	Part Number
Static Ground Wrist Strap, 6 1/2 - 8 in wrist	12263496
Static Ground Wrist Strap, up to 6 1/2 in wrist	12263623
Static Ground Shielding Bag, 5x8 in	12263624
Static Ground Shielding Bag, 8x12 in	12263625
Static Ground Shielding Bag, 10x12 in	12263626
Static Ground Shielding Bag, 14x18 in	12263499
Static Ground Shielding Bag, 16x24 in	12263627

Logic Board Interchangeability

Table 10-4 lists all boards that have been part of the DI configuration and shows whether you can still use them. The table has a separate list for each board, and each list has three columns:

- Use - Indicates whether you can use the board. One of three codes, I, S, or x, appears in this column.
  - I means you can use the board interchangeably with any other one of this type.
  - S means the board will work, except for some selective applications. Those selective applications require an FCO.
  - x means the board is obsolete--do not use it. Replace the board with any usable version on hand.
- Part No - Part number used to order the board. The last number in the table is the latest available version (as of date this manual is printed). You always get the latest interchangeable version when ordering a new board. Figure 10-1 shows where find the part number on a board assembly.
- ROM - Applies only to later versions of MPB, SMM, ESCI, and CIM boards. This column shows the level of firmware in the board's ROM and correlates to the ROM level on the hardware status display. By comparing ROM levels on the status display to those in the table, you can determine if a board is at the correct level without removing it to check the part number.
- FCOs - Applicable FCOs (field change orders) against the equipment. The FCO number appears alongside the part number it introduces (this and later versions of the board include the FCO). Note that an FCO can introduce more than one board. There are three varieties of FCOs.
  - FCOs applying to all previous boards - Must be installed in all equipment and obsoletes all previous versions of the board (changes their Use code to x).
  - FCOs applying only to certain situations - Necessary only under certain conditions and changes the Use code of previous boards to S.
  - FCOs adding an optional feature - Add a feature desired by some users, but not necessary for the system to meet specifications. The Use codes of previous boards are not affected.

  The list does not include FCOs that have been superceded by later FCOs. See Verifying FCO Level of Equipment in later in this chapter, or ask the next level of support if you have a question on whether an FCO applies to your units.

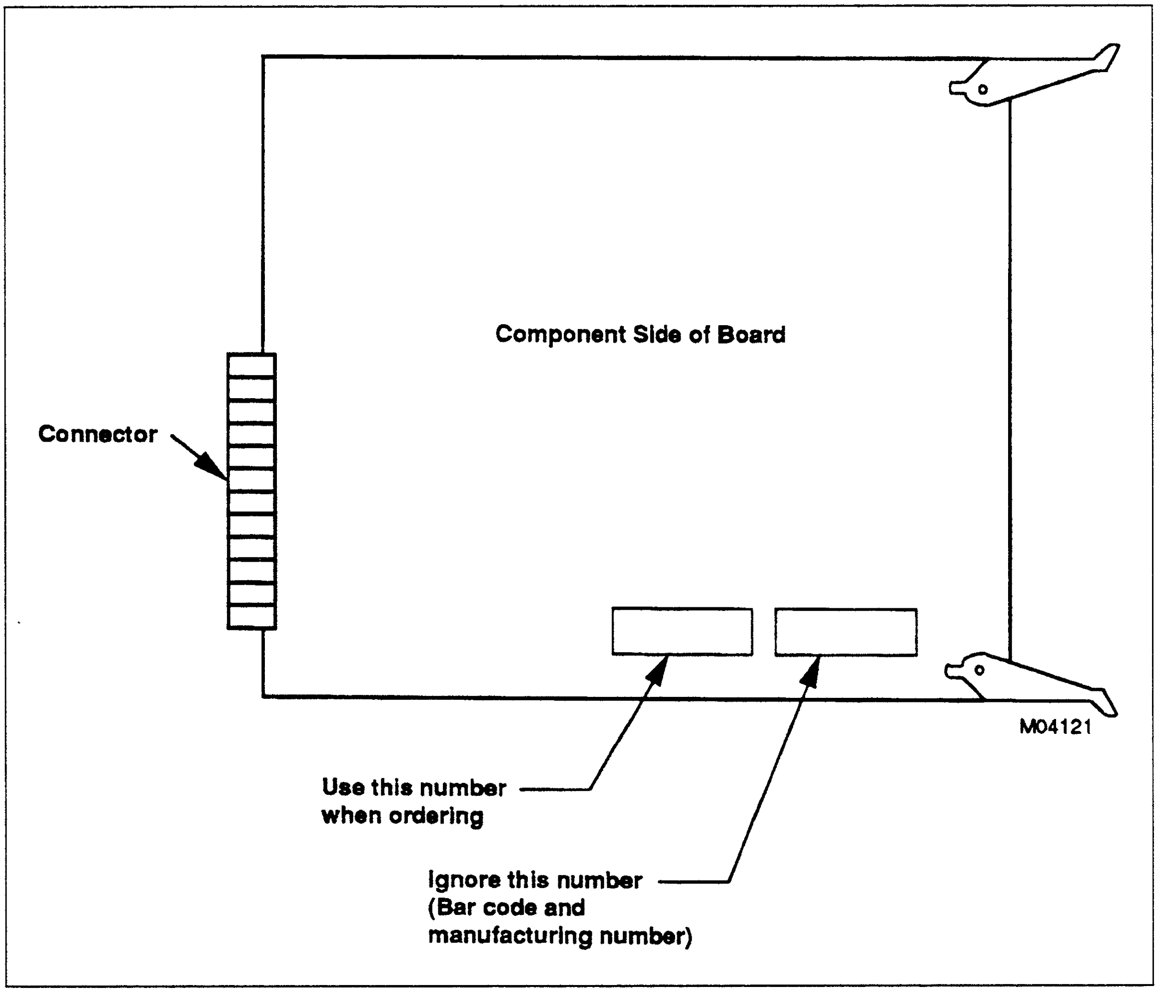

Figure 10-1. Finding the Part Number on a Board

The following examples show how to use the board interchangeability table.

Example 1: Assume you have a spare XYZ board with part number 67184873 and need to know if you can use it to replace another board. Looking in the Use column, in the following example table, you see an x by this part number, indicating it is obsolete and cannot be used.

Example 2: Assume you have an XYZ board with part number 22123456 and want to know if FCO CA99911 is installed. The example table shows that the FCO introduced part number 90446827. Your board is newer, so it has the FCO. The I in the Use column shows that your board is interchangeable with any other board.

Example 3: Assume you have a spare XYZ board with part number 24641381 and want to know where it can be used. In the example table, there is an "S" in the Use column for this board, indicating selective interchangeability. The selective interchangeability is a result of FCO CA99922, which introduces part number 24567081. The FCO does not obsolete previous versions, but does change their Use codes to "S", indicating that the new level of board is needed for some applications. To determine whether you need the FCO, see Verifying FCO Level of Equipment, later in this chapter.

Example 4: You notice FCO CA99933 in the list for the XYZ board and want to know how it affects your equipment. The FCO introduces part number 22123456, but does not change the Use codes of previous boards. This means the FCO adds an optional feature that may be desired by some users, but is not necessary for the system to meet specifications.

DY999A
XYZ Board

Use	Part No	ROM	FCOs
x	53984763	----	
x	23143013	----	
x	67184873	0201	
x	53593355	0201	
S	90446827	030A	CA99911
S	24641381	030A	
S	22179439	030A	
I	24567081	0403	CA99922
I	22128904	0403	
I	22123456	0506	CA99933
I	67189934	0506	

Table 10-4. Board Interchangeability Table

DY245A
MPB Board

Use	Part No	ROM	FCOs
x	53984783	----	
x	23143013	----	
x	67184873	----	
x	24641342	----	
x	24641382	----	
x	24641381	----	
x	22697035	----	
I	24615510	----	CA46919
I	24615511	----	CA46919
I	53593363	050C	
I	53593362	050C	
I	22179412	050C	
I	22179413	050C	
I	22126407	050C	
		160A	
I	10302262	5204	CA49711
I	10310354	5204	
		7302	

* SEE NOTE 1 *

AC117A
MPB Board

Use	Part No	ROM	FCOs
I	10284395	7304	

* SEE NOTE 1 *

DY225A
SMM Board (1 meg)

Use	Part No	ROM	FCOs
x	23136598	----	
x	67184880	----	
x	24641318	----	
I	53593358	050C	CA47377
I	53593357	050C	
I	22183275	050C	
I	22183274	050C	
I	53595276	050C	
I	22126408	050C	
I	22127641	1602	
I	10310378	6108	

* SEE NOTES 2 and 3 *

BS236A
SMM Board (4 meg)

Use	Part No	ROM	FCOs
I	10302235	7101	

* SEE NOTE 2 *

(Continued)

Table 10-4. Board Interchangeability Table *(Continued)*

DY227A
ESCI Board

Use	Part No	ROM	FCOs
x	67184800	----	
x	53592099	----	
x	53595823	----	
I	53593361	----	CA47375
I	22179436	0806	
I	22126404	0806	
		1704	

NOTE: DY227A no longer available. Use DY227B for new orders.

DY227B
ESCI Board

Use	Part No	ROM	FCOs
I	53595282	----	
I	22179439	0806	
I	22126406	0806	
		160A	
I	10293397	160A	

DY226A
MCI Board

Use	Part No	ROM	FCOs
x	53984787	----	
x	23142030	----	
x	23143051	----	
x	23140966	----	
x	22697032	----	
x	67184871	----	
x	53595970	----	
x	53595971	----	
x	53593365	050C	
x	53593364	050C	
x	23113015	050C	
x	22112867	050C	
x	53586889	050C	
x	22126405	050C	
x	90446808	050C	
x	90446826	050C	
x	10283691	050C	
I	10302267	5301	CA49716

DY228A
CIM Board

Use	Part No	ROM	FCOs
x	53984777		
x	23140163		
x	67184869		
x	53586821		
x	53586822		
x	53593356	0506	
x	53593355	0506	
S	90446827	2702	CD17983
I	10306790	6108	CA50448

(Continued)

Table 10-4. Board Interchangeability Table *(Continued)*

DY232A PMM Board			DY246A URI Board			DY234B X.24 LIM		
Use	Part No	FCOs	Use	Part No	FCOs	Use	Part No	FCOs
I	10390810		S	24670905		I	22127799	
I	67184877		S	53595733				
* SEE NOTE 4 *			I	53590782	CA48892			

DY229B RS-232 LIM			DY267A RS-232 LIM			DY230A RS-449 LIM		
Use	Part No	FCOs	Use	Part No	FCOs	Use	Part No	FCOs
S	24641329		I	22126415		I	67184879	
I	10302269	CA49717				I	53984781	
I	10317297	CA49717				I	23140900	

(Continued)

Table 10-4. Board Interchangeability Table *(Continued)*

DY230B RS-449 LIM Use	Part No	FCOs	DY261A V.35 LIM Use	Part No	FCOs
I	23140147		I	20296218	

NOTES:

1. An AC117A replaces a DY245A in all applications (although PMM can not be used when AC117A is installed). However, check with next level of support before replacing an AC117A with a DY245A because a DY245A replaces an AC117A only in certain applications and also may require a PMM board.

2. One BS236A (4 meg) SMM replaces from one to four DY225A (1 meg) SMMs and four DY225A SMMs will replace one BS236A. However, do not mix the two types in the same unit.

3. If SMM in lowest numbered slot is at ROM level 050C or 160A, the hardware status display will show all other SMM ROMs as being at this level, although they may actually be at different levels.

4. Use only with DY245A MPB.

Verifying FCO Level of Equipment

The equipment must have all applicable FCOs (field change orders) installed to operate properly. Table 10-5 lists all the FCOs currently applicable to the DI (as of date manual was printed). The table has three columns:

- FCO Number - Number assigned to the FCO document. This is the number logged on the FCO log for the equipment.
- Equip Type - Equipment affected by the FCO (for example, DY245A).
- Summary of Change - Brief description of the change. The description includes whether the change applies to all or just certain applications.

Before ordering or installing an FCO, always check the actual FCO document or ask the next level of support for assistance. As a general rule, you can install cabinet FCOs in the series codes to which they apply. But you may not be able to update a circuit board without replacing the entire board.

Verifying DI Cabinet FCOs

To determine if a cabinet FCO is installed, compare the series code on the cabinet equipment label (inside front door) to the series codes affected by the FCO.

- If the series code is in the range affected by the FCO, the FCO number should be logged on the cabinet FCO log (inside front door).
- If the series code is not among those affected by the FCO, the change either doesn't apply or has been installed in the factory as part of the normal build process.

Verifying Circuit Board FCOs

To determine whether a circuit board FCO is installed, compare the part number of the board to those in table 10-4. If the board has the same part number or a newer part number than the one introduced by the FCO, the FCO is installed. With MPB, SMM, CIM, and ESCI boards, it may be easier to check the ROM level on the hardware status display than to than remove the board and check the part number. Compare the ROM level on the display to the level for the FCOed board, as shown in table 10-4.

Table 10-5. List of Applicable FCOs

FCO[1] Number	Equipment Type	Summary of Change
CA46919	DY245A	Eliminates loading problems on 68000 bus. Obsoletes all previous versions of the board.
CA47375	DY227A	Updates ROM code. Obsoletes all previous versions of the board.
CA47377	DY225A	Updates ROM code. Obsoletes all previous versions of the board.
CA47268	GH120B GH121A	Affects series codes 01-03. Warns of higher neutral currents because a switching supply is used in DI. Also implements more shock-resistant mounting for power supply board.
CA48805	GH120B GH121A	Affects series codes 01-04. Eliminates possible problem with safety ground in DI cabinet.
CD17983	DY228A	Allows CIM to be used as a boot source. Obsoletes all previous versions of the board.
CA48892	DY246A	Applies only to sites where, under certain conditions, two characters are printed instead of one.
CA49711	DY245A	This change shortens power-up time by eliminating some MPB/memory tests and applies only to specific sites where the following conditions exist. 1. The site is subject to frequent and unexpected power outages. 2. Minimum recovery time is critical to the specific application. Also, do not enable the short power-up feature on DY245A boards that have a ROM level below 7302 and use more than four DY225A SMMs or more than one BS236A SMM. Otherwise, the test hangs.
CA49716	DY226A	Allows MCI to connect to a NOS/VE peripheral processor through a concurrent input/output (CIO) channel. The DI fails to boot across a CIO channel unless this FCO is installed in the MCI card connected to that channel. A CIO channel is available only on Cyber 180 models 840, 850, 860, 870, 96X, and 99X that have an I4 input/output unit with direct memory access (DMA). A CYBER 180 model 962 or 992 has only this type of channel so the FCO is a requirement for these systems. This FCO obsoletes all previous versions of the MCI board.

(Continued)

Table 10-5. List of Applicable FCOs *(Continued)*

FCO[1] Number	Equipment Type	Summary of Change
CA49717	DY229B	Applies only where board is used with synchronous lines (for example, HDLC). Improves noise immunity thus reducing possibility of excessive data retransmissions and CRC errors. To easily verify whether this FCO is installed, check the DY229B version level shown on the hardware status display. If the version is 0009, the FCO is not installed.
CA50448	DY228A	Applies to all units using an AC117A type MPB. Eliminates intermittent onboard diagnostic failures. This FCO also corrects problems reported by PSRs AC1G594, AC1G848, AC1J159, and AC1J269 (install the FCO if these problems occur).

1. Lists only changes affecting safety or board interchangeability. When FCOs apply to only certain applications, it is noted in the Summary of Change column. FCOs superceded by later FCOs are not listed.

Vendor Part Numbers

Table 10-6 provides part number information for various vendors other than Control Data that supply network hardware components.

Table 10-6. Vendor Part Numbers

Component Supplied	Vendor/Part Number
Major Parts	
Codelink 3030A Fiber Transceiver[1]	CODENOLL 1086 North Broadway, Yonkers, NY 10701
200X Star Coupler[1]	
Fiber Cable[1]	
TRANSLAN III or IV Ethernet Bridge[1]	VITALINK 1350 Charleston Road Mountain View, CA 94043
Active Optical Star Coupler (compatible with IEEE 802.3 and V2.0)[1]	Hirschmann Verwaitung Richard-Hirschmann-Strate 19 D-7300 Esslingen/Neckar West Germany
Ungermann Bass Buffered Repeater, Model 5261A[1]	Ungermann Bass 3990 Freedon Circle Santa Clara, CA 95050
Coaxial Cable Transceiver[1]	3Com Model 3C101
Cabletron ST-500-03 Transceiver for use with Thin Ethernet coaxial cable[1]	Cabletron P.O. Box 6257 Rochester, NH 03867-6257
IBM 3211 to DPC Long Line Interface. Interfaces URI to Xerox laser printer.[1]	Spur Products Corporation 13469 Beach Avenue Marina Del Rey, CA 90292

1. Equipment has been functionally tested on CDCNET but has not been certified as a CDCNET system component.

(Continued)

Table 10-6. Vendor Part Numbers *(Continued)*

Component Supplied	Vendor/Part Number			
Crimping Tools	**Kings**	**Amphenol**		
Crimp Handle	KTH-1000	227-994		
Thick Cable Die	KTH-2004	227-1221-25		
Thin Cable Die	KTH-2001	227-1221-11		
Segment Cables	**3Com**	**Inmac**		
15 m (49.2 ft)	3C120-15	1062-1H-5		
30 m (98 ft)	3C120-30	1062-1H-5		
50 m (164 ft)	3C120-50	1062-1H-5		
100 m (328 ft)	3C120-100	--		
200 m (656 ft)	3C120-200	--		
500 m (1640 ft)	3C120-500	--		
Transceiver I/F Cables	**3Com**	**Inmac**		
5 m (16.4 ft)	3C110-005	1063-1H-5		
10 m (32.8 ft)	3C110-010	1063-2H-5		
15 m (49.2 ft)	3C110-015	1063-3H-5		
Bulk Coaxial Cable	**3Com**	**Inmac**	**Belden**	
PVC (0.405 in O.D.)	3C121-YYY[2]	1784	9880	
FEP (0.375 in O.D.)	--	--	89880	
FEP (0.405 in O.D.)	--	1785	--	
Coaxial Cable Connectors	**3Com**	**Inmac**	**Kings**	**Amp**
Male Type N, Clamp (UG1185A/U)	3C150 w/boot	--	KN59-270	51692-2-PVC
Male Type N, Crimp	--	Special Order	KN59-201	--
Connector Adapters	**3Com**	**Inmac**	**Kings**	**Amphenol**
N male-male Barrel (UG57B)	3C161	--	KN99-44	82-100
N female-female Barrel (UG29B)	3C160	1064-2	KN99-50	82-101
N female-BNC female (M55339/01-00001)	3C540	1064-6	1209-21	82-5550
N male-BNC female (UG201A)	3C541	1064-7	KN99-35	31-216

2. YYY indicates length in meters, available from 3Com in 100, 200, and 500-m (330, 660, and 1650-ft) lengths only.

CDCNET Product/Equipment Cross-Reference

Table 10-7 lists the external product numbers, internal equipment numbers, and descriptions for hardware products currently available for CDCNET configurations.

Table 10-7. CDCNET Product/Equipment Cross-Reference

Product Number	Equipment Number	Nomenclature
2601-4	GH121-A GH120-B	Device Interface (DI) cabinet, harvest gold, 50 Hz, 240 V ac (GH121-A) or 60 Hz, 120 V ac (GH120-B).
2601-5	GH121-B GH120-C	Device Interface (DI) cabinet, dark blue gray, 50 Hz, 240 V ac (GH121-B) or 60 Hz, 120 V ac (GH120-C).
2602-1	AC117-A	Main Processor Board (MPB-II).
2604-1	DY225-A	System Main Memory Board (SMM), 1024 K bytes.
2604-2	BS236-A	System Main Memory Board (SMM), 4 M bytes.
2605-1	DY232-A	Private Memory Module (PMM), 128 K bytes, and jumper cable.
2606-1	DY245-A	Main Processor Board (MPB).
2607-1	DY226-A	Mainframe Channel Interface Board (MCI), a pair of channel I/O cables, and an internal cable assembly.
2608-5	DY227-B	Ethernet Serial Channel Interface Board (ESCI) and cable assembly.
2608-114	YA329-E	802.3 Transceiver interface cable, CL2, 5 m (16.4 ft).
2608-131	YA329-F	802.3 Transceiver interface cable, CL2, 10 m (32.8 ft).
2608-163	YA329-G	802.3 Transceiver interface cable, CL2, 20 m (65.6 ft).
2608-98	YA329-H	802.3 Transceiver interface cable, CL2, 50 m (164 ft).
2608-216	YA328-A	802.3 Transceiver interface cable, CL2P, 5 m (16.4 ft).
2608-233	YA328-B	802.3 Transceiver interface cable, CL2P, 10 m (32.8 ft).
2608-265	YA328-C	802.3 Transceiver interface cable, CL2P, 20 m (65.6 ft).

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2608-200	YA328-D	802.3 Transceiver interface cable, Teflon (recommended), 50 m (164 ft).
2609-1	DY228-A	Communications Interface Module (CIM) and cable assembly.
2610-1	DY230-B	2-Port RS-449 LIM.
2610-123	TN101-D	RS-449 LIM to modem (DCE), 37-pin male plug to user device, 7.6-m (25-ft) CL2 cable.
2610-148	TN101-E	RS-449 LIM to modem (DCE), 37-pin male plug to user device, 15-m (50-ft) CL2 cable.
2610-149	TN101-G	RS-449 LIM to modem (DCE), 37-pin male plug to user device, 15-m (50-ft) CL2P cable.
2610-188	TN101-F	RS-449 LIM to modem (DCE), 37-pin male plug to user device, 58-m (190-ft) CL2 cable.
2610-189	TN101-H	RS-449 LIM to modem (DCE), 37-pin male plug to user device, 58-m (190-ft) CL2P cable.
2610-523	TN102-D	RS-449 LIM to terminal (DTE), 37-pin female plug to user device, 7.6-m (25-ft) CL2 cable.
2610-548	TN102-E	RS-449 LIM to terminal (DTE), 37-pin female plug to user device, 15-m (50-ft) CL2 cable.
2610-549	TN102-G	RS-449 LIM to terminal (DTE), 37-pin female plug to user device, 15-m (50-ft) CL2P cable.
2610-588	TN102-F	RS-449 LIM to terminal (DTE), 37-pin female plug to user device, 58-m (190-ft) CL2 cable.
2610-589	TN102-H	RS-449 LIM to terminal (DTE), 37-pin female plug to user device, 58-m (190-ft) CL2P cable.
2611-1	DY234-A	4-Port X.24 LIM.
2611-123	TN107-D	X.24 LIM to modem (DCE), 15-pin male plug to user device, 7.6-m (25-ft) CL2 cable.
2611-148	TN107-E	X.24 LIM to modem (DCE), 15-pin male plug to user device, 15.2-m (50-ft) CL2 cable.
2611-149	TN107-G	X.24 LIM to modem (DCE), 15-pin male plug to user device, 15.2-m (50-ft) CL2P cable.
2611-188	TN107-F	X.24 LIM to modem (DCE), 15-pin male plug to user device, 58-m (190-ft) CL2 cable.

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2611-189	TN107-H	X.24 LIM to modem (DCE), 15-pin male plug to user device, 58-m (190-ft) CL2P cable.
2612-1	DY229-B	4-Port RS-232-C/V.24 LIM.
2612-108	TN108-D	4-Port RS-232-C LIM to modem (DCE), 25-pin male plug to user device, 3-m (10-ft) CL2 cable.
2612-123	TN108-E	4-Port RS-232-C LIM to modem (DCE), 25-pin male plug to user device, 7.6-m (25-ft) CL2 cable.
2612-148	TN108-F	4-Port RS-232-C LIM to modem (DCE), 25-pin male plug to user device, 15-m (50-ft) CL2 cable.
2612-149	TN108-G	4-Port RS-232-C LIM to modem (DCE), 25-pin male plug to user device, 15-m (50-ft) CL2P cable.
2612-508	TN109-D	4-Port RS-232-C LIM to terminal (DTE), 25-pin female plug to user device, 3-m (10-ft) CL2 cable.
2612-523	TN109-E	4-Port RS-232-C LIM to terminal (DTE), 25-pin female plug to user device, 7.6-m (25-ft) CL2 cable.
2612-548	TN109-F	4-Port RS-232-C LIM to terminal (DTE), 25-pin female plug to user device, 15-m (50-ft) CL2 cable.
2612-549	TN109-G	4-Port RS-232-C LIM to terminal (DTE), 25-pin female plug to user device, 15-m (50-ft) CL2P cable.
2612-608	TN472-D	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin female plug to user device, 3-m (10-ft) CL2 cable.
2612-623	TN472-E	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin female plug to user device, 7.6-m (25-ft) CL2 cable.
2612-648	TN472-F	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin female plug to user device, 15-m (50-ft) CL2 cable.
2612-649	TN472-G	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin female plug to user device, 15-m (50-ft) CL2P cable.
2612-708	YA305-D	4-Port RS-232-C LIM to terminal (DTE) 25-pin male plug to user device, 3-m (10-ft) CL2 cable.
2612-723	YA305-E	4-Port RS-232-C LIM to terminal (DTE) 25-pin male plug to user device, 7.6-m (25-ft) CL2 cable.

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2612-748	YA305-F	4-Port RS-232-C LIM to terminal (DTE) 25-pin male plug to user device, 15-m (50-ft) CL2 cable.
2612-749	YA305-G	4-Port RS-232-C LIM to terminal (DTE) 25-pin male plug to user device, 15-m (50-ft) CL2P cable.
2612-808	YA306-D	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin male plug to user device, 3-m (10-ft) CL2 cable.
2612-823	YA306-E	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin male plug to user device, 7.6-m (25-ft) CL2 cable.
2612-848	YA306-F	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin male plug to user device, 15-m (50-ft) CL2 cable.
2612-849	YA306-G	4-Port RS-232-C LIM to terminal (DTE) with flow control, 25-pin male plug to user device, 15-m (50-ft) CL2P cable.
2613-1	DY246-A	2-Port Unit Record Interface (URI) LIM.
2613-123	TN484-C	URI to Centronics, 36-pin male plug, 7.6-m (25-ft) CL2 cable.
2613-148	TN484-D	URI to Centronics, 36-pin male plug, 15.2-m (50-ft) CL2 cable.
2613-223	TN485-D	URI to Data Products, 50-pin male plug, 7.6-m (25-ft) CL2 cable.
2613-248	TN485-E	URI to Data Products, 50-pin male plug, 15.2-m (50-ft) CL2 cable.
2613-249	TN485-G	URI to Data Products, 50-pin male plug, 15.2-m (50-ft) CL2P cable.
2613-297	TN485-F	URI to Data Products, 50-pin male plug, 30.4-m (100-ft) CL2 cable.
2613-298	TN485-H	URI to Data Products, 50-pin male plug, 30.4-m (100-ft) CL2P cable.
2613-301	TN486-B	Winchester adapter CL2 cable, 0.91 m (3 ft).
2617-1	DY261-A	2-Port V.35 LIM.
2617-108	TN490-D	V.35 LIM to modem (DCE), 34-pin male plug to user device, 3-m (10-ft) CL2 cable. Plug has 0.060-in diameter pins and single lead, jackscrew connector locking mechanism.

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2617-123	TN490-E	V.35 LIM to modem (DCE), 34-pin male plug to user device, 7.6-m (25-ft) CL2 cable. Plug has 0.060-in diameter pins and single lead, jackscrew connector locking mechanism.
2617-148	TN490-F	V.35 LIM to modem (DCE), 34-pin male plug to user device, 15-m (50-ft) CL2 cable. Plug has 0.060-in diameter pins and single lead, jackscrew connector locking mechanism.
2617-149	TN490-G	V.35 LIM to modem (DCE), 34-pin male plug to user device, 15-m (50-ft) CL2P cable. Plug has 0.060-in diameter pins and single lead, jackscrew connector locking mechanism.
2617-208	YA327-D	V.35 LIM to modem (DCE), 34-pin male plug to user devices, 3-m (10-ft) CL2 cable. Plug has 0.040-in diameter pins and spring clip with guide pin connector locking mechanism.
2617-223	YA327-E	V.35 LIM to modem (DCE), 34-pin male plug to user devices, 7.6-m (25-ft) CL2 cable. Plug has 0.040-in diameter pins and spring clip with guide pin connector locking mechanism.
2617-248	YA327-F	V.35 LIM to modem (DCE), 34-pin male plug to user devices, 15-m (50-ft) CL2 cable. Plug has 0.040-in diameter pins and spring clip with guide pin connector locking mechanism.
2617-249	YA327-G	V.35 LIM to modem (DCE), 34-pin male plug to user devices, 15-m (50-ft) CL2P cable. Plug has 0.040-in diameter pins and spring clip with guide pin connector locking mechanism.
2617-508	YA326-D	V.35 LIM to terminal (DTE), 34-pin female plug to user devices, 3-m (10-ft) CL2 cable. Plug is for 0.060-in diameter pins.
2617-523	YA326-E	V.35 LIM to terminal (DTE), 34-pin female plug to user devices, 7.6-m (25-ft) CL2 cable. Plug is for 0.060-in diameter pins.
2617-548	YA326-F	V.35 LIM to terminal (DTE), 34-pin female plug to user devices, 15-m (50-ft) CL2 cable. Plug is for 0.060-in diameter pins.

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2617-549	YA326-G	V.35 LIM to terminal (DTE), 34-pin female plug to user devices, 15-m (50-ft) CL2P cable. Plug is for 0.060-in diameter pins.
2618-1	DY267-A	8-Port RS-232 Asynchronous LIM.
2618-11	YA324-A	8-Port RS-232 Asynchronous LIM cable adapter for modems (DCE) that require a 25-pin male connector, and use DCE flow control and DCD disconnect.
2618-21	YA324-B	8-Port RS-232 Asynchronous LIM cable adapter for modems (DCE) that require a 25-pin male connector, and use DCE flow control and DSR disconnect.
2618-31	YA324-C	8-Port RS-232 Asynchronous LIM cable adapter for modems (DCE) that require a 25-pin male connector, and use both DCD and DSR disconnect.
2618-50	YA324-D	8-Port RS-232 Asynchronous LIM cable adapter for terminals that use hardware or software flow control and require a 25-pin female cable connector.
2618-51	YA324-E	8-Port RS-232 Asynchronous LIM cable adapter for terminals (DTE) that use hardware or software flow control and require a 25-pin male cable connector.
2618-112	YA333-J	8-Port RS-232 Asynchronous LIM cable (unshielded CL2), 4.2 m (14 ft).
2618-123	YA333-K	8-Port RS-232 Asynchronous LIM cable (unshielded CL2), 7.6 m (25 ft).
2618-148	YA333-L	8-Port RS-232 Asynchronous LIM cable (unshielded CL2), 15.2 m (50 ft).
2618-149	YA333-T	8-Port RS-232 Asynchronous LIM cable (unshielded CL2P), 15.2 m (50 ft).
2618-198	YA333-M	8-Port RS-232 Asynchronous LIM cable (unshielded CL2), 60.8 m (200 ft).
2618-199	YA333-U	8-Port RS-232 Asynchronous LIM cable (unshielded CL2P), 60.8 m (200 ft).
2618-212	YA333-N	8-Port RS-232 Asynchronous LIM cable (shielded CL2), 4.2 m (14 ft).
2618-223	YA333-P	8-Port RS-232 Asynchronous LIM cable (shielded CL2), 7.6 m (25 ft).

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2618-248	YA333-R	8-Port RS-232 Asynchronous LIM cable (shielded CL2), 15.2 m (50 ft).
2618-249	YA333-V	8-Port RS-232 Asynchronous LIM cable (shielded CL2P), 15.2 m (50 ft).
2618-398	YA333-S	8-Port RS-232 Asynchronous LIM cable (shielded CL2), 60.8 m (200 ft).
2618-399	YA333-W	8-Port RS-232 Asynchronous LIM cable (shielded CL2P), 60.8 m (200 ft).
2629-2	GK431-A	Integrated Communications Adapter (ICA).
2630-3	TN111-B	IEEE 802.3 transceiver.
2630-4	YA331-A	IEEE 802.3 transceiver tap block.
2631-2	TN112-C	IEEE 802.3 multiplexer, 120/240 V ac, 50/60 Hz.
2632-1	TN114-B	IEEE 802.3 repeater, 120/240 V ac, 50/60 Hz.
2633-1	YA302-A	IEEE coaxial cable splice kit.
2633-2	YA301-A	IEEE coaxial cable terminator kit.
2634-23	YA304-A	IEEE 802.3 (Ethernet) coaxial cable, CL2P, 23.4 m (76.8 ft) with terminators.
2634-70	YA304-B	IEEE 802.3 (Ethernet) coaxial cable, CL2P, 70.2 m (230.3 ft) with terminators.

(Continued)

Table 10-7. CDCNET Product/Equipment Cross-Reference *(Continued)*

Product Number	Equipment Number	Nomenclature
2634-117	YA304-C	IEEE 802.3 (Ethernet) coaxial cable, CL2P, 117 m (383.8 ft) with terminators.
2634-500	YA304-D	IEEE 802.3 (Ethernet) coaxial cable, CL2P, 500 m (1640.5 ft) with terminators.
2635-21	YA303-E	IEEE 802.3 (Ethernet) coaxial cable, CL2, 23.4 m (76.8 ft) with terminators.
2635-68	YA303-F	IEEE 802.3 (Ethernet) coaxial cable, CL2, 70.2 m (230.3 ft) with terminators.
2635-115	YA303-G	IEEE 802.3 (Ethernet) coaxial cable, CL2, 117 m (383.8 ft) with terminators.
2635-498	YA303-H	IEEE 802.3 (Ethernet) coaxial cable, CL2, 500 m (1640.5 ft) with terminators.
2650-1	GH486-A	Three-DI Cabinet, 120 V ac, 60 Hz.
2650-2	GH486-B	Three-DI Cabinet, 240 V ac, 50 Hz.
2651-1	GH487-A	DI Enclosure Table.
2652-1	TN113-B	Maintenance Console Option.
2653-2	YA332-A	CDCNET Maintenance Kit.

Appendixes

Glossary A

Glossary A

A

Alarm

A log message that is routed to an operator. Any CDCNET log message may be designated as an alarm.

Asynchronous Protocol

The communications protocol enabling the transmission of data as characters individually synchronized by start/stop bits.

B

Bell 113

A modem protocol similar to Bell 103.

Bell 212

A dual-mode modem protocol featuring full-duplex transmission at speeds up to 300 baud using the 103 protocol or up to 1200 baud using a phase-shifted carrier.

Bus

1. (ANDIPS) One or more conductors used for transmitting signals or power.
2. A hardware arrangement in which processors and storage components are attached to a shared transmission medium.

Bus Structure

Refer to Bus.

Byte

1. (ISO) A binary character string operated upon as a unit and usually shorter than a computer word.
2. (ISO) A group of contiguous bits. Unless prefixed (for example, a 6-bit byte), the term implies 8-bit groups. An 8-bit byte is sometimes called an octet. When used for encoding character data, a byte represents a single character.

C

Carrier Sense Multiple Access/Collision Detect (CSMA/CD)

A communications protocol that performs the following three functions:

1. Carrier sense enables a communications medium or communications processor to detect any traffic currently active in a network circuit.
2. Multiple access enables a communications medium or communications processor to send a message whenever it senses that the circuit is not busy.

3. Collision detect enables a communications medium or communications processor to sense when a collision occurs on a circuit between data transmitted from different sources. When a collision is detected, the data transmission stops, and the transmitting sources wait for a preset interval before beginning their transmissions again.

Catenet

Refer to Concatenated Network.

CCITT

Refer to Consultative Committee of International Telephone and Telegraph.

CDCNET

Refer to Control Data Distributed Communications Network.

Central Processor Unit (CPU)

The high-speed arithmetic processing unit that carries out the basic instructions required in program execution.

Character

(ISO) A member of a set of elements upon which agreement has been reached, and that is used for the organization, control, or representation of information. Characters may be letters, digits, punctuation marks, or other symbols. A character can be a graphic character or a control character.

CIM

Refer to Communications Interface Module.

Coaxial Cable

A transmission cable that provides large bandwidth and high data/low error rates. This cable contains a central carrier wire surrounded by fine copper mesh and/or an aluminum sleeve.

A two-conductor (center conductor, shield system), concentric, constant-impedance transmission line used as the trunk medium in the baseband system.

Coaxial Cable Segment

A length of coaxial cable made up from one or more coaxial cable sections and coaxial connectors, and terminated at each end in its characteristic impedance.

Communication Line

A terminal line that establishes a complete communication circuit between a terminal or workstation and a CDCNET device interface.

Communications Interface Module (CIM)

The logic board within a CDCNET device interface that controls transmissions between the line interface module (LIM) bus and the internal system bus (ISB).

Computer Network

A linked collection of data processing and communications equipment.

Concatenated Network (Catenet)

A communications network composed of more than one type of communications medium (more than one network solution); often established when it is necessary to interconnect a local area network (LAN) with other resources (for example, another local area network, or geographically remote computer-related resources). Also called a catenet.

Configuration

The process by which various computer-related resources are coordinated to function together. Under CDCNET, various types of configuration activities are performed.

1. Network configuration, whereby hosts, terminals, workstations, and unit record devices are interconnected into a network using CDCNET device interfaces and appropriate communications media.

2. Device interface hardware configurations, whereby decisions are made regarding which logic boards to install in a particular CDCNET device interface.

3. Device interface software configuration, whereby CYBER hosts decide which CDCNET software to downline-load into a specific CDCNET device interface.

4. Creation of device interface configuration files, whereby network administrators or communications consultants identify/describe the specific CDCNET device interfaces that reside in their networks and place this information in host-maintained permanent files.

See also Logical Configuration.

Consultative Committee of International Telephone and Telegraph (CCITT)

An organization chartered by the United Nations to develop and publish international standards for the communications industry.

Control Data Distributed Communications Network (CDCNET)

1. The collection of compatible hardware and software products offered by Control Data to interconnect computer resources into distributed communications networks.

2. A network that is interconnected by Control Data Network Architecture (CDNA)-compatible hardware and software products.

CPU

Refer to Central Processor Unit.

CSMA/CD

Refer to Carrier Sense Multiple Access/Collision Detect.

D

Data Circuit-Terminating Equipment (DCE)

1. In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line in a data station. The DCE may be separate equipment or an integral part of the DTE or of intermediate equipment. The DCE may perform other functions that are normally performed at the network end of the line.

2. The hardware that links data terminating equipment (DTE) to communications media. Data communications equipment is normally a modem or modem equivalent (data set).

Data Communication

The interchange of data messages from one point to another over communications channels.

Data Set

A hardware interface that transforms analog to digital data and the converse. A data set is a modem capable of using telephone lines.

Data Terminal Equipment (DTE)

1. That part of a data station which serves as a data source, data sink, or both.

2. Data communications equipment that allows human interaction with the databases and operations of a network.

Data Transmission

The passing of information over physical media from source to receiver.

DCE

Refer to Data Circuit-Terminating Equipment.

DCNS

Refer to Distributed Communications Network Software.

Deadman Timeout (DMTO)

A device interface hardware reset that occurs automatically if software does not work normally for 10 seconds.

Dedicated Line

A communication line that permanently connects a terminal to a device interface. Contrast with Switched Line.

Default

A pre-selected value supplied for a missing parameter upon the entry of a command or subcommand.

Default Parameter Settings

The command parameter values to be assumed when no alternate values are supplied by the user.

Device Interface (DI)

The communications processor that Control Data offers as its CDCNET hardware product. Also called a CDCNET device interface.

Device Interface Dump Analyzer

Host-resident software that processes device interface dump files.

Device Interface Resident Debugger (DIRD)

A software utility that enables software developers to debug their own CDCNET software. The DIRD is controlled from an interactive terminal connected to the device interface's main processor board (MPB).

DI

Refer to Device Interface.

DI Cabinet Configuration Form

A document that contains hardware configuration information for a specific device interface.

Diagnostic

1. Software and/or microcode that isolates failing hardware/software components within a CDCNET device interface.
2. A message indicating a malfunction within a CDCNET device interface or one of its related communications media.

Diagnostic Initialization Processor (DIP)

Part of Diagnostic Management Services (DMS).

Diagnostic Management Services (DMS)

The device interface maintenance software that provides support to the device interface software and the online diagnostics.

DIP

Refer to Diagnostic Initialization Processor.

DIRD

Refer to Device Interface Resident Debugger.

Distributed Communications Network Software (DCNS)

The software that executes in a device interface as part of the CDCNET product.

DMS

Refer to Diagnostic Management Services.

DMTO

Refer to Deadman Timeout.

DTE

Refer to Data Terminal Equipment.

Duplex

1. In data communication, pertains to an independent transmission that alternates one way at a time.
2. Refer to Full Duplex.

E

EEPROM

Refer to Electronically Erasable Programmable Read Only Memory.

Electronically Erasable Programmable Read Only Memory (EEPROM)

Read only memory that can be updated dynamically by the software at configuration time.

ESCI

Refer to Ethernet Serial Channel Interface.

Ethernet

A baseband local area network protocol developed by the Xerox Corporation. CDCNET supports an Ethernet-compatible network.

Ethernet Serial Channel Interface (ESCI)

The logic board within a CDCNET device interface that controls transmissions between an Ethernet (IEEE 802.3) transceiver and the internal system bus (ISB) of the device interface.

F

FDX

Refer to Full Duplex.

Fiber Optic Link

An interconnection method that provides a means for routing the network through hazardous environments or between buildings.

Firmware

Microcode that is contained in Read-only Memory (ROM). In the device interface, on-board diagnostics and bootstrap are examples of firmware.

Four-wire Circuit Transmission

A transmission arrangement in which two half duplex circuits (two wires each) are combined to make one full duplex circuit.

Full Duplex (FDX)

Simultaneous independent transmission in both directions. Also called Duplex. Contrast with Half Duplex.

H

Half Duplex (HDX)

In data communication, pertains to an independent transmission that alternates one way at a time. Contrast with Full Duplex.

Hardware

1. (ISO) Physical equipment as opposed to programs, procedures, rules, and associated documentation.

2. Electronic circuitry and its housing, including cabinetry, power hook-up, and cooling system.

Hardware Performance Analyzer (HPA)

A set of programs that generate equipment and media performance reports using data collected by NOS or NOS/VE.

HDLC

Refer to High-Level Data Link Control.

HDX

Refer to Half Duplex.

Hertz (Hz)

A unit of electrical frequency equal to one cycle per second.

High-Level Data Link Control (HDLC)

The International Standards Organization's (ISO) bit-oriented protocol for the data link layer of the Open Systems Interconnection (OSI) reference model.

Host

Refer to Host Computer.

Host Computer

A mainframe computer system, connected to a communications network, which provides primary services, such as database access, user application execution, or program compilation. For CDCNET, a host computer provides network support functions, including maintenance of device interface load files. Also called a host.

Host Console

The keyboard and display screen used to manage the host computer. Also used in CDCNET to access the Network Operator Utility (NETOU) to monitor and control the CDCNET. See also System Console.

Host Operating System

The host containing applications and maintenance software available to the device interface.

HPA

Refer to Hardware Performance Analyzer.

I

ICA

Refer to Integrated Communications Adapter.

ICA Channel Interface (ICI)

The ICI is the I/O subsystem in the ICA that interfaces to a CYBER 180 channel.

ICA Ethernet Interface (IEI)

The IEI is the I/O subsystem in the ICA that interfaces to the Ethernet.

ICA-II

See Integrated Communications Adapter

ICB

Refer to Internal Control Bus.

ICI

Refer to ICA Channel Interface.

IEEE

Institute of Electrical and Electronics Engineers.

IEEE 802.3

A subset of IEEE 802 that defines line protocol and media access technology for local area networks that use a bus employing CSMA/CD.

IEI

Refer to ICA Ethernet Interface.

Inline Diagnostic

The inline diagnostic tests the MCI hardware by transmitting and receiving messages across the MCI interface. This diagnostic can be run during system operation.

Institute of Electrical and Electronics Engineers (IEEE)

The IEEE Computer Society promotes cooperation and exchange of technical information among its members. Through conferences, committee work, publications, and other information exchanges, the IEEE has established several data processing standards (for example, the IEEE standard 802).

Integrated Communications Adapter (ICA-II)

A hardware device that connects a single 16-bit Integrated Controller Interface (ICI) channel of a CYBER 930 host computer to CDCNET. The ICA is a logic board installed in a CYBER 930 series mainframe and allows the CYBER 930 to connect directly to Ethernet.

There have been two versions of the ICA. The original version , model 2629-1, is no longer available and does not work with release 1.5.1 and above CDCNET software. The current version, model 2629-2, is required for CDCNET release 1.5.1 and above. The 2629-2 is also called the ICA-II.

Interface

A mechanism that enables the exchange of data between two dissimilar resources in a communications network.

Internal Control Bus (ICB)

The part of the internal system bus (ISB) that forwards status and interrupt messages from the main processor board (MPB) to other boards in the device interface.

Internal System Bus (ISB)

The circuit within a CDCNET device interface that relays signals between the logic boards of the device interface.

Internal Transfer Bus (ITB)

The part of the internal system bus (ISB) that relays general-purpose signals between the major device interface boards.

ISB

Refer to Internal System Bus.

ITB

Refer to Internal Transfer Bus.

L

LAN

Refer to Local Area Network.

LED

Light-emitting diode.

LIM

Refer to Line Interface Module.

Line Interface Module (LIM)

A smaller logic board within a CDCNET device interface that enables the device interface to be attached to terminal, workstation, and unit record equipment lines.

Link

1. Any specified relationship between two device interfaces in a network, or a communication path between two device interfaces, or a data link.
2. The communications path between two device interfaces. Also called a line, channel, or circuit.

Local Area Network (LAN)

A privately owned communications network that interconnects computer-related resources. Typically, the resources interconnected by this network are confined to a relatively concise geographic area, such as a single building.

A privately owned network that interconnects data processing equipment to provide high speed communication. Allows users and services to exchange messages and share resources.

Log Message

A message written into a permanent file on a CYBER host describing an operational event affecting network resources.

Logic Board

A printed circuit board with data storage and/or processing components installed; sometimes called a board, card, or module.

Loopback Test

A failure management test that checks the integrity of a hardware element by sending data through the element and back again.

M

Main Processor Board II (MPB-II)

Processor board containing a high performance architecture consisting of MC68030 32-bit processor and 512 K bytes of local onboard memory.

Main Processor Board (MPB)

The logic board within a CDCNET device interface that provides the primary processing power for the device interface.

Mainframe Channel Interface (MCI)

An optional logic board within a CDCNET device interface that connects the device interface to a 12-bit CYBER host channel.

Mainframe Device Interface (MDI)

The CDCNET device interface variant that interconnects a 12-bit channel of host computers operating under NOS or NOS/VE with an Ethernet (IEEE 802.3) local area network.

Mainframe/Terminal Device Interface (MTI)

The CDCNET device interface variant that interconnects 12-bit NOS and NOS/VE host computers with terminals, workstations, and unit record equipment without requiring a local area network.

Maintenance Console Option (MCO)

An optional CDCNET product that allows an RS-232-C ASCII terminal or modem to be connected directly to the main processor board (MPB) for test purposes.

Maintenance Host

In CDCNET, a NOS or NOS/VE host responsible for collection of all network errors and production of error analysis reports.

Maintenance Software

Software designed to perform system tests and diagnostics. All CDCNET maintenance software is onboard and online.

Mark

Presence of a signal. Equivalent to a binary one condition. CDCNET does not support mark parity processing (parity bit always set to one) for asynchronous terminals.

MCI

Refer to Mainframe Channel Interface.

MCO

Refer to Maintenance Console Option.

MDI

Refer to Mainframe Device Interface.

Modem Eliminator

A wiring device that replaces two modems. It connects equipment over a distance of up to several hundred feet. Also called a null modem.

Modulation

A message signal that is impressed on a carrier signal and transmitted at another signal frequency.

MPB

Refer to Main Processor Board.

MPB-II

Refer to Main Processor Board II.

MTI

Refer to Mainframe/Terminal Device Interface.

Multiplexer (MUX)

Equipment that enables a site to concentrate data transmission between multiple slower-speed devices (such as terminals and workstations) and a higher-speed channel. For example, a multiplexer can concentrate data being transmitted between multiple terminals and a host computer by using a local area network.

Multiplexing

1. (ISO) In data transmission, a function that permits two or more data sources to share a common transmission medium such that each data source has its own channel.

2. The division of a transmission facility into two or more channels.

MUX

Refer to Multiplexer.

N

N-Connector

A type of coaxial cable connector that is used on the segment cable of the local area network (LAN).

NAM K Display

A display on the host console screen that allows operator interface to Network Access Method (NAM). A CDCNET operator at the host console communicates with the CDCNET through the NAM K display.

NDI

Refer to Network Device Interface.

NETOU

Refer to Network Operator Utility.

Network

An interconnected set of host computers, terminals, workstations, and unit record equipment. Refer also to Local Area Network and Concatenated Network.

Network Architecture

A set of functional layers in which each layer performs a specific set of functions and services; together, the layers interact to provide total, end-to-end network operation. Each layer uses a protocol and has its relationship with other layers defined.

Network Device Interface (NDI)

The standard CDCNET device interface variant that transfers data between networks (for example, between two local area networks; between a local area network and a communications line; or between a local area network and a public data network).

Network Identifier

A unique identifier (32-bit character string) assigned to a network solution.

Network Operating System (NOS)

The software that controls data processing and storage in a CYBER 170 mainframe or a CYBER 180 mainframe (running NOS only or dual-state). CDCNET files stored and processed in CYBER 170 mainframes, such as configuration and boot files, network log files, and CDCNET host applications, are run under the Network Operating System.

The operating system for CYBER 170 computer systems.

Network Operating System/Virtual Environment (NOS/VE)

The software that controls data processing and storage in CYBER 180 mainframes. CDCNET files stored and processed in CYBER 180 mainframes, such as configuration and boot files, network log files, and CDCNET host applications, are run under the Network Operating System/Virtual Environment.

Network Operator

A person who monitors CDCNET activity, has the ability to control CDCNET hardware and software, makes occasional network configuration changes, and performs elementary troubleshooting by sending commands to the network's device interfaces. A network operator may perform these tasks from a host console or a remote terminal.

Network Operator Utility (NETOU)

A group of programs residing on a host computer and in a (NOS) mainframe device interface or mainframe terminal interface connected to the mainframe. NETOU allows a network operator to access, monitor, control, and configure a CDCNET from the host console or a remote terminal. Using NETOU, network operators can send CDCNET operations commands to specific device interfaces or to all the device interfaces in the network.

Network Performance Analyzer (NPA)

The CDCNET software utility that generates statistical reports based on its analysis of the network log file or generates event/error reports based on log messages in the network log file.

Non-Data Caller

Any use of an input/output device that does not involve the transfer of data.

NOS

Refer to Network Operating System.

NOS/VE

Refer to Network Operating System/Virtual Environment.

NPA

Refer to Network Performance Analyzer.

O

Onboard

ROM-resident; for example, the self-test diagnostics in the device interface.

Online Diagnostics

Optional diagnostics for the device interface that can be executed while the device interface is connected to and operating as part of the CDCNET.

Open System Interconnection (OSI)

The International Standards Organization's (ISO's) reference model for network processing. This model is based on a network architecture that segregates network functions into seven layers.

OSI

Refer to Open System Interconnection.

P

Packet

A group of binary digits, including data and control elements, switched and transmitted as a data unit by communications networks. The packet's data, control signals, and error-control information are arranged in a specific format. Different types of networks use different sizes of packets.

Packet-Switching

1. A data transmission process using addressed packets whereby a channel is occupied only for the duration of transmission of the packet.
2. The process by which data packets are placed on the channel and travel to the destination.
3. A method of transmitting messages through a communications network in which long messages are subdivided into short packets with a maximum length.

Parallel Port

An I/O port that transmits bits of data (usually a byte) simultaneously. Contrast with Serial Port.

Parallel Transmission

A method of transmission in which each bit within a unit of information (usually a byte) is sent simultaneously on a single channel. Contrast with Serial Transmission.

Parity Check

An error detection method in which an extra bit is added to data to make the number of 1s in each grouping of bits either always odd (for odd parity), or always even (for even parity).

PDN

Refer to Public Data Network.

Phase 1QL

A part of the on-board self-test that is run without MPB intervention. For example, the MC68K test in a CIM.

Phase 2QL

The portion of a device test that follows phase 1 and requires MPB intervention. For example, a test of the CIM-SMM link.

PMM

Refer to Private Memory Module.

Point-to-Point Connection

A network configuration in which a connection is established between two device interfaces.

PP

Peripheral processor.

Private Memory Module (PMM)

An optional device interface board with 128K bytes of static RAM dedicated to the main processor board (MPB) for code execution.

The logic board within a CDCNET device interface that provides additional random access memory dedicated for use by the main processor board (MPB) of the device interface.

Program EEPROM

Refer to Program Electronically Erasable Programmable Read Only Memory.

Program Electronically Erasable Programmable Read Only Memory (Program EEPROM)

Contains the boot and diagnostic code for the MPB-II. Also contains the PMMU translation tables. Mostly synonymous with MPB ROM on the MPB-I. See also EEPROM.

Protocol

A set of conventions that must be followed to achieve complete communications between the computer-related resources in a network. A protocol can reflect the following:

1. A set of pre-defined coding sequences, such as the control byte envelopes added to (or removed from) data exchanged with a terminal.

2. A set of data addressing and division methods, such as the block mechanism used between a network application program and Network Access Method.
3. A set of procedures that control communications, such as the supervisory message sequences used between a network application program and Network Access Method.

Public Data Network (PDN)

A commercial packet-switching network that supports the communications interface described in CCITT protocol X.25.

Q

Quicklook

A process whereby maintenance software is selected to run in a minimum amount of time. This is usually done by varying parameters such as section selection.

R

Read-Only Memory (ROM)

An organized collection of files including file attributes and names residing in a real system as opposed to FTAM, which uses a virtual filestore system. Within FTAM, NOS/VE is considered to be a real filestore system. //PUB

A data storage device. Storage with contents that can be altered only under certain circumstances. Storage that cannot be written over. Also permanent storage.

Remote Terminal Interface (RTI)

The CDCNET device interface variant that functions as a remote line concentrator for RS-232-C lines.

A type of device interface that acts as a remote line concentrator for RS-232 lines. An RTI provides CDCNET access to remote terminal users by connecting a remote terminal device interface (TDI) to an Ethernet-connected network device interface (NDI) via one or more HDLC trunks. Services and interfaces to a user connected to an RTI are the same as those available via a TDI connected to Ethernet.

Repeater

A network device that extends the network service beyond one 500-meter (1639.3-ft) length of segment cable.

Reverse Channel

An answer-back channel provided during half-duplex operation. Allows the receiving modem to send low-speed acknowledgments to the transmitting modem without breaking the half-duplex mode. Also used to arrange the turnaround between modems so that one ceases transmitting and the other begins.

ROM

Refer to Read-Only Memory.

RS-232-C

An Electrical and Electronic Industries Association (EIA) standard that describes the interface between terminals or other Data Terminal Equipment (DTE) and modems or other Data Communications Equipment (DCE) employing a serial binary interchange.

RS-422/423

1. Electrical and Electronic Industries Association Level 1 standards for Data Terminal Equipment (DTE) that regulate the physical link between Data Communications Equipment (DCE).

2. Electrical and Electronic Industries Association standards designed to replace RS-232. RS-422 defines electrical characteristics of a balanced interface. RS-423 defines electrical characteristics of an unbalanced interface.

RS-449

1. A physical interface standard for data communications used with high speeds and long communication lines.

2. A newer standard than RS-232-C, also used for serial communications. Eventually meant to replace RS-232-C, but backward compatibility is specified in RS-449.

RTI

Refer to Remote Terminal Interface.

S

SDLC

Refer to Synchronous Data Link Control.

Segment Cable

Refer to Coaxial Cable.

Serial Port

An I/O port that transmits data out one bit at a time. Contrast with Parallel Port. RS-232-C is a common serial-signaling protocol.

Serial Transmission

1. The sequential transmission of the bits constituting an entity of data over a data circuit.

2. In data communication, transmission at successive intervals of signal elements constituting the same telegraph or data signal. The sequential elements may be transmitted with or without interruption, provided they are not transmitted simultaneously. For example, telegraph transmission by a time-divided channel.

3. A method of data transmission in which each bit of information is sent sequentially on a single channel. Contrast with Parallel Transmission.

SMM

Refer to System Main Memory.

SMM4

A 4 M byte version of the SMM (see System Main Memory).

Start Bit

In asynchronous transmission, the bit that synchronizes the receiver's. At least one start bit is sent to the receiver prior to the start of each character; the start bit always has a value of zero.

Stop Bit

In asynchronous transmission, the bit that ends a character's frame. One stop bit is sent to the receiver after the end of each character; the stop bit always has a value of one.

Switched Line

A communication line connected with one device interface, but able to be connected to any one of several terminals via a switching mechanism, such as a dialed telephone line. Contrast with Dedicated Line.

Sync Character

A character sent from a transmitting station for the purpose of synchronizing the clocks in the transmitting and receiving stations.

Synchronous Data Link Control (SDLC)

Bit-oriented data link control protocol developed by International Business Machines (IBM).

Synchronous Transmission

Transmission in which the data characters are transmitted at a fixed rate with the transmitter and receiver synchronized.

System Console

A component of a host operating system that is used to monitor and control the operating system. The system console can also be used to monitor and control CDCNET through the Network Operator Utility (NETOU). See also Host Console.

System Main Memory (SMM)

A device interface board with 1024K byte increments of dynamic RAM accessible by all interfaces and the resident main processor board (MPB).

T

TDI

Refer to Terminal Device Interface.

TDR

Refer to Time Domain Reflectometer.

Terminal

An operator input/output device used for communication on the network.

Terminal Device Interface (TDI)

The CDCNET device interface variant that interconnects terminals, workstations, and unit record devices with an Ethernet local area network.

Terminal Interface Program (TIP)

CDCNET software that resides in terminal device interfaces (TDIs) and enables terminals/workstations that employ specific terminal protocols (such as async, HASP, and IBM 3270) to communicate in CDCNET networks.

Terminator

An electrical/mechanical component that is used to terminate a cable in its characteristic impedance.

Time Domain Reflectometer

A test device used to check out the network cabling by identifying the location and nature of each discontinuity on the cable.

TIP

Refer to Terminal Interface Program.

Transceiver

A hardware device that is used to interconnect network devices.

Transceiver Interface Cable

A multiwire cable used to connect a transceiver to a network device.

Trunk

A logical definition of a line and the communications software that allows the line to carry data between communications controllers. These controllers could be device interfaces or devices for other networks. Trunks going to other networks, such as DECNET or SNA, are not recognized as network solutions.

Medium through which data communications can occur.

Trunk Cable

Refer to Coaxial Cable.

U

Unit Record Device

A peripheral device (for example, a line printer, card reader, or card punch) whose unit of input/output corresponds to a logical record on a host computer.

Unit Record Interface (URI)

An interface board that provides for CDCNET attachment to peripheral devices. Refer to Unit Record Device.

URI

Refer to Unit Record Interface.

V

V.35

CCITT standard for the physical interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) operating above 20 K bps.

Segment, Transceiver, and LIM Cable Information B

Segment, Transceiver, and LIM Cable Information B

This appendix provides information on the cables you use to connect your network. It is divided into three areas.

- Segment cables - Product, equipment, and part numbers for the Ethernet coaxial segment cable.
- Transceiver interface cables - Product, equipment and part numbers for the transceiver cables.
- LIM cables - Product, equipment, and part numbers for the LIM cables and also which cables to use for each application.

Segment Cables

Control Data segment cables come in four standard lengths and are provided with a terminator installed at each end. Tables B-1, B-2, and B-3 provide product, equipment, and part numbers. Choose either CL2 (table B-1) or CL2P (table B-2) cables, depending on your installation. The CL2 (class 2) and and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-3 are an older type that is no longer offered or recommended by Control Data. They are shown here only so you can cross-reference to a newer type when ordering replacements.

Table B-1. Ethernet Coaxial Cables (CL2)

Product Number	Equipment Number	Part Number	Description
2635-21	YA303-E	10302985	23.4 m (76.8 ft)
2635-68	YA303-F	10302986	70.2 m (230.3 ft)
2635-115	YA303-G	10302987	117 m (383.3 ft)
2635-498	YA303-H	10302988	500 m (1640.5 ft)

Table B-2. Ethernet Coaxial Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
2634-23	YA304-A	53590834	23.4 m (76.8 ft)
2634-70	YA304-B	53590835	70.2 m (230.3 ft)
2634-117	YA304-C	53590836	117 m (383.3 ft)
2634-500	YA304-D	53590837	500 m (1640.5 ft)

Table B-3. Ethernet Coaxial Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
2635-23	YA303-A	53590839	23.4 m (76.8 ft)
2635-70	YA303-B	53590840	70.2 m (230.3 ft)
2635-117	YA303-C	53590841	117 m (383.3 ft)
2635-500	YA303-D	53590842	500 m (1640.5 ft)

Transceiver Interface Cables

Tables B-4 through B-7 show the transceiver interface cables that are available from Control Data.

Tables B-4, B-5, and B-6 describe cables used with TN111B transceivers. Choose TN111B cables from either table B-4 (CL2) or table B-5 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC). Cables in table B-6 are an older type that is no longer offered or recommended by Control Data. They are shown here only so you can cross-reference to a newer type when ordering replacements.

Table B-7 describes cables used with TN111A transceivers. Control Data does not offer CL2 or CL2P versions of these cables.

Table B-4. Transceiver Interface Cables (CL2 for TN111B Transceivers)

Product Number	Equipment Number	Part Number	Description
2608-114	YA329-E	10303272	5.0 m (16.4 ft)
2608-131	YA329-F	10303273	10.0 m (32.8 ft)
2608-163	YA329-G	10303274	20.0 m (65.6 ft)
2608-98	YA329-H	10303275	50.0 m (164 ft)

Table B-5. Transceiver Interface Cables (CL2P for TN111B Transceivers)

Product Number	Equipment Number	Part Number	Description
2608-216	YA328-A	22120970	5 m (16.4 ft)
2608-233	YA328-B	22120971	10 m (32.8 ft)
2608-265	YA328-C	22120972	20 m (65.6 ft)
2608-200	YA328-D	22120973	50 m (164 ft)

Table B-6. Transceiver Interface Cables (Older Type for TN111B Transceivers)

Product Number	Equipment Number	Part Number	Description
2608-116	YA329-A	22120965	5 m (16.4 ft)
2608-133	YA329-B	22120966	10 m (32.8 ft)
2608-165	YA329-C	22120967	20 m (65.6 ft)
2608-100	YA329-D	22120968	50 m (164 ft)

B

Table B-7. Transceiver Interface Cables (Use with TN111A Transceivers)

Product Number	Equipment Number	Part Number	Description
None	TN110-A	24620036	3.0 m (10 ft)
None	TN110-B	24620038	15.2 m (50 ft)
None	TN110-C	24620039	30.4 m (100 ft)

For reference, table B-8 shows transceiver connector pin assignments.

Table B-8. Transceiver Connector Pin Assignments

Pin		Use
3	DO-A	Data Out circuit A
10	DO-B	Data Out circuit B
11	DO-S	Data Out circuit Shield
5	DI-A	Data In circuit A
12	DI-B	Data In circuit B
4	DI-S	Data In circuit Shield
7	CO-A	Control Out circuit A
15	CO-B	Control Out circuit B
8	CO-S	Control Out circuit Shield
2	CI-A	Control In circuit A
9	CI-B	Control In circuit B
1	CI-S	Control In circuit Shield
6	VC	Voltage Common[1]
13	VP	Voltage Plus[1]
14	VS	Voltage Shield
Shell	PG	Protective Ground (Conductive Shell)

1. Voltage Plus and Voltage Common use a single twisted pair in the cable.

LIM Cables

This section provides information about the cables you use to connect your terminal devices to the DI Line Interface Modules (LIMs). There are various Control Data standard types of cables that cover the majority of devices. However, in some cases, adapters and/or special wiring might be required. The following information will help you determine if the standard cables will work on your equipment or if special cables/adapters are required. The information is presented in the following order:

- Selecting the right LIM cable - Describes which cable to use, according to equipment requirements.
- CDCNET 4-Port RS-232-C LIM cable information including:

  Product, equipment, and part numbers

  RS-232-C signals supported and signal/pin definitions for CDCNET cables
- CDCNET 8-Port RS-232 Asynchronous LIM cable information including:

  Product, equipment, and part numbers

  RS-232-C signals supported and signal/pin definitions for CDCNET cables
- CDCNET RS-449 LIM cable information including:

  Product, equipment, and part numbers

  RS-449 signals supported and signal/pin definitions for CDCNET cables
- CDCNET X.24 LIM cable information including:

  Product, equipment, and part numbers

  X.24 signals supported and signal/pin definitions for CDCNET cables
- CDCNET URI LIM cable information including:

  Product, equipment, and part numbers

  Centronics and Data Products signals supported and signal/pin definitions for CDCNET cables
- CDCNET V.35 LIM cable information including:

  Product, equipment, and part numbers

  V.35 signals supported and signal/pin definitions for CDCNET cables

Selecting the Right LIM Cable

Table B-9 shows the LIM cable to use with standard data terminal equipment (DTE) configurations. All specified asynchronous connections are usable with interactive terminal passthrough.

Table B-9. LIM Cables for Standard DTE Configurations

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
DTE with male connector using hardware flow control, and RS-232-C as the electrical interface.	4-Port RS-232-C	2612-1	2612-6xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-50
DTE with male connector using software flow control, and RS-232-C or CCITT V.24 as the electrical interface.	4-Port RS-232-C	2612-1	2612-5xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-50
DTE with female connector using hardware flow control, and RS-232-C or CCITT V.24 as the electrical interface.	4-Port RS-232-C	2612-1	2612-8xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-51
DTE with female connector using software flow control, and RS-232-C or CCITT V.24 as the electrical interface.	4-Port RS-232-C	2612-1	2612-7xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-51
IBM 3270 controller support. Synchronous or Asynchronous without hardware flow control.	4-Port RS-232-C	2612-1	2612-5xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-50

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

(Continued)

Table B-9. LIM Cables for Standard DTE Configurations *(Continued)*

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
IBM 3270 controller support. Asynchronous only with hardware flow control.	4-Port RS-232-C	2612-1	2612-6xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-50
Printer (DTE) with Centronics interface.	URI	2613-1	2613-1xx
Printer (DTE) with Data Products long-line interface.	URI	2613-1	2613-2xx[2]
DTE with male connector using RS-449, RS-422/V.11, or RS-423/V.10 as the electrical interface.	RS-449	2610-1	2610-5xx
DTE with male connector having 0.060-in diameter pins, and using CCITT or AT&T V.35 as the electrical interface.	V.35	2617-1	2617-5xx
DCE with female connector conforming to ISO 4903-1980(E) and CCITT X.24.	X.24	2611-1	2611-1xx

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

2. Some connections may require the URI adapter cable (2613-301).

Table B-10 shows the LIM cable to use with specific DTE equipments. All specified asynchronous connections are usable with Interactive Terminal Passthrough.

Table B-10. LIM Cables to Use with Specific DTE Equipments

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
Control Data 790 Digital Equipment Corporation Decwriter I/II (male connector option) Digital Equipment Corporation VT-100	4-Port RS-232-C	2612-1	2612-6xx
Hazeltine Corporation 2000 PC Compatible (Zenith Eelectronics Corporation Z-150) Tektronix, Inc. 4014, 4109, 4114, 4115 Teletype Corporation M43 Zenith Electronics Corporation Z-19, Z-29, Z-150.	8-Port RS-232-C	2618-1	2618-1xx 2618-50
Control Data CYBER 120 (HASP), BARR, HASP, PC Products.	4-Port RS-232-C	2612-1	2612-5xx
Control Data 533-1, 536-1, 713-10 721, 722-30, 751, 752, 753, IST II	4-Port RS-232-C	2612-1	2612-8xx
Digital Equipment Corporation Decwriter I/II (female connector option) Hazeltine Corporation Esprint II.	8-Port RS-232-C	2618-1	2618-1xx 2618-51
Control Data CYBER 18-xx (HASP), Control Data 537 Printer.	4-Port RS-232-C	2612-1	2612-7xx
IBM 3274 controller support. Synchronous without hardware flow control.	4-Port RS-232-C	2612-1	2612-5xx,
IBM 3274 controller support. Synchronous with hardware flow control.	4-Port RS-232-C	2612-1	2612-6xx

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

(Continued)

Table B-10. LIM Cables to Use with Specific DTE Equipments *(Continued)*

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
Centronics 353 printer with long-line interface.	URI	2613-1	2613-1xx
Control Data 585 printer, Centronics PB1600 printer with Data Products long-line interface.	URI	2613-1	2613-2xx[2]

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

2. Some connections may require the URI adapter cable (2613-301).

Table B-11 shows the LIM cable to use with standard data communications equipment (DCE) configurations. All DCE equipment is assumed to have female connectors. No accommodation has been made for DCE equipment with male connectors. All specified asynchronous connections are usable with interactive terminal passthrough.

Table B-11. LIM Cables for Standard DCE Configurations

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
DCE with female connector using DCE flow control and DCD disconnect, and using RS-232-C or CCITT V.24 as the electrical interface.	4-Port RS-232-C	2612-1	2612-1xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-11
DCE with female connector using DCE flow control and DSR disconnect, and using RS-232-C or CCITT V.24 as the electrical interface.	4-Port RS-232-C	2612-1	2612-1xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-21
DCE with female connector using DCE flow control and Non-Data Caller, and using RS-232-C or CCITT V.24 as the electrical interface.	4-Port RS-232-C	2612-1	2612-1xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-31
DCE with female connector using DCE flow control, DCD disconnect, and modem Make-Busy, and using RS-232-C or CCITT V.24 as the electrical interface.	8-Port RS-232-C	2618-1	2618-1xx 2618-11
DCE with female connector using DCE flow control, DSR disconnect, and modem Make-Busy, and using RS-232-C or CCITT V.24 as the electrical interface.	8-Port RS-232-C	2618-1	2618-1xx 2618-21

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

(Continued)

Table B-11. LIM Cables for Standard DCE Configurations *(Continued)*

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
DCE with female connector using DCE flow control, Non-Data Caller, and modem Make-Busy, and using RS-232-C or CCITT V.24 as the electrical interface.	8-Port RS-232-C	2618-1	2618-1xx 2618-31
DCE with female connector using RS-449, RS-422/V.11, or RS-423/V.10 as the electrical interface.	RS-449	2610-1	2610-1xx
DCE with female connector for 0.060-in diameter pins, with single lead jackscrew connector locking mechanism, and using CCITT or AT&T V.35 as the electrical interface.	V.35	2617-1	2617-1xx
DCE with female connector for 0.040-in diameter pins, with spring clip and guide pin connector locking mechanism, and using CCITT or AT&T V.35 as the electrical interface.	V.35	2617-1	2617-2xx

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

Table B-12 shows the LIM cables to use with specific DCE equipments. All DCE equipment is assumed to have female connectors. No accommodation has been made for DCE equipment with male connectors. All specified asynchronous connectivity options are usable with Interactive Terminal Passthrough.

Table B-12. LIM Cables to Use with Specific DCE Equipments

Terminal Equipment/Situation	LIM Type	LIM Product Number	Cable and Adapter Product Numbers[1]
Bell 103J, 113C, 113D, 212A, 201C-LID.	4-Port RS-232-C	2612-1	2612-1xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-11
European Public Telephone and Telegraph (PTT) modems in which the Non-Data Caller is not a problem.	4-Port RS-232-C	2612-1	2612-1xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-21
European Public Telephone and Telegraph (PTT) modems in which the Non-Data Caller is a problem.	4-Port RS-232-C	2612-1	2612-1xx
	8-Port RS-232-C	2618-1	2618-1xx 2618-31
Avanti Communications Corp. 2200 and 2300 LADDs.	RS-449	2610-1	2610-1xx
Gandalf Data Inc. LDS-260 Bell 303, 306 CCITT modems in Australia, England and Japan.	V.35	2617-1	2617-1xx
CCITT modems in France and Switzerland.	V.35	2617-1	2617-2xx

1. xx roughly indicates the cable lengths in feet. Refer to the tables later in this appendix for specific part numbers and lengths.

4-Port RS-232-C LIM Cable Information

Tables B-13 through B-15 provide product, equipment, and part number information on 4-port, RS-232-C LIM cables.

When ordering, choose cables from either table B-13 (CL2) or table B-14 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-15 are an older type that is no longer offered or recommended by Control Data. They are shown here so you can cross-reference to a newer type when ordering replacements.

Table B-13. 4-Port RS-232-C LIM Cables (CL2)

Product Number	Equipment Number	Part Number	Description
			Connect one port of the 4-Port RS-232-C LIM to all modems/data sets and most other data circuit-terminating equipment (DCE) devices requiring a male cable connector.
2612-108	TN108-D	10303212	3 m (10 ft)
2612-123	TN108-E	10303213	7.6 m (25 ft)
2612-148	TN108-F	10303214	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to most terminals and other data terminal equipment (DTE) devices requiring a female cable connector.
2612-508	TN109-D	10303216	3 m (10 ft)
2612-523	TN109-E	10303217	7.6 m (25 ft)
2612-548	TN109-F	10303218	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to DTEs that use hardware flow control and require a female cable connector.
2612-608	TN472-D	10303219	3 m (10 ft)
2612-623	TN472-E	10303220	7.6 m (25 ft)
2612-648	TN472-F	10303221	15.2 m (50 ft)

(Continued)

Table B-13. 4-Port RS-232-C LIM Cables (CL2) *(Continued)*

Product Number	Equipment Number	Part Number	Description
			Connect one port of the 4-Port RS-232-C LIM to terminals and other DTE devices requiring a male cable connector.
2612-708	YA305-D	10303246	3 m (10 ft)
2612-723	YA305-E	10303247	7.6 m (25 ft)
2612-748	YA305-F	10303248	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to DTEs that use hardware flow control and require a male cable connector.
2612-808	YA306-D	10303249	3 m (10 ft)
2612-823	YA306-E	10303250	7.6 m (25 ft)
2612-848	YA306-F	10303251	15.2 m (50 ft)

Table B-14. 4-Port RS-232-C LIM Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
			Connect one port of the 4-Port RS-232-C LIM to all modems/data sets and most other data circuit-terminating equipment (DCE) devices requiring a male cable connector.
2612-149	TN108-G	10303208	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to most terminals and other data terminal equipment (DTE) devices requiring a female cable connector.
2612-549	TN109-G	10310042	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to DTEs that use hardware flow control and require a female cable connector.
2612-649	TN472-G	10310043	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to terminals and other DTE devices requiring a male cable connector.
2612-749	YA305-G	10310048	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to DTEs that use hardware flow control and require a male cable connector.
2612-849	YA306-G	10310049	15.2 m (50 ft)

Table B-15. 4-Port RS-232-C LIM Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
			Connect one port of the 4-Port RS-232-C LIM to all modems/data sets and most other data circuit-terminating equipment (DCE) devices requiring a male cable connector.
2612-110	TN108-A	24612710	3 m (10 ft)
2612-125	TN108-B	24612711	7.6 m (25 ft)
2612-150	TN108-C	24612712	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to most terminals and other data terminal equipment (DTE) devices requiring a female cable connector.
2612-510	TN109-A	24612720	3 m (10 ft)
2612-525	TN109-B	24612721	7.6 m (25 ft)
2612-550	TN109-C	24612722	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to DTEs that use hardware flow control and require a female cable connector.
2612-610	TN472-A	23107050	3 m (10 ft)
2612-625	TN472-B	23107051	7.6 m (25 ft)
2612-650	TN472-C	23107052	15.2 m (50 ft)

(Continued)

Table B-15. 4-Port RS-232-C LIM Cables (Older Type--No Longer Recommended) *(Continued)*

Product Number	Equipment Number	Part Number	Description
			Connect one port of the 4-Port RS-232-C LIM to terminals and other DTE devices requiring a male cable connector.
2612-710	YA305-A	22112813	3 m (10 ft)
2612-725	YA305-B	22112814	7.6 m (25 ft)
2612-750	YA305-C	22112815	15.2 m (50 ft)
			Connect one port of the 4-Port RS-232-C LIM to DTEs that use hardware flow control and require a male cable connector.
2612-810	YA306-A	22112823	3 m (10 ft)
2612-825	YA306-B	22112824	7.6 m (25 ft)
2612-850	YA306-C	22112825	15.2 m (50 ft)

NOTE

Hardware flow control uses the Request-to-Send and Clear-to-Send (RTS/CTS) signals to electrically control the flow of data.

RS-232-C CCITT Signals Supported

The RS-232-C signals shown in table B-16 are supported by the 4-Port RS-232-C LIM:

Table B-16. RS-232-C CCITT Signals Supported

Outputs		Inputs	
TxD	Transmit Data	RxD	Receive Data
TxC[1]	Transmit Clock	RxC[1]	Receive Clock
RTS	Request To Send	TxCE[1]	Transmit Clock (external)
DTR	Data Terminal Ready	CTS	Clear To Send
		DCD	Data Carrier Detect
		DSR	Data Set Ready
		RI[2]	Ring Indicator

1. Used for synchronous operation only.

2. Wired but not supported by modem cable.

Pin Assignments for the 4-Port RS-232-C LIM 15-Pin Connector

This information is necessary only if you want to build or modify your own cable and plug it directly into the LIM. Refer to figure B-1 for pin locations on the LIM connector, type DB15-P.

```
In/Out    CCITT    Signal     Pin           Signal   CCITT   In/Out

Ground    102      SG--------  8
                                  15 ------- CTS      106     In
Out       113      TxC-------  7
                                  14 ------- RI       125     In
In        115      RxC-------  6
                                  13 ------- TxCE     114     In
In        109      DCD-------  5
                                  12-------- (*)
In        104      RxD-------  4
                                  11-------- DSR      107      In
Out       108/2    DTR-------  3
                                  10-------- RTS      105      Out
Out       103      TxD-------  2
                                   9-------- (*)
Shield    101      FG--------  1

NOTES:

*Reserved, do not use.

Nominal signal voltages are:

   Output:  +10 V = ON = Space = "0"
            -10 V = OFF = Mark = "1"
            Maximum voltage is ±15 V

   Input:   More positive than +3 V = ON = Space = "0"
            More negative than -3 V = OFF = Mark = "1"

Unconnected inputs are interpreted as OFF.
```

Figure B-1. 4-Port RS-232-C LIM Connector

LIM-to-Modem (DCE) Pin Assignments (RS-232-C)

The 2612-1xx is a standard RS-232-C modem cable with a 25-pin male plug on the modem end. Pin assignments are shown in figure B-2.

LIM Plug 15-Pin (P1)				User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
Shield	FG	1	------------------	1	FG	Shield
Out	TxD	2	------------------	2	TxD	In
In	RxD	4	------------------	3	RxD	Out
Out	RTS	10	------------------	4	RTS	In
In	CTS	15	------------------	5	CTS	Out
In	DSR	11	------------------	6	DSR	Out
Gnd	SG	8	------------------	7	SG	Gnd
In	DCD	5	------------------	8	DCD	Out
Reserved		9		9	Reserved	
Reserved		12		10	Reserved	
				11	Spare	
				12	SDCD	Out
				13	SCTS	Out
				14	STxD	In
In	TxCE	13	------------------	15	TxCE	Out
				16	SRxD	Out
In	RxC	6	------------------	17	RxC	Out
				18	Spare	
				19	SRTS	In
Out	DTR	3	------------------	20	DTR	In
				21	SQ	Out
In	RI	14	------------------	22	RI	Out
				23	SRS	In/Out
Out	TxC	7	------------------	24	TxC	In
				25	Spare	

Figure B-2. 2612-1xx Cable Pin Assignments

LIM-to-Terminal (DTE) Pin Assignments (RS-232-C)

These null modem cables, 2612-5xx and 2612-7xx, connect to a DTE device. The 2612-5xx has a 25-pin female plug on the user end and the 2612-7xx has a 25-pin male plug on the user end. A null modem cable must be used because the LIM and terminal are both DTEs. If two DTEs are connected with a standard cable, they both use the same pins for outputs and inputs. For example, they both try to use pin 2 to transmit data and pin 3 to receive data. A null modem cable internally reverses the transmit/receive pins (and some others). Pin assignments for the 25-pin plug are shown in figure B-3.

LIM Plug 15-Pin (P1)					User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)			Pin (P2)	Signal	In/Out
Shield	FG	1	------------------------------------		1	FG	Shield
In	RxD	4	------------------------------------		2	TxD	Out
Out	TxD	2	------------------------------------		3	RxD	In
Out	RTS	10	Tied to 15	Tied to 5	4	RTS	Out
In	DCD	5	Tied to 11		5	CTS	In
Out	DTR	3	------------------------------------		6	DSR	In
Gnd	SG	8	------------------------------------		7	SG	Gnd
In	CTS	15	------------------------------------		8	DCD	In
Reserved		9			9	Reserved	
Reserved		12			10	Reserved	
					11	Spare	
					12	SDCD	In
					13	SCTS	In
					14	STxD	Out
In	TxCE	13	Tied to 6	Tied to 17	15	TxCE	In
					16	SRxD	In
Out	TxC	7	------------------------------------		17	RxC	In
					18	Spare	
					19	SRTS	Out
In	DSR	11	------------------------------------		20	DTR	Out
					21	SQ	In
In	RI	14			22	RI	In
					23	SRS	In/Out
In	RxC	6	------------------------------------		24	TxC	Out
					25	Spare	

Figure B-3. 2612-5xx Cable Pin Assignments

LIM-to-Terminal with Hardware Flow-Control Pin Assignments (RS-232-C)

The 2612-6xx and 2612-8xx are null modem cables similar to the 2612-5xx and 2612-7xx, but with added hardware flow-control wiring. The 2612-6xx cable has a 25-pin female plug on the user end that connects to a DTE device, and the 2612-8xx has a male plug for this purpose. Pin assignments for the 25-pin plug are shown in figure B-4.

LIM Plug 15-Pin (P1)					User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)			Pin (P2)	Signal	In/Out
Shield	FG	1	----------------	----------------	1	FG	Shield
In	RxD	4	----------------	----------------	2	TxD	Out
Out	TxD	2	----------------	----------------	3	RxD	In
In	CTS	15	----------------	----------------	4	RTS	Out
Out	RTS	10	----------------	----------------	5	CTS	In
In	DSR	11	Tied to 5	Tied to 8	6	DSR	In
Gnd	SG	8	----------------	----------------	7	SG	Gnd
Out	DTR	3	----------------	----------------	8	DCD	In
Reserved		9			9	Reserved	
Reserved		12			10	Reserved	
					11	Spare	
					12	SDCD	In
					13	SCTS	In
					14	STxD	Out
In	TxCE	13	Tied to 6	Tied to 17	15	TxCE	In
					16	SRxD	In
Out	TxC	7	----------------	----------------	17	RxC	In
					18	Spare	
					19	SRTS	Out
In	DCD	5	----------------	----------------	20	DTR	Out
					21	SQ	In
In	RI	14			22	RI	Out
					23	SRS	In/Out
In	RxC	6	----------------	----------------	24	TxC	Out
					25	Spare	

Figure B-4. 2612-6xx Cable Pin Assignments

8-Port RS-232 Asynchronous LIM Cable Information

Tables B-17 through B-19 provide product, equipment, and part numbers for shielded and nonshielded 8-port, RS-232-C LIM cables. Table B-20 provides information on the cable adapters that are required for some applications.

When ordering, choose cables from either table B-17 (CL2) or table B-18 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-19 are an older type that is no longer offered or recommended by Control Data. They are shown here so you can cross-reference to a newer type when ordering replacements.

Table B-17. 8-Port RS-232 Asynchronous LIM Cables (CL2)

Product Number	Equipment Number	Part Number	Description
			These cables connect one port of an 8-Port RS-232-C asynchronous LIM directly to a DTE or DCE device, which is equipped with a connector adapter, or connects to an interconnecting RJ45-compatible wall plate. They can also connect a DTE or DCE device, which is equipped with a connector adapter, to an interconnecting RJ45-compatible wall plate.
			Unshielded cables:
2618-112	YA333-J	51917932	4.2 m (14 ft)
2618-123	YA333-K	51917933	7.6 m (25 ft)
2618-148	YA333-L	51917934	15.2 m (50 ft)
2618-198	YA333-M	51917935	60.8 m (200 ft)
			Shielded cables; required for VDE applications:
2618-212	YA333-N	51917936	4.2 m (14 ft)
2618-223	YA333-P	51917937	7.6 m (25 ft)
2618-248	YA333-R	51917938	15.2 m (50 ft)
2618-398	YA333-S	51917939	60.8 m (200 ft)

Table B-18. 8-Port RS-232 Asynchronous LIM Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
			These cables connect one port of an 8-Port RS-232-C asynchronous LIM directly to a DTE or DCE device, which is equipped with a connector adapter, or connects to an interconnecting RJ45-compatible wall plate. They can also connect a DTE or DCE device, which is equipped with a connector adapter, to an interconnecting RJ45-compatible wall plate.
			Unshielded cables:
2618-149	YA333-T	51917940	15.2 m (50 ft)
2618-199	YA333-U	51917941	60.8 (200 ft)
			Shielded cables; required for VDE applications:
2618-249	YA333-V	51917942	15.2 m (50 ft)
2618-399	YA333-W	51917943	60.8 m (200 ft)

Table B-19. 8-Port RS-232 Asynchronous LIM Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
			These cables connect one port of an 8-Port RS-232-C asynchronous LIM directly to a DTE or DCE device, which is equipped with a connector adapter, or connects to an interconnecting RJ45-compatible wall plate. They can also connect a DTE or DCE device, which is equipped with a connector adapter, to an interconnecting RJ45-compatible wall plate.
			Unshielded cables:
2618-114	YA333-A	51917919	4.2 m (14 ft)
2618-125	YA333-B	51917920	7.6 m (25 ft)
2618-150	YA333-C	51917921	15.2 m (50 ft)
2618-200	YA333-D	51917922	60.8 m (200 ft)
			Shielded cables; required for VDE applications:
2618-214	YA333-E	51917927	4.2 m (14 ft)
2618-225	YA333-F	51917928	7.6 m (25 ft)
2618-250	YA333-G	51917929	15.2 m (50 ft)
2618-400	YA333-H	51917930	60.8 m (200 ft)

Table B-20. 8-Port RS-232 Asynchronous LIM Cable Adapters

Product Number	Equipment Number	Part Number	Description
2618-11	YA324-A	22108952	Used with preceding cables to connect one port of the 8-Port RS-232-C Asynchronous LIM to modems/data sets and other DCE devices that require a male connector, and use DCE flow control and DCD disconnect.
2618-21	YA324-B	22108953	Used with preceding cables to connect one port of the 8-Port RS-232-C Asynchronous LIM to modems/data sets and other DCE devices that require a male connector, and use DCE flow control and DSR disconnect.
2618-31	YA324-C	22108954	Used with preceding cables to connect one port of the 8-Port RS-232-C Asynchronous LIM to modems/data sets and other DCE devices that require a male connector, that use both DCD and DSR disconnect.
2618-50	YA324-D	22108958	Used with preceding cables to connect one port of the 8-Port RS-232-C LIM to DTEs that use hardware or software flow control and require a female cable connector.
2618-51	YA324-E	22108959	Used with preceding cables to connect one port of the 8-Port RS-232-C LIM to DTEs that use hardware or software flow control and require a male cable connector.

RS-232-C Signals Supported

The RS-232-C signals shown in table B-21 are supported by the 8-Port RS-232 Asynchronous LIM.

Table B-21. RS-232-C Signals Supported

Outputs		Inputs	
TxD	Transmit Data	RxD	Receive Data
RTS	Request To Send or Make Busy, depending on cable and software	CTS	Clear To Send
DTR	Data Terminal Ready	DCD	Data Carrier Detect
CN	Make Busy		

Pin Assignments for LIM RJ45 Modular Connector

This information is necessary only if you want to build or modify your own cable and plug it directly into the 8-Port RS-232-C Asynchronous LIM. Refer to figures B-5 and B-6 for pin locations on the LIM connector.

In/Out	Signal	Name	Pin
--	FG	Frame Ground	S1 *
Out	CN	Make Busy	1
In	DCD	Data Carrier Detect	2
Out	DTR	Data Terminal Ready	3
--	SG	Signal Ground	4
In	RxD	Received Data	5
Out	TxD	Transmit Data	6
Out	RTS	Request to Send	7
In	CTS	Clear to Send	8

* No connection on unshielded cables.

Figure B-5. RJ45 Modular Connector Pin Assignments

CAUTION

Pin damage to the FG pin may occur when using non-Control Data cables.

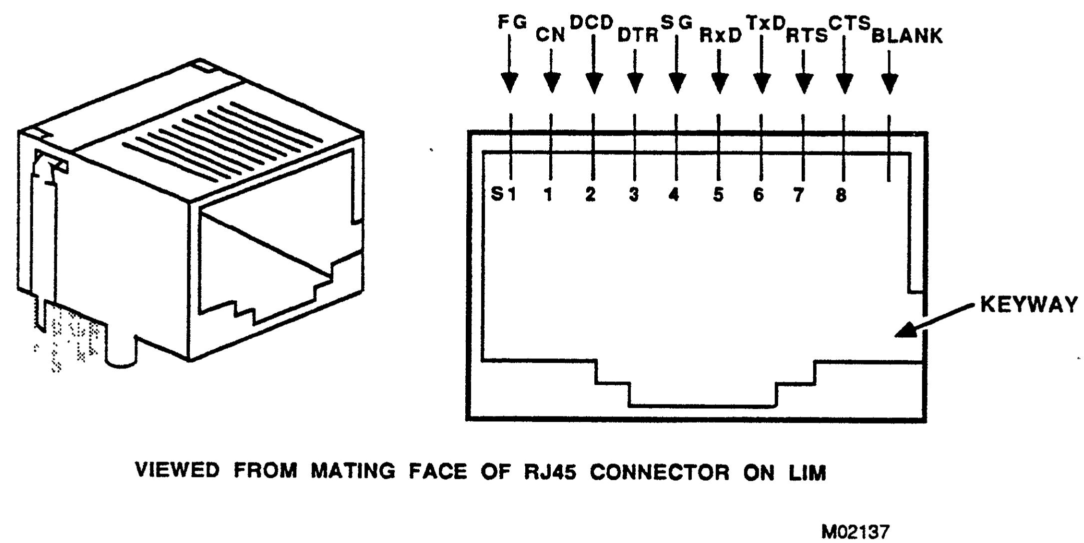

Figure B-6. RJ45 Pin Configuration

LIM-to-Modem (DCE) Pin Assignments (RS-232-C Asynchronous)

The 2618-11, -21 and -31 connector adapters for use with DCE devices have an 8-pin plug (which is equivalent to the LIM plug) on one end, and a 25-pin plug on the other. Adapter pin assignments are shown in figures B-7, B-8, and B-9.

LIM Plug 8-Pin (P1)				User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
Out	CN	1	------------------	25	CN	IN
In	DCD	2	------------------	8	DCD	Out
Out	DTR	3	------------------	20	DTR	In
Gnd	SG	4	------------------	7	SG	Gnd
In	RxD	5	------------------	3	RxD	Out
Out	TxD	6	------------------	2	TxD	In
Out	RTS	7	------------------	4	RTS	In
In	CTS	8	------------------	5	CTS	Out

Figure B-7. 2618-11 Connector Adapter Pin Assignments

LIM Plug 8-Pin (P1)			User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)	Pin (P2)	Signal	In/Out
Out	CN	1	25	CN	In
In	DCD	2	6	DSR	Out
Out	DTR	3	20	DTR	In
Gnd	SG	4	7	SG	Gnd
In	RxD	5	3	RxD	Out
Out	TxD	6	2	TxD	In
Out	RTS	7	4	RTS	In
In	CTS	8	5	CTS	Out

Figure B-8. 2618-21 Connector Adapter Pin Assignments

LIM Plug 8-Pin (P1)			User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)	Pin (P2)	Signal	In/Out
Out	CN	1	25	CN	In
In	DCD	2	6	DSR	Out
Out	DTR	3	20	DTR	In
Gnd	SG	4	7	SG	Gnd
In	RxD	5	3	RxD	Out
Out	TxD	6	2	TxD	In
Out	RTS	7	4	RTS	In
In	CTS	8	8	DCD	Out

Figure B-9. 2618-31 Connector Adapter Pin Assignments

LIM-to-Terminal (DTE) Pin Assignments (RS-232-C Asynchronous)

The 2618-50 and 2618-51 connector adapters for use with DTE devices have an 8-pin plug (which is equivalent to the LIM plug) on one end, and a 25-pin plug on the other. Adapter pin assignments are shown in figure B-10.

LIM Plug 8-Pin (P1)				User Plug 25-Pin (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
Out	CN	1		N/C		
In	DCD	2		20	DTR	Out
Out	DTR	3		6	DSR	In
Gnd	SG	4		7	SG	Gnd
In	RxD	5		2	TxD	Out
Out	TxD	6		3	RxD	In
Out	RTS	7		5	CTS	In
In	CTS	8		4	RTS	Out
			Tied to 6	8	DCD	In

Figure B-10. 2618-5x Connector Adapter Pin Assignments

RS-449 LIM Cable Information

Tables B-22 through B-24 provide product, equipment, and part numbers for RS-449 LIM cables.

When ordering, choose cables from either table B-22 (CL2) or table B-23 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-24 are an older type that is no longer offered or recommended by Control Data. They are shown here so you can cross-reference to a newer type when ordering replacements.

Table B-22. RS-449 LIM Cables (CL2)

Product Number	Equipment Number	Part Number	Description
			Connects an RS-449 LIM to a modem/data set or other DCE device.
2610-123	TN101-D	10303200	7.6 m (25 ft)
2610-148	TN101-E	10303201	15.2 m (50 ft)
2610-188	TN101-F	10303202	58 m (190 ft)
			Connects an RS-449 LIM to a terminal or other DTE device.
2610-523	TN102-D	10303203	7.6 m (25 ft)
2610-548	TN102-E	10303204	15.2 m (50 ft)
2610-588	TN102-F	10303205	58 m (190 ft)

Table B-23. RS-449 LIM Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
			Connects an RS-449 LIM to a modem/data set or other DCE device.
2610-149	TN101-G	10303206	15.2 m (50 ft)
2610-189	TN101-H	10303207	58 m (190 ft)
			Connects an RS-449 LIM to a terminal or other DTE device.
2610-549	TN102-G	10310038	15.2 m (50 ft)
2610-589	TN101-H	10310039	58 m (190 ft)

Table B-24. RS-449 LIM Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
			Connects an RS-449 LIM to a modem/data set or other DCE device.
2610-125	TN101-A	24612740	7.6 m (25 ft)
2610-150	TN101-B	24612741	15.2 m (50 ft)
2610-190	TN101-C	24612742	58 m (190 ft)
			Connects an RS-449 LIM to a terminal or other DTE device.
2610-525	TN102-A	24641332	7.6 m (25 ft)
2610-550	TN102-B	24641333	15.2 m (50 ft)
2610-590	TN102-C	24641334	58 m (190 ft)

RS-449 Signals Supported

The RS-449 signals shown in table B-25 are supported by the 2-port RS-449 LIM:

Table B-25. RS-449 Signals Supported

Outputs		Inputs	
SD[1]	Send Data	RD[1]	Receive Data
TT[1]	Terminal Timing	RT[1]	Receive Timing
RS[1]	Request To Send	ST[1]	Send Timing
TR[1]	Terminal Ready	CS[1]	Clear to Send
IS	In Service	RR[1]	Receiver Ready
NS	New Signal	DM[1]	Data Mode
SF/SR	Sel Freq/Sig Rate	IC	Incoming Call
LL	Local Loopback	SQ	Signal Quality
RL	Remote Loopback	SI	Signal Rate Indicator
SS	Select Standby	TM	Test Mode
SC	Send Common	SB	Standby Indicator
RC	Receive Common		

1. Differential signals.

LIM-to-Modem (DCE) Pin Assignments (RS-449)

The 2610-1xx cable is a standard RS-449 modem cable with a 37-pin male plug on the modem end. Pin assignments are shown in figure B-11.

LIM Plug				Modem Plug		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
Shield		1	------------	1		Shield
In	SI	2	------------	2	SI	Out
Spare		3	------------	3	Spare	
Out	+SD	4	------------	4	+SD	In
In	+ST	5	------------	5	+ST	Out
In	+RD	6	------------	6	+RD	Out
Out	+RS	7	------------	7	+RS	In
In	+RT	8	------------	8	+RT	Out
In	+CS	9	------------	9	+CS	Out
Out	LL	10	------------	10	LL	In
In	+DM	11	------------	11	+DM	Out
Out	+TR	12	------------	12	+TR	In
In	+RR	13	------------	13	+RR	Out
Out	RL	14	------------	14	RL	In
In	IC	15	------------	15	IC	Out
Out	SF/SR	16	------------	16	SF/SR	In
Out	+TT	17	------------	17	+TT	In
In	TM	18	------------	18	TM	Out
Gnd	SG	19	------------	19	SG	Gnd
In	RC	20	------------	20	RC	Out
Spare		21	------------	21	Spare	
Out	-SD	22	------------	22	-SD	In
In	-ST	23	------------	23	-ST	Out
In	-RD	24	------------	24	-RD	Out
Out	-RS	25	------------	25	-RS	In
In	-RT	26	------------	26	-RT	Out
In	-CS	27	------------	27	-CS	Out
Out	IS	28	------------	28	IS	In
In	-DM	29	------------	29	-DM	Out
Out	-TR	30	------------	30	-TR	In
In	-RR	31	------------	31	-RR	Out
Out	SS	32	------------	32	SS	In
In	SQ	33	------------	33	SQ	Out
Out	NS	34	------------	34	NS	In
Out	-TT	35	------------	35	-TT	In
In	SB	36	------------	36	SB	Out
Out	SC	37	------------	37	SC	In

Figure B-11. 2610-1xx Cable Pin Assignments

LIM-to-Terminal (DTE) Pin Assignments (RS-449)

The 2610-5xx cable is a standard RS-449 terminal cable with a 37-pin female plug on the modem end. Pin assignments are shown in figure B-12.

```
          LIM Plug                                              Terminal Plug
In/Out    Signal   Pin (P1)                             Pin (P2)  Signal   In/Out

Shield              1 ------------------------------------  1    Shield
In        SI        2 ------------------------------------ 16    SE/SR    Out
Out       SF/SR    16 ------------------------------------  2     SI      In
Out       +SD       4 ------------------------------------  6    +RD      In
Out       -SD      22 ------------------------------------ 24    -RD      In
In        +RD       6 ------------------------------------  4    +SD      Out
In        -RD      24 ------------------<------------------ 22    -SD      Out
Out       +TT      17 ------------------>---------------+--  8    +RT      In
In        +ST       5 --↓ *                         * ↑--  5    +ST      In
In        +RT       8 --+---------------<------------------ 17    +TT      Out
Out       -TT      35 ------------------>---------------+-- 23    -ST      In
In        -ST      23 --↓ *                         * ↑-- 26    -RT      In
In        -RT      26 --+---------------<------------------ 35    -TT      Out
Out       +RS       7 ------------------>------------------ 13    +RR      In
Out       -RS      25 ------------------>------------------ 31    -RR      In
In        +RR      13 ------------------<------------------  7    +RS      Out
In        -RR      31 ------------------<------------------ 25    -RS      Out
Out       +TR      12 ------------------>---------------+-- 11    +DM      In
In        +CS       9 --↓ *                         * ↑--  9    +CS      In
In        +DM      11 --+---------------<------------------ 12    +TR      Out
Out       -TR      30 ------------------>---------------+-- 29    -DM      In
In        -CS      27 --↓ *                         * ↑-- 27    -CS      In
In        -DM      29 --+---------------<------------------ 30    -TR      Out
Out       LL       10 ------------------>------------------ 18     TM      In
In        TM       18 ------------------<------------------ 10     LL      Out
Out       RL       14 ------------------>------------------ 15     IC      In
In        IC       15 ------------------<------------------ 14     RL      Out
Out       IS       28 ------------------>------------------ 33     SQ      In
In        SQ       33 ------------------<------------------ 28     IS      Out
Out       SS       32 ------------------------------------ 36     SB      In
In        SB       36 ------------------------------------ 32     SS      Out
Out       SC       37 ------------------------------------ 20     RC      In
In        RC       20 ------------------------------------ 37     SC      Out
Gnd       SG       19 ------------------------------------ 19     SG      Gnd
Spare               3        <---(no connection)--->        3    Spare
Spare              21        <---(no connection)--->       21    Spare
Out       NS       34        <---(no connection)--->       34     NS      Out

* Jumper wire.
```

Figure B-12. 2610-5xx Cable Pin Assignments

X.24 LIM Cable Information

Tables B-26 through B-28 provide product, equipment, and part numbers for X.24 LIM cables.

When ordering, choose cables from either table B-26 (CL2) or table B-27 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-28 are an older type that is no longer offered or recommended by Control Data. They are shown here so you can cross-reference to a newer type when ordering replacements.

Table B-26. X.24 LIM Cables (CL2)

Product Number	Equipment Number	Part Number	Description
			Connects an X.24 LIM to a modem or other DCE device.
2611-123	TN107-D	10303209	7.6 m (25 ft)
2611-148	TN107-E	10303210	15.2 m (50 ft)
2611-188	TN107-F	10303211	58 m (190 ft)

Table B-27. X.24 LIM Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
			Connects an X.24 LIM to a modem or other DCE device.
2611-149	TN107-G	10310040	15.2 m (50 ft)
2611-189	TN107-H	10310041	58 m (190 ft)

Table B-28. X.24 LIM Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
			Connects an X.24 LIM to a modem or other DCE device.
2611-125	TN107-A	24612730	7.6 m (25 ft)
2611-150	TN107-B	24612731	15.2 m (50 ft)
2611-190	TN107-C	24612732	58 m (190 ft)

X.24 Signals Supported

The subset of X.24 signals shown in table B-29 are supported by the X.24 LIM.

Table B-29. X.24 Signals Supported

Outputs		Inputs	
T	Transmit (Data)	R	Receive (Data)
C	Control	I	Indicator
		S	Signal Element Timing (Clock)

Outputs from the LIM are differential. The nominal voltage for the outputs is 0 to +5 V. Inputs to the LIM are differential and require (typically) a minimum of 200 mV (0.2 V) difference in voltage between the input leads for proper operation.

Pin Assignments for X.24 LIM 15-Pin Connector

This information is necessary only if you want to build or modify your own cable and plug it directly into the LIM. Refer to figure B-13 for pin locations on the LIM connector, type DB15-P.

In/Out	Signal	Pin	Signal
Ground	GA	8	
		15	(*)
Out	(*)	7	
		14	(*)
In	+S	6	
		13	+S
In	+I	5	
		12	-I
In	+R	4	
		11	-R
Out	+C	3	
		10	-C
Out	+T	2	
		9	-T
Shield	G	1	

Notes:

*Reserved, do not use.

Figure B-13. X.24 LIM Connector

LIM-to-Modem (DCE) Pin Assignments (X.24)

The 2611-1xx cable is a standard X.24 modem cable with a 15-pin male plug on the modem end. Pin assignments are shown in figure B-14.

LIM Plug In/Out	LIM Plug Signal	Pin (P1)		Pin (P2)	Modem Plug Signal	Modem Plug In/Out
Shield	G	1	-------------------------------	1		Shield
Out	+T	2	-------------------------------	2	+T	In
Out	-T	9	-------------------------------	9	-T	In
In	+R	4	-------------------------------	4	+R	Out
In	-R	11	-------------------------------	11	-R	Out
In	+S	6	-------------------------------	6	+S	Out
In	-S	13	-------------------------------	13	-S	Out
Out	+C	3	-------------------------------	3	+C	In
Out	-C	10	-------------------------------	10	-C	In
In	+I	5	-------------------------------	5	+I	Out
In	-I	12	-------------------------------	12	-I	Out
Ground	GA	8	-------------------------------	8	GA	Ground
Reserved		7	-------------------------------	7	Reserved	
Reserved		14	-------------------------------	14	Reserved	
Reserved		15	-------------------------------	15	Reserved	

Figure B-14. 2611-1xx Cable Pin Assignments

URI LIM Cable Information

Tables B-30 through B-32 provide product, equipment, and part numbers for URI cables.

When ordering, choose cables from either table B-30 (CL2) or table B-31 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-32 are an older type that is no longer offered or recommended by Control Data. They are shown here so you can cross-reference to a newer type when ordering replacements.

Table B-30. URI LIM Cables (CL2)

Product Number	Equipment Number	Part Number	Description
			URI to Centronics cable.
2613-123	TN484-C	10303222	7.6 m (25 ft)
2613-148	TN484-D	10303223	15.2 m (50 ft)
			URI to Data Products cable.
2613-223	TN485-D	10303232	7.6 m (25 ft)
2613-248	TN485-E	10303233	15.2 m (50 ft)
2613-297	TN485-F	10303234	30.4 m (100 ft)
2613-301	TN486-B	10303242	Winchester adapter cable, 0.91 m (3 ft).

Table B-31. URI LIM Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
			URI to Centronics cable.
2613-249	TN485-G	10310045	15.2 m (50 ft)
2613-298	TN485-H	10310046	30.4 m (100 ft)

Table B-32. URI LIM Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
			URI to Centronics cable.
2613-125	TN484-A	53584610	7.6 m (25 ft)
2613-150	TN484-B	53584621	15.2 m (50 ft)
			URI to Data Products cable.
2613-225	TN485-A	53584620	7.6 m (25 ft)
2613-250	TN485-B	53584621	15.2 m (50 ft)
2613-299	TN485-C	53584622	30.4 m (100 ft)
2613-303	TN486-A	53584600	Winchester adapter cable, 0.91 m (3 ft).

Centronics Signals Supported

The Centronics signals shown in table B-33 are supported at the Centronics port of the URI LIM.

Table B-33. Centronics Signals Supported

Outputs		Inputs	
PAR	Parity	PAR	Parity
DB1-DB8	Data bits 1-8	+5	+5 V OK
STR	Strobe	LD	Light Detect
IP	Input Prime	CP	Compressed Pitch
		PO	Paper Out
		BUSY	Busy
		125KHZ	125 KHz OK
		FLT	Fault
		SEL	Select
		ACKIN	Acknowledge Input

Current CDCNET printer support software does not use the Centronics interface.

Data Products Signals Supported

The Data Products signals shown in table B-34 are supported at the Data Products port of the URI LIM.

Table B-34. Data Products Signals Supported

Outputs		Inputs	
PAR	Parity	PAR	Parity
DB1 - DB8	Data bits 1 through 8	PE	Parity Error
PI	Paper Instruction	CP	Compressed Pitch
BCLR	Buffer Clear	T0	Band Ident 0
STR	Strobe	T1	Band Ident 1
		EFU	VFU Verify
		PM	Paper Moving
		VR	VFU Ready
		TOF	Top-of-Forms
		BOF	Bottom-of-Forms
		+5	+5 V OK
		GND	Ground
		IV	Interface Verify
		RDY	Ready
		OL	On Line
		DMD	Demand

URI LIM-to-Centronics Equipment Pin Assignments

The 2613-1xx cable is a standard Centronics printer cable with a 36-pin male plug on the printer end. Pin assignments are shown in figure B-15.

LIM Centronics Plug 37-pin (P1) — User Plug 36-pin (P2)

In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
In	SEL	13	------------------------------	13	SEL	Out
		14	------------------------------	14		
In	ACKIN	10	------------------------------	10	ACKIN	Out
		29	------------------------------	28		
Out	STR	1	------------------------------	1	STR	In
		20	------------------------------	19		
Out	DB1	2	------------------------------	2	DB1	In
		21	------------------------------	20		
Out	DB2	3	------------------------------	3	DB2	In
		22	------------------------------	21		
Out	DB3	4	------------------------------	4	DB3	In
		23	------------------------------	22		
Out	DB4	5	------------------------------	5	DB4	In
		24	------------------------------	23		
Out	DB5	6	------------------------------	6	DB5	In
		25	------------------------------	24		
Out	DB6	7	------------------------------	7	DB6	In
		26	------------------------------	25		
Out	DB7	8	------------------------------	8	DB7	In
		27	------------------------------	26		
Out	DB8	9	------------------------------	9	DB8	In
		28	------------------------------	27		
In	125KHZ	15	------------------------------	15	125KHZ	Out
		16	------------------------------	16		
In/Out	PAR/LD	34	------------------------------	33	PAR/LD	In/Out
		35	------------------------------	34		
Out	IP	32	------------------------------	31	IP	In
		31	------------------------------	30		
In	+5	18	------------------------------	18	+5	Out
In	GND	17	------------------------------	17	GND	Out
In	BUSY	11	------------------------------	11	BUSY	Out
		30	------------------------------	29		
In	CP	36	------------------------------	35	CP	Out
		37	------------------------------	36		
In	PO	12	------------------------------	12	PO	Out
In	FLT	33	------------------------------	32	FLT	Out

Figure B-15. 2613-1xx Cable Pin Assignments

URI LIM-to-Data Products Equipment Pin Assignments

The 2613-2xx cable is a standard Data Products printer cable with a 50-pin male plug on the printer end. Pin assignments are shown in figure B-16.

LIM Data Products Plug 50-pin (P1)				User Plug 50-pin (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
In	RDY	22	------------------------------	22	RDY	Out
		6	------------------------------	6		
In	OL	21	------------------------------	21	OL	Out
		5	------------------------------	5		
In	DMD	23	------------------------------	23	DMD	Out
		7	------------------------------	7		
Out	STR	38	------------------------------	38	STR	In
		37	------------------------------	37		
Out	DB1	19	------------------------------	19	DB1	In
		3	------------------------------	3		
Out	DB2	20	------------------------------	20	DB2	In
		4	------------------------------	4		
Out	DB3	1	------------------------------	1	DB3	In
		2	------------------------------	2		
Out	DB4	41	------------------------------	41	DB4	In
		40	------------------------------	40		
Out	DB5	34	------------------------------	34	DB5	In
		18	------------------------------	18		
Out	DB6	43	------------------------------	43	DB6	In
		42	------------------------------	42		
Out	DB7	36	------------------------------	36	DB7	In
		35	------------------------------	35		
Out	DB8	28	------------------------------	28	DB8	In
		44	------------------------------	44		
In	IV	46	------------------------------	46	IV	Out
		45	------------------------------	45		
In	TOF	24	------------------------------	24	TOF	Out
		8	------------------------------	8		
In	BOF	25	------------------------------	25	BOF	Out
		9	------------------------------	9		
In	EFU	47	------------------------------	47	EFU	Out
		33	------------------------------	33		
In	T0	50	------------------------------	50	T0	Out
		32	------------------------------	32		
In	T1	49	------------------------------	49	T1	Out
		16	------------------------------	16		
In/Out	PAR	29	------------------------------	29	PAR	In/Out
		13	------------------------------	13		
Out	BCLR	31	------------------------------	31	BCLR	In
		15	------------------------------	15		
In	+5	12	------------------------------	12	+5	Out
In	GND	39	------------------------------	39	GND	Out

Figure B-16. 2613-2xx Cable Pin Assignments

(Continued)

(Continued)

LIM Data Products Plug 50-pin (P1) — User Plug 50-pin (P2)

In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
In	PM/VR	48	------------------------------	48	PM/VR	Out
		17	------------------------------	17		
In	PM/VR	26	------------------------------	26	PM/VR	Out
		10	------------------------------	10		
In	PE	27	------------------------------	27	PE	Out
		11	------------------------------	11		
Out	PI	30	------------------------------	30	PI	In
		14	------------------------------	14		

Figure B-16. 2613-2xx Cable Pin Assignments

Winchester Adapter Cable Pin Assignments

The 2613-303 cable is a standard Data Products to Winchester adapter cable with a 50-pin D-subminiature female plug on one end and a 50-pin Winchester female plug on the printer end. Pin assignments are shown in figure B-17.

Data Products Plug 50-pin (P1)				User Plug 50-pin Winchester (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
In	RDY	22	------------------------------	CC	RDY	Out
		6	------------------------------	EE		
In	OL	21	------------------------------	y	OL	Out
		5	------------------------------	AA		
In	DMD	23	------------------------------	E	DMD	Out
		7	------------------------------	C		
Out	STR	38	------------------------------	j	STR	In
		37	------------------------------	m		
Out	DB1	19	------------------------------	B	DB1	In
		3	------------------------------	D		
Out	DB2	20	------------------------------	F	DB2	In
		4	------------------------------	J		
Out	DB3	1	------------------------------	L	DB3	In
		2	------------------------------	N		
Out	DB4	41	------------------------------	R	DB4	In
		40	------------------------------	T		
Out	DB5	34	------------------------------	V	DB5	In
		18	------------------------------	X		
Out	DB6	43	------------------------------	Z	DB6	In
		42	------------------------------	b		
Out	DB7	36	------------------------------	n	DB7	In
		35	------------------------------	k		
Out	DB8	28	------------------------------	u	DB8	In
		44	------------------------------	w		
In	IV	46	------------------------------	v	IV	Out
		45	------------------------------	x		
In	TOF	24	------------------------------	S	TOF	Out
		8	------------------------------	U		
In	BOF	25	------------------------------	M	BOF	Out
		9	------------------------------	P		
In	EFU	47	------------------------------	e	EFU	Out
		33	------------------------------	h		
In	T0	50	------------------------------	d	T0	Out
		32	------------------------------	f		
In	T1	49	------------------------------	a	T1	Out
		16	------------------------------	c		
In/Out	PAR	29	------------------------------	z	PAR	In/Out
		13	------------------------------	BB		

Figure B-17. 2613-303 Winchester Adapter Cable Pin Assignments

(Continued)

(Continued)

Data Products Plug 50-pin (P1)				User Plug 50-pin Winchester (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
Out	BCLR	31	------------------------------	A	BCLR	In
		15	------------------------------	H		
In	+5	12	------------------------------	HH	+5	Out
In	GND	39				
In	PM/VR	48	------------------------------	FF	PM/VR	Out
		17	------------------------------	DD		
In	PM/VR	26	------------------------------	W	PM/VR	Out
		10	------------------------------	Y		
In	PE	27	------------------------------	r	PE	Out
		11	------------------------------	t		
Out	PI	30	------------------------------	p	PI	In
		14	------------------------------	s		

Figure B-17. 2613-303 Winchester Adapter Cable Pin Assignments

V.35 LIM Cable Information

Tables B-35 through B-37 provide product, equipment, and part numbers for V.35 LIM cables.

When ordering, choose cables from either table B-35 (CL2) or table B-37 (CL2P), depending on your installation. The CL2 (class 2) and CL2P (class 2 plenum) cables meet the requirements of article 725, paragraph 38b of the National Electrical Code (NEC).

Cables in table B-37 are an older type that is no longer offered or recommended by Control Data. They are shown here so you can cross-reference to a newer type when ordering replacements.

Table B-35. V.35 LIM Cables (CL2)

Product Number	Equipment Number	Part Number	Description
			Connects a V.35 LIM to a modem/data set or other DCE devices that require a 34-pin male cable connector with 0.060-in diameter pins and single lead jackscrew connector locking mechanism.
2617-108	TN490-D	10303243	3 m (10 ft)
2617-123	TN490-E	10303244	7.6 m (25 ft)
2617-148	TN490-F	10303245	15.2 m (50 ft)
			Connects the LIM to modem/data set or other DCE devices that require a 34-pin male cable connector with 0.040-in diameter pins and spring clip with guide arm connector locking mechanism.
2617-508	YA326-D	10317223	3 m (10 ft)
2617-523	YA326-E	10317224	7.6 m (25 ft)
2617-548	YA326-F	10317225	15.2 m (50 ft)
			Connects the LIM to a terminal or other DTE devices that require a 34-pin female cable connector for 0.060-in diameter pins used with single lead jackscrew connector locking mechanism.
2617-208	YA327-D	10317226	3 m (10 ft)
2617-223	YA327-E	10317227	7.6 m (25 ft)
2617-248	YA327-F	10317228	15.2 m (50 ft)

Table B-36. V.35 LIM Cables (CL2P)

Product Number	Equipment Number	Part Number	Description
			Connects a V.35 LIM to a modem/data set or other DCE devices that require a 34-pin male cable connector with 0.060-in diameter pins and single lead jackscrew connector locking mechanism.
2617-149	TH490-G	10310047	15.2 m (50 ft)
			Connects the LIM to modem/data set or other DCE devices that require a 34-pin male cable connector with 0.040-in diameter pins and spring clip with guide arm connector locking mechanism.
2617-549	YA326-G	10310050	15.2 m (50 ft)
			Connects the LIM to a terminal or other DTE devices that require a 34-pin female cable connector for 0.060-in diameter pins used with single lead jackscrew connector locking mechanism.
2617-249	YA327-G	10310051	15.2 m (50 ft)

Table B-37. V.35 LIM Cables (Older Type--No Longer Recommended)

Product Number	Equipment Number	Part Number	Description
			Connects a V.35 LIM to a modem/data set or other DCE devices that require a 34-pin male cable connector with 0.060-in diameter pins and single lead jackscrew connector locking mechanism.
2617-110	TN490-A	53595400	3 m (10 ft)
2617-125	TN490-B	53595401	7.6 m (25 ft)
2617-150	TN490-C	53595402	15.2 m (50 ft)
			Connects the LIM to modem/data set or other DCE devices that require a 34-pin male cable connector with 0.040-in diameter pins and spring clip with guide arm connector locking mechanism.
2617-210	YA327-A	22106377	3 m (10 ft)
2617-225	YA327-B	22106378	7.6 m (25 ft)
2617-250	YA327-C	22106379	15.2 m (50 ft)
			Connects the LIM to a terminal or other DTE devices that require a 34-pin female cable connector for 0.060-in diameter pins used with single lead jackscrew connector locking mechanism.
2617-510	YA326-A	22120996	3 m (10 ft)
2617-525	YA326-B	22120997	7.6 m (25 ft)
2617-550	YA326-C	22120998	15.2 m (50 ft)

The 2617-1xx cable converts the 25-pin subminiature D-type male connector on the LIM to the V.35 standard 34-pin rectangular male connector (ISO 2593) with jack screws.

V.35 Signals Supported

The RS-232-C signals shown in table B-38 are supported by the V.35 LIM.

Table B-38. V.35 Signals Supported

Outputs		Inputs	
TxD	Transmit Data	RxD	Receive Data
TxC	Transmit Clock	RxC	Receive Clock
RTS	Request To Send	TxCE	Transmit Clock (external)
DTR	Data Terminal Ready	CTS	Clear To Send
		DCD	Data Carrier Detect
		DSR	Data Set Ready
		RI	Ring Indicator

Pin Assignments for the V.35 LIM 25-Pin Connector

This information is necessary only if you want to build or modify your own cable and plug it directly into the LIM. Refer to figure B-18 for pin locations on the LIM connector, type DB25-P.

In/Out	CCITT	Signal	J3/J4 Pin	Signal	CCITT	In/Out
In	115	RxC(B)----	13			
			25 ---			
In	114	TxCE(B)---	12			
			24 -------	TxC(A)	113	Out
		---	11			
			23 ---			
		---	10			
			22 -------	RI (*)	125	In
		---	9			
			21 ---			
In	109 (*)	DCD-------	8			
			20 -------	DTR (*)	108/2	Out
Ground	102	SG--------	7			
			19 -------	TxC(B)	113	Out
In	107 (*)	DSR-------	6			
			18 ---			
In	106 (*)	CTS-------	5			
			17 -------	RxC(A)	115	In
Out	105 (*)	RTS-------	4			
			16 -------	RxD(B)	104	In
In	104	RxD(A)----	3			
			15 -------	TxCE(A)	114	In
Out	103	TxD(A)----	2			
			14 -------	TxD(B)	103	Out
Shield	101	FG--------	1			

NOTES:

Viewed from mating face of 25-pin subminiature D male connector mounted on a V.35 LIM circuit board.

Pins with no signal names are unused (not connected).

Signals with (A) or (B) suffix are balanced differential pairs.

* Indicates standard bipolar RS-232 signal level:

Output: +10 V = ON = Space = "0"
-10 V = OFF = Mark = "1"
Maximum voltage is ±15 V

Figure B-18. V.35 LIM Connector

V.35 LIM-to-Modem (DCE) Pin Assignments

The 2617-1xx and 2xx are standard modem cables with a 34-pin male plug on the modem end. Pin assignments are shown in figure B-19.

LIM Plug 25-Pin (P1)				User Plug 34-Pin (P2)		
In/Out	Signal	Pin (P1)		Pin (P2)	Signal	In/Out
Shield	FG	1	--------------------------	A	FG	Shield
Out	TxD(A)	2	--------------------------	P	TxD(A)	In
In	RxD(A)	3	--------------------------	R	RxD(A)	Out
Out	RTS	4	--------------------------	C	RTS	In
In	CTS	5	--------------------------	D	CTS	Out
In	DSR	6	--------------------------	E	DSR	Out
Gnd	SG	7	--------------------------	B	SG	Gnd
In	DCD	8	--------------------------	F	DCD	Out
Reserved		9	--------------------------	f		
Reserved		10	--------------------------	g		
Reserved		11				
In	TxCE(B)	12	--------------------------	a	TxCE(B)	Out
In	RxC(B)	13	--------------------------	X	RxC(B)	Out
Out	TxD(B)	14	--------------------------	S	TxD(B)	In
In	TxCE(A)	15	--------------------------	Y	TxCE(A)	Out
In	RxD(B)	16	--------------------------	T	RxD(B)	Out
In	RxC(A)	17	--------------------------	V	RxC(A)	Out
	(*)	18				
Out	TxC(B)	19	--------------------------	W	TxC(B)	In
Out	DTR	20	--------------------------	H	DTR	In
	(*)	21				
In	RI	22	--------------------------	J	RI	Out
	(*)	23				
Out	TxC(A)	24	--------------------------	U	TxC(A)	In
	(*)	25				

* = Not used.

Figure B-19. 2617-1xx and 2xx Cable Pin Assignments

V.35 LIM-to-Terminal (DTE) Pin Assignments

The 2617-5xx are standard modem cables with a 34-pin female plug on the terminal end. Pin assignments are shown in figure B-20.

```
  LIM Plug 25-Pin (P1)                           User Plug 34-Pin (P2)
In/Out   Signal   Pin (P1)                      Pin (P2)   Signal    In/Out

Shield   FG          1 -------------------------- A        FG         Shield
Out      TxD(A)      2 -------------------------- R        RxD(A)     Out
In       RxD(A)      3 -------------------------- P        TxD(A)     In
Out      RTS         4 -------------------------- F        DCD        Out
In       CTS         5 ----Tied to 4
In       DSR         6 -------------------------- H        DTR        In
Gnd      SG          7 -------------------------- B        SG         Gnd
In       DCD         8 -------------------------- C        RTS        In
Reserved             9              Tied to C---- D        CTS        Out
Reserved            10
Reserved            11
In       TxCE(B)    12 -------------------------- W        TxC(B)     In
In       RxC(B)     13 ----Tied to 12
Out       TxD(B)    14 -------------------------- T        RxD(B)     Out
In       TxCE(A)    15 -------------------------- U        TxC(A)     In
In       RxD(B)     16 -------------------------- S        TxD(B)     In
In       RxC(A)     17 ----Tied to 15
          (*)       18               Tied to a----X        RxC(B)     Out
Out       TxC(B)    19 -------------------------- a        TxCE(B)    Out
Out       DTR       20 -------------------------- E        DSR        Out
          (*)       21
In        RI        22                            J        RI         Out
          (*)       23               Tied to Y----V        RxC(A)     Out
Out       TxC(A)    24 -------------------------- Y        TxCE(A)    Out
          (*)       25

* = Not used.
```

Figure B-20. 2617-5xx Cable Pin Assignments

Setting Printer Switches C

Setting Printer Switches C

This appendix contains the switch settings for the various printers that may be used in a CDCNET configuration. For more information on the switch settings, refer to your printer's manual(s).

At present, CDCNET supports the following printers:

- CDC533/536 asynchronous line printer
- CDC585 Unit Record Interface (URI) line printer
- CDC537 synchronous line printer
- CDC587 Unit Record Interface (URI) line printer

NOTE

To set the various attributes for your printer, use the CHANGE BATCH DEVICE ATTRIBUTES command (refer to the Batch Device User Guide listed in About This Manual).

CDC533/536 Asynchronous Line Printer

The recommended switch settings for the CDC533/536 printer are shown in table C-1. The main control panel options are shown in table C-2.

Table C-1. Recommended CDC533/536 Switch Settings

Switch Number	Switch Setting	Description
Switches on the 1PC1 Board		
1	ON	Online mode
2	ON	Unused
3	OFF	Unused
4	OFF	Unused
Switch Set SWN1 on the 1PC2 Board		
1	ON	Diagnostic routine selection
2	ON	Diagnostic routine selection
3	ON	Diagnostic routine selection
4	ON	Diagnostic routine selection
5	ON	Diagnostic routine selection
6	ON	Diagnostic routine selection
7	ON	Diagnostic routine selection
8	ON	Diagnostic routine selection
9	ON	Diagnostic routine selection
Switch Set SWN2 on the 1PC2 Board		
1	ON	Channel 2 = bottom-of-form
2	ON	Channel 2 = bottom-of-form
3	OFF	No auto line-feed
Switch Set SWN3 on the 1PC2 Board		
1	OFF	I/O vertical format unit
2	ON	I/O vertical format unit
3	ON	3-line perforation skip
4	ON	3-line perforation skip
5	ON	136 columns
6	ON	Unused
7	ON	VT selects channel 3
8	OFF	Unused

Table C-2. Main Control Panel Options

Option Number	Setting	Description
01	N/A	Reserved
02	N	Auto new line on carriage return
03	Y	Lower to upper-case translate
04	Y	Auto new line on right margin
05	Y	S0/S1 enable
06	Y	Convert vertical tab to line-feed
07	FF	Invalid control code substitute character code
08	FF	Invalid control sequence substitute character code
09	FF	Transmission error substitute character code
10	Y	Substitute on invalid control code
11	Y	Substitute on invalid control sequence
12	Y	Substitute on transmission error
13	Y	Sound bell on invalid control code
14	Y	Sound bell on invalid control sequence
15	Y	Sound bell on transmission sequence
16	N	Halt on invalid control code
17	N	Halt on invalid control sequence
18	N	Halt on transmission error
19	N	Monitor data set ready
20	N	Monitor received line signal detector
21	N	Drop data terminal ready on printer offline
22	3	Constant RTS without wait for CTS
23	N	Reserve channel enable (almost full = Off)
24	N	Invert reverse channel (almost full = On)
25	Y	Send X-ON/X-OFF enable
26	N	Break enable

(Continued)

Table C-2. Main Control Panel Options *(Continued)*

Option Number	Setting	Description
27	N	Auto enable answer
28	Y	Parity enable
29	0	Odd/Even parity
30	N	Synchronous mode
31	N	Sync transmit mode with external clock
32	N	Pacers follow start/stop
33	96	Select baud rate
34	7	Data byte bit length
35	1	Number of stop bits
36	10	Set buffer almost full threshold (X 16 decimal or 10 hex)
37	10	Set buffer almost empty threshold (X 16 decimal or 10 hex)
38	00	Set carrier dropout time limit (seconds)
39	00	Set no activity timer (seconds)
40	00	Set data terminal ready off timer (seconds)
41	N/A	Translate on 48 character-set print baud
42	N/A	Translate on 64 character-set print baud
43	N/A	Translate on 96 character-set print baud
44	N/A	Translate on 128 character-set print baud
45	Y	Enable control panel buffer clear switch
46	1	Set number of sync characters
47	16	Set sync character code
48	N/A	Reserved
49	N/A	Reserved
50	N/A	Reserved
51	N/A	Reserved
52	N/A	Reserved
53	N	Auto start
54	N	Immediate status response
55	Y	Ignore NUL/DEL codes without echo or SO conversion

CDC585 Unit Record Interface (URI) Line Printer

The recommended switch settings for the CDC585 printer are shown in table C-3.

Table C-3. Recommended CDC585 Switch Settings

Switch Number	Switch Setting	Description
Switch Set SW1		
1	ON	SW1-1 and SW1-2 select channel 8 as the
2	ON	bottom-of-form channel
3	OFF	SW1-3, 1-4, and 1-5 form a binary number
4	OFF	which describes the number of lines to be
5	OFF	skipped when the bottom-of-form is reached. SW1-3 is the low-order bit, SW1-5 is the high order bit. Setting all three switches to OFF specifies skipping 0 lines. Enabled by switch 3-2.
6	OFF	No Line feed on carriage return
7	OFF	Retain ready status on parity error
8	OFF	Report VFU ready status (must be OFF)
Switch Set SW2		
1	OFF	Retain ready status on error conditions
2	OFF	Strobe signal not delayed
3	ON	Disable dual interface function
4	OFF	Unused (must be OFF)
5	OFF	Unused (must be OFF)
6	OFF	Unused (must be OFF)
7	OFF	Execute control codes
8	ON	Select DPC standard interface
Switch Set SW3		
1	OFF	Stop on end-of-form detection
2	ON	Disable skipover function defined by SW1-3, 4, 5
3	ON	Enable VFU skipover
4	OFF	Data line 5 is VFU control bit
5	OFF	Control bit false indicates channel command
6	ON	Step-count truncate enabled - If a line skip command results in a position past top-of-form, the skip count will be truncated to place the paper at the top of the form.
7	ON	SW3-7 and SW3-8 select DAVFU with
8	ON	8 data bits plus PI.

(Continued)

Table C-3. Recommended CDC585 Switch Settings *(Continued)*

Switch Number	Switch Setting	Description
Switch Set SW4		
1	ON	Select data 1 through 7 signals high true
2	ON	Select data 8 signal high true
3	ON	Select data P signal high true
4	OFF	Select PI signal high true
5	OFF	Select strobe signal high true
6	ON	Select buffer clear signal low true
7	ON	Select printer status signals high true
8	ON	Select ready status signal high true
Switch Set SW5		
1	OFF	Select interface control 326 ns clock (must be OFF)
2	OFF	Enable 8th data bit (communications protocol - must be OFF)
3	ON	Select 8th data bit not for PI (communications protocol - must be ON)
4	OFF	Unused (must be OFF)
5	ON	Selects parity check on 8 bits
6	OFF	Select odd parity (enabled with SW5-7)
7	OFF	Enable parity check
8	OFF	Unused (must be OFF)

CDC537 Synchronous Line Printer

The recommended switch settings for the CDC537 printer are shown in table C-4.

Table C-4. Recommended CDC537 Switch Settings

Switch Number	Switch Setting	Recommended Switch Setting Action
SW1-1	ON	Step-Count Truncate
SW1-2	OFF	Initial Status is Stop after Power-on
SW1-3	OFF	Print Only on Buffer Full Condition
SW1-4	OFF	Do not Convert to Uppercase
SW1-5	OFF	No Double LF
SW1-6	ON	Print on PF Command
SW1-7	OFF	Maximum of 8 Overprints
SW1-8	OFF	No Line-feed on Carriage Return
SW2-1	OFF	Invalid Characters Printed as Spaces
SW2-2	ON	Invalid Function Code is Ignored
SW2-3	ON	DEL Code is Invalid
SW2-4	ON	VFU Skipover is Enabled
SW2-5	OFF	Works with switches SW6 and SW7 to form a binary
SW2-6	OFF	number which specifies the number of skipover lines
SW2-7	OFF	for bottom-of-form. SW5=OFF, SW6=OFF, and SW7=OFF specify Skipover = 3
SW2-8	OFF	DEL Code = DEL Control Code
SW3-1	OFF	Disable FLS Switch
SW3-2	OFF	Unused
SW3-3	OFF	Unused
SW3-4	OFF	Unused
SW3-5	OFF	Unused
SW3-6	OFF	Unused
SW3-7	OFF	Unused
SW3-8	ON	Selects character printed for code 23 hex when universal UK/US band (HKK32) is used. OFF selects English pound sign. ON selects U.S. pound sign (#).
SW4-1	ON	Enable 7 Data Bits
SW4-2	ON	Enable 1 Stop Bit
SW4-3	OFF	Tx Parity
SW4-4	OFF	Rx Parity
SW4-5	ON	Even Parity
SW4-6	OFF	Data Buffer = 4K Bytes
SW4-7	OFF	CAN Code Disabled
SW4-8	ON	No Modem - RTS Constantly On

(Continued)

Table C-4. Recommended CDC537 Switch Settings *(Continued)*

Switch Number	Switch Setting	Recommended Switch Setting Action
SW5-1	OFF*	Used with SW5-3, SW5-4, and SW5-5 to Set BPS
SW5-2	OFF*	Used with SW5-6 to Set Protocol
SW5-3	OFF*	Switches SW5-1, SW5-3, SW5-4, and SW5-5 Set BPS
SW5-4	ON*	
SW5-5	OFF*	SW5-1 SW5-3 SW5-4 SW5-5 BPS OFF, OFF, OFF, OFF = 19,200 *OFF, OFF, ON, OFF = 9,600 OFF, OFF, OFF, ON = 7,200 OFF, OFF, ON, ON = 4,800 ON, OFF, OFF, OFF = 3,600 OFF, OFF, ON, OFF = 2,400 ON, OFF, OFF, ON = 2,000 ON, OFF, ON, ON = 1,800 OFF, ON, OFF, OFF = 1,200 OFF, ON, ON, OFF = 600 OFF, ON, OFF, ON = 300
SW5-6	OFF	Used with SW5-2 to Set Protocol SW5-2 SW5-6 OFF, OFF SIMPLEX ON, OFF UNBLOCKED FULL-DUPLEX OFF, ON BLOCKED FULL-DUPLEX
SW5-7	OFF	Internal Clock Selection
SW5-8	OFF	Unused
SW6-1	OFF	Low Frequency
SW6-2	OFF	SCA Low
SW6-3	ON	CTS Disabled
SW6-4	ON	DCD Disabled
SW6-5	ON	DSR Disabled
SW6-6	OFF	DTR Only
SW6-7	OFF	Rx Clock Internal
SW6-8	OFF	Tx Clock Internal

CDC587 Printer

The recommended settings for the CDC587 printer are shown in table C-5.

NOTE

You must use the printer's long-line driver port with a URI LIM.

Table C-5. Recommended CDC587 Switch Settings

Switch Number	Switch Setting	Description
Switch SW201 on PCI in power supply		
1	ON	The initial power ready signal is supplied by the internal circuit.
2	ON	The initial power ready signal is supplied by the internal circuit.
3	ON	The initial power ready signal is supplied by the internal circuit.
4	ON	Power alarm signal is supplied by the internal circuit.
5	ON	Disconnect DISABLE SW-NO from PCI Unit.
6	ON	Disconnect DISABLE SW-NC from PCI Unit.
7	ON	Disconnect DISABLE SW-C from PCI Unit.
Switch CPSW1 on CE608 board		
1	OFF	Microprocessor is running.
2	OFF	Spare to be used for future standard option requirement.
3	OFF	Spare to be used for future standard option requirement.
4	OFF	FORM LENGTH is set for 11 inches.
5	OFF	Enables HD TR CHECK for the odd columns.
6	OFF	Enables HD TR CHECK for the even columns.
7	OFF	Enables P-ROM SUM CHECK.
8	OFF	Enables P-ROM/RAM PARITY CHECK.

(Continued)

Table C-5. Recommended CDC587 Switch Settings *(Continued)*

Switch Number	Switch Setting	Description
Switch CPSW2 on CE608 board		
1	ON	136 Hammers are installed.
2	ON	136 columns are available for Interface Operation.
3	OFF	Spare to be used for future standard option requirement.
4	OFF	Spare to be used for future standard option requirement.
5	OFF	Spare to be used for future standard option requirement.
6	OFF	Spare to be used for future standard option requirement.
7	OFF	Spare to be used for future standard option requirement.
8	ON/OFF	ON selects U.S. pound (#) character. OFF selects English pound character.
Switch SW1 on IF131 board		
1	ON	DPC interface is enabled.
2	OFF	Spare to be used for future standard option requirement.
3	ON	START CODE/STOP CODE=6E/6F for DPC IF.
4	OFF	Slew/Skip ID bit=2^4 (D5).
5	OFF	ID bit 2^4 (2^6)=0 means "skip to CH m".
6	ON	Bit 6 ON and bit 7 OFF indicates VFU ready
7	OFF	is available.
8	OFF	Spare to be used for future standard option requirement.

(Continued)

Table C-5. Recommended CDC587 Switch Settings *(Continued)*

Switch Number	Switch Setting	Description
Switch SW2 on IF131 board		
1	OFF	INVALID print character code is spaced.
2	ON	INVALID Function code is spaced.
3	OFF	CR, LF, FF are regarded as VALID F.C.
4	OFF	Spare to be used for future standard option requirement.
5	OFF	CR means "PRINT only" Function.
6	OFF	Spare to be used for future standard option requirement.
7	OFF	Spare to be used for future standard option requirement.
8	OFF	Spare to be used for future standard option requirement.
Switch SW3 on IF131 board		
1	OFF	LF indicates "SINGLE SPACE" Function.
2	ON	Bits 2 and 3 ON select BOF channel 8. This
3	ON	function is enabled even in FLS mode.
4	OFF	Bits 4, 5, and 6 indicate position where BOF
5	OFF	channel is loaded. All three bits OFF
6	OFF	indicates 0 lines from BOF channel to the next TOF. In case of DPC, BOF channel is specified by BOF CHANNEL SELECTION switches.
7	ON	When BOF channel is detected in the FCB for the line-advance command, an advance moves until the next CHI is detected.
8	ON	When CHI code is detected in the FCB for the line-advance command, an advance is truncated at the CHI position.

(Continued)

Table C-5. Recommended CDC587 Switch Settings *(Continued)*

Switch Number	Switch Setting	Description
Switch SW4 on IF131 board		
1	OFF	A line-advance command is decoded up to 15 lines.
2	OFF	LP continues to print until TOF is reached after PAPER OUT.
3	OFF	LP remains in the ONLINE state even if TRANS PARITY ERROR occurs.
4	OFF	LP remains in the ON LINE state, even if FCB LOAD CHECK occurs.
5	OFF	LP remains in the READY state, even if FCB DATA CHECK occurs, however ON LINE goes to inactive.
6	OFF	Spare to be used for future standard option requirement.
7	OFF	The 1403 compatibility function is disabled.
8	ON	DPC LONG interface is enabled.
Switch SW5 on IF131 board		
1	OFF	DATA and DATA P are recognized as High true signals.
2	OFF	ONLINE is High true.
3	OFF	BUSY is High true signal.
4	OFF	PI is recognized as High true signal.
5	ON	STROBE is recognized as High true signal.
6	OFF	BUFCLR is recognized as Low true.
7	OFF	PAPER MOVING, VFU READY, CH9 STATUS, PAPER EMPTY, PARITY ERROR, TOF, BOF become High true.
8	OFF	READY IS High true.

(Continued)

Table C-5. Recommended CDC587 Switch Settings *(Continued)*

Switch Number	Switch Setting	Description
Switch SW6 on IF131 board		
1	ON	80.5 ns CLOCK is used for the interface control clock.
2	OFF	Enables the 8th data bit.
3	OFF	DATA 8 is not used for PI.
4	OFF	DATA STROBE is required conjunction with PI for paper instruction.
5	ON	DEMAND is recognized as High true.
6	OFF	Odd parity check.
7	OFF	The printer will enable to perform a parity check on 8 data lines.
8	OFF	VFU VERIFY is not reported.
Switch SW1 on SD031 board		
1	ON	Normal mode.
2	ON	Normal mode.
3	ON	Table auto-up function is disabled.
4	OFF	Spare to be used for future standard option requirement.

IEEE 802.3 and Ethernet V 1.0, V2.0 Specifications Comparisons D

IEEE 802.3 and Ethernet V 1.0, V 2.0 Specifications Comparisons D

Table D-1 notes some of the differences between the IEEE 802.3 and the Ethernet V 1.0, V 2.0 specifications that may present implementation problems. The material in the table is listed in the order in which it appears within the IEEE 802.3 specification. For the most part, times are given in bit times. Real times are specified relative to a 10-Mbit-per-second data rate. A dash (–) indicates that a value was not specified or could not be found in the specification.

Table D-1. 802.3 and V 2.0, V 1.0 Specifications Comparison Chart

Subject	802.3	V 2.0	V 1.0
Preamble	56 bit times	64 bit times	64 bit times
Preamble bits consumed by DTE	18 max	16 max	16 max
Carrier Sense Inhibit function:			
• Minimum time to clear the Carrier Sense signal after loss of carrier presence (receive and collisions).	–	1.6 bit times	–
• Carrier Sense inhibited period	4 to 8 µs	4 to 9.6 µs	–
Data Rates Supported	1 to 10 M bps	10 M bps	10 M bps
Transceiver Cable Driver:			
• AC Signal Levels	450 mV min – 1315 mV max	550 mV min 700 mV nom 1200 mV max	– – –
• Idle (IDL) Levels	0 mV ± 40 mV	0 mV	700 mV
• Time for returning to IDL • state following last • positive-going transition of • the frame.	200 ns to 8 µs	300 ns to 2 ms	–
• Voltage presented to the • transceiver cable by the • driver during return to IDL • time.	100 mV differential	100 mV differential	–

(Continued)

Table D-1. 802.3 and V 2.0, V 1.0 Specifications Comparison Chart *(Continued)*

Subject	802.3	V 2.0	V 1.0
• Collision Presence test.			
– Time following the last positive-going transition on the transmit pair by which the signal shall begin.	4 ns	360 ns	–
– Time following the last positive-going transition on the transmit pair by which the signal shall end.	8 ns	500 ns	–
– Duration of signal.	10 ± 5 bit times	300 ns min (3 bit times)	–
• Transceiver cable squelch (receiver threshold level)	160 mV min	175 mV min	–
• DC Common Mode output (driver) voltage (V_C)	0 - 5.5 V	0 - 5 V	0 - 5 V
Timing distortion jitter	1.5 ns max	± 2 ns with ± 200 mV peak sinusoidal signal	± 2 ns with ± 200 mV peak sinusoidal signal
Maximum jitter received by DTE	± 18 ns	± 7 ns	± 7 ns
Circuit shield terminators:			
• Pins 1, 4, 8, 11, and 14	Grounded in DTE; capacitively coupled to V_C in transceiver	Reserved	Reserved
• Connector ground pin	Ground shield connected to connector shell	Pin 1 connected to connector shell and ground shield	Pin 1 connected to connector shell and ground shield

(Continued)

Table D-1. 802.3 and V 2.0, V 1.0 Specifications Comparison Chart *(Continued)*

Subject	802.3	V 2.0	V 1.0
Jabber control	Auto reset by absence of transmit signal for 0.5 sec ± 50 %	No auto reset. Must be ready to transmit within 100 ms of fault determination	No auto reset. Must be ready to transmit within 100 ms of fault determination
Input bias current	+2 µA to -25 µA	-	50 mA
Collision (SQE) to Jam Delay of Repeater	6.5 bit times	-	-
Propagation Delay through Repeaters	7.5 bit times	6 bit times	8 bit times
Worst Case Round Trip Signal Propagation Delay	499 bit times	464 bit times	465 bit times

Converting a 255x Cabling Scheme to a CDCNET TDI/NDI Cabling Scheme E

Converting a 255x Cabling Scheme to a CDCNET TDI/NDI Cabling Scheme E

This appendix describes how to convert from a 255x cabling scheme to a CDCNET TDI/NDI cabling scheme without removing existing 255x cables. This includes the cabling scheme for the following six major 255x cable types most commonly used in 255x installations (refer to the Control Data ACLA Hardware Maintenance manual, Control Data SCLA Hardware Maintenance manual, and Control Data Synchronous Bit Protocol Communications Line Adapter Hardware Maintenance manual:

- 10400-1 - ACLA to DCE Connection with Make Busy option (103/113/212)
- 10400-2 - ACLA to DTE Connection (null-modem cable)
- 10400-3 - ACLA to DCE Connection with Originate Mode option (202)
- DU184-A/B or DU138-A with XA129-A/YA224-A - Bell Type 209 support
- DU185-A or DU138 with XA132-A/YA227-A - Synchronous DTE Connection
- DU193-A/B or DU140 with XA137/YA232-A - V.35 Connection

NOTE

The first three items describe the ACLA. The second three items describe the SCLA. The DU192-A/B or DU139-A with XA136-A/YA231-A cable is not discussed since it is used to connect a SCLA to Bell 301/303 equipment; this equipment is not supported by CDCNET.

The cables are further defined later in this appendix.

How to Convert a 255x to a TDI/NDI

Figure E-1 shows three configurations which are labeled in the figure as 1, 2, and 3. The configuration labeled 1, shows the current cabling scheme for a 255X. The configuration labeled 3 shows the way the cabling scheme looks after the conversion is made. The configuration labeled 2 shows the CABLE DEMARCATION POINT. This is the point at which any connecting device must see the proper interface. For example, if the ACLA/SCLA CABLE shown in figure E-1 is a 10400-2, any device connecting to that point must be capable of driving DTE-type equipment; the ACLA is such a device. In other words, the device which connects to that demarcation point will see a DTE at the other end. Therefore, the device connecting to the demarcation point must emulate a DCE.

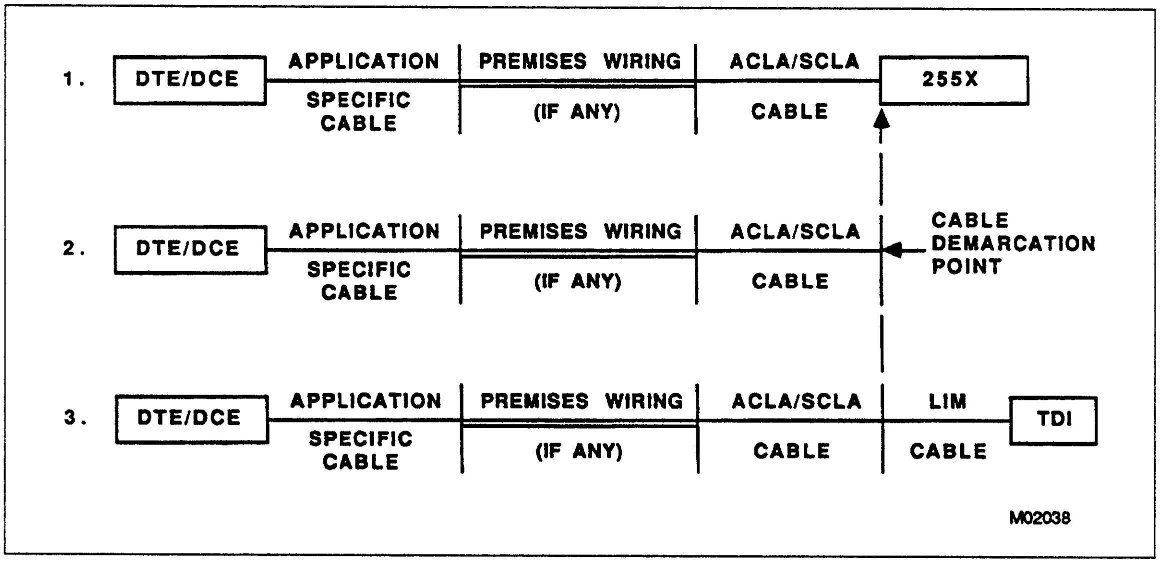

Figure E-1. 255x Cabling Scheme

To convert the 255x cabling scheme to a TDI/NDI cabling scheme, use the following step-by-step procedure.

Step 1

Read the specifications (listed later in this appendix) for each conversion cable to determine which one to use.

NOTE

The user must ensure that the additional CDCNET cable does not introduce a total cable length between LIM and DCE/DTE that exceeds the maximum recommended cable length for RS-232-C and the respective LIM. Refer to the Product Descriptions manual for the cable lengths).

Step 2

Disconnect the ACLA/SCLA cable from the CLA port on the 255x (figure E-1).

Step 3

Connect the male connector of the conversion cable to the female connector on the ACLA/SCLA cable (figure E-1).

NOTE

The ACLA/SCLA cable has a female connector on the CABLE DEMARCATION POINT side (figure E-1) to permit connection to the male connector mounted on the ACLA/SCLA modules. The CDCNET cables described in this appendix are the correct gender to mate to the ACLA/SCLA cable. The CDCNET cables are shipped with locking screws and posts to permit mechanical locking of these cables to the 255x cables.

Step 4

Check the type of LIM board being used in the TDI/NDI. If it is an 8-port LIM, go to step 5. If it is a 4-port LIM board, go to step 6.

NOTE

If the connection involves a V.35 interface, then a new and separate cable must be installed between the CDCNET V.35 LIM and the specific V.35 DCE/DTE (figure E-1).

Step 5, 8-Port LIMS Only

Connect the other end of the conversion cable to a YA324-x (the –x indicates a cable length designator) modular adapter (figure E-2). Connect the modular adapter to the 8-port LIM YA333-x RJ-45 connector/cable (figure E-2). Connect the remaining end of the 8-port LIM cable to the LIM board (figure E-3).

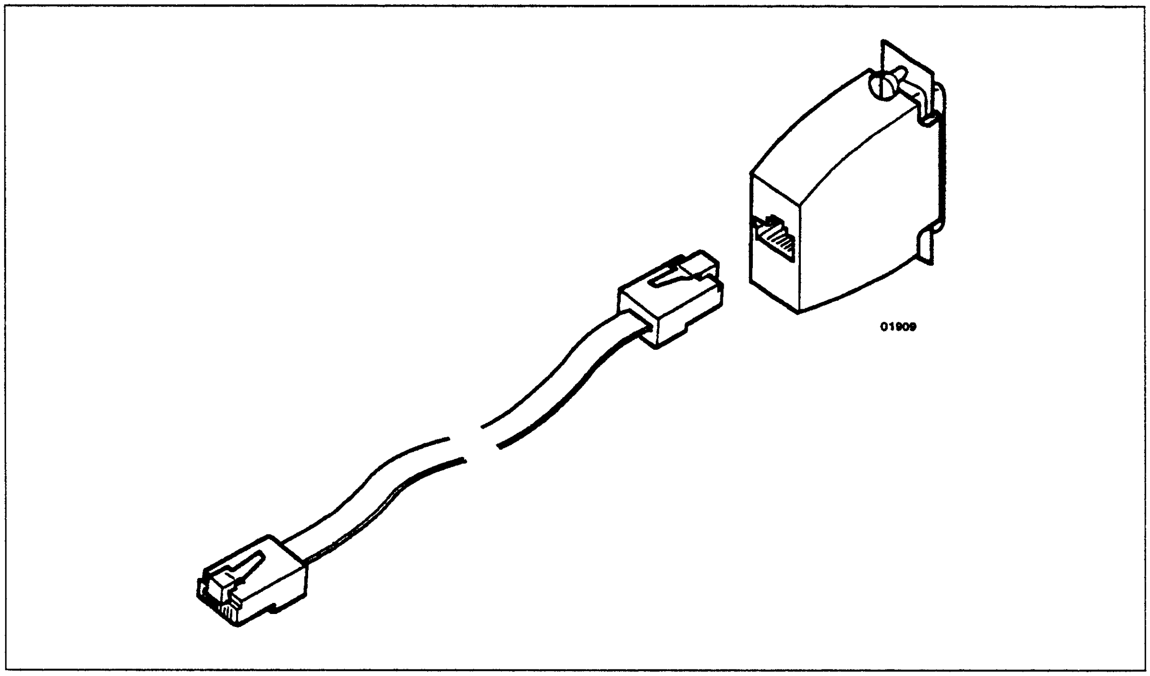

Figure E-2. 8-Port Cable (YA333-x) and Modular Adapter (YA324-x)

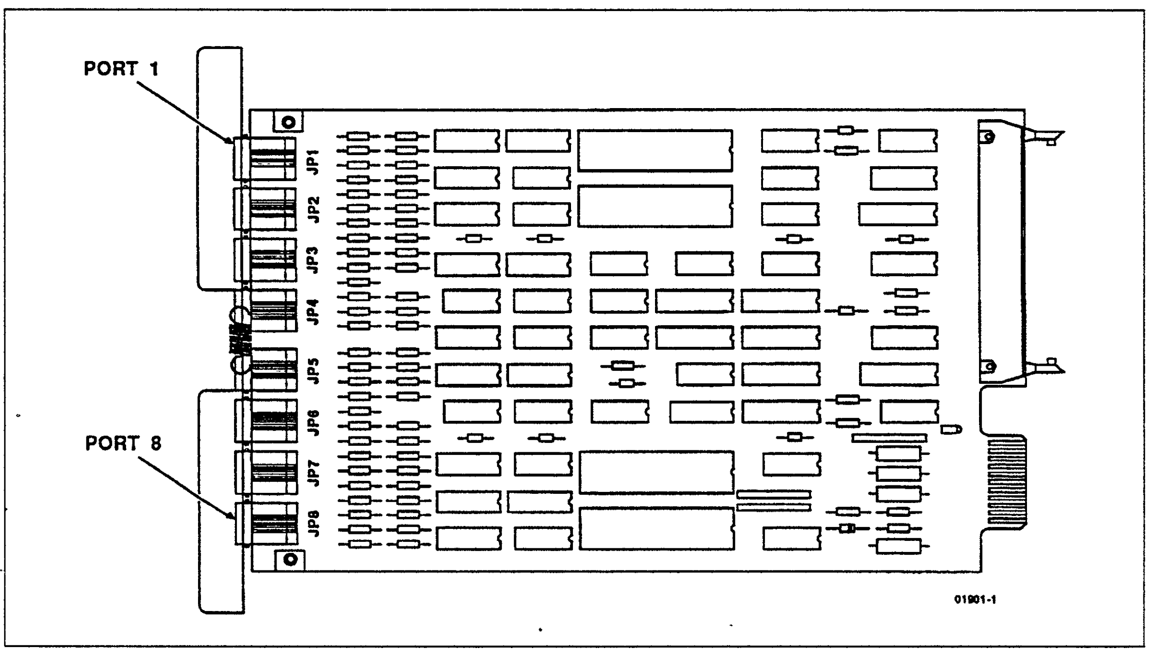

Figure E-3. 8-Port LIM

Step 6, 4-Port LIMS Only

Connect the remaining end of the 4-port LIM cable to the LIM board (figure E-4).

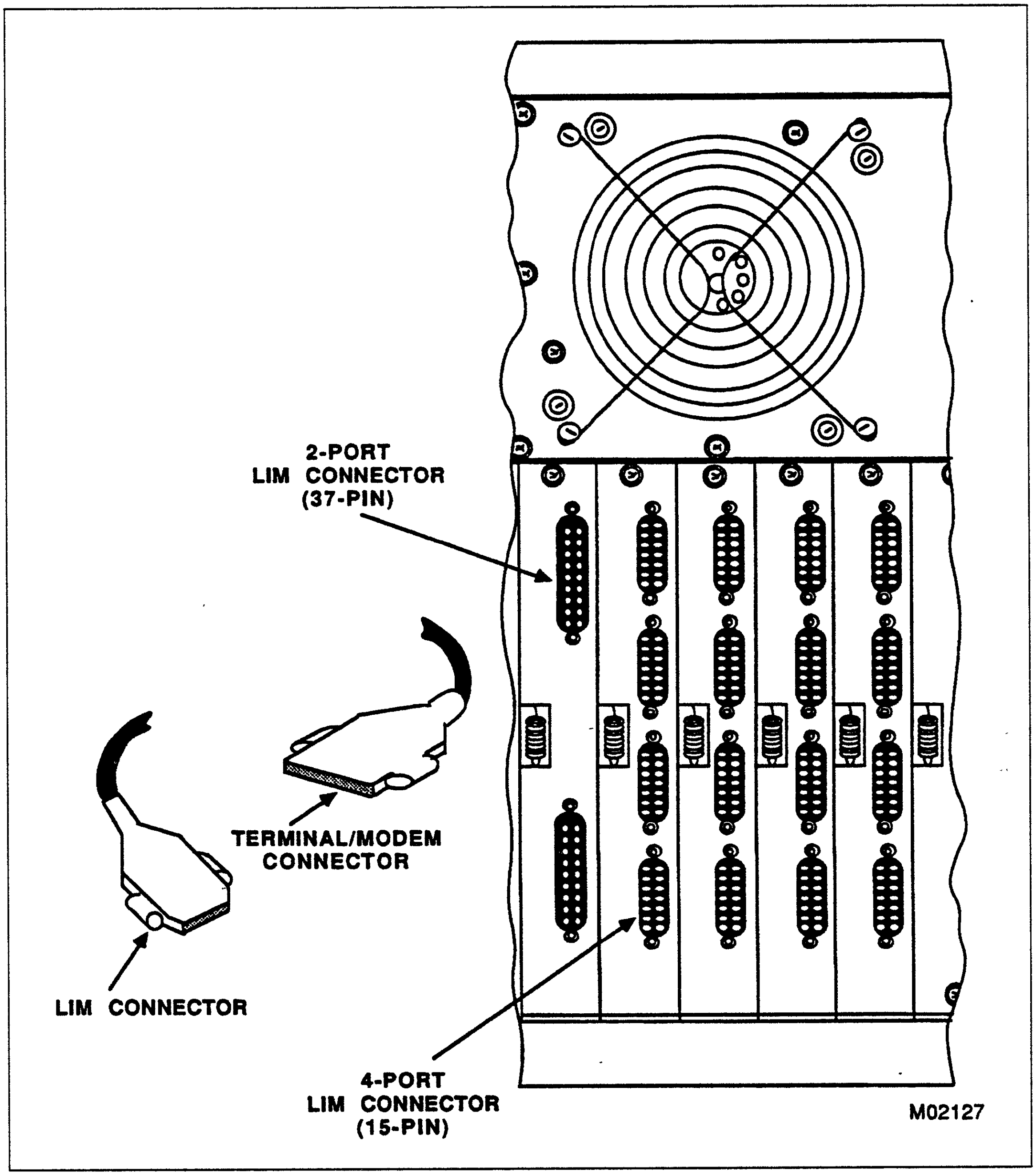

Figure E-4. 4-Port LIM Connectors

10400-1 Cable

The 10400-1 cable (table E-1) is used to connect the ACLA to the Bell Type 103/113/212 modems (DCE). The ACLA supports the Terminal Busy (CN) signal which is not supported by the 4-port LIM (DY229-B); it is only supported by the 8-port LIM (DY267-A). Therefore, if the DCE connected to the 10400-1 supports and requires the Terminal Busy signal, then the 10400-1 must only connect to an 8-port LIM.

If the DCE does not support and/or require Terminal Busy, then the 4-port LIM can be used. The 4-port LIM can be used to replace an ACLA that is using Terminal Busy by disabling the Terminal Busy function at the DCE modem. For example, on a Bell 212A modem this is option CN and TM assignments.

Neither the 4-port LIM nor the 8-port LIM support the Ring Indicator (RI) circuit (CE) of the RS-232-C interface.

Refer to the LIM/Cable Connectability Matrix in the CDCNET Product Descriptions manual for other possible equipment options.

Table E-1. 10400-1 Cable

<-- PREMISES WIRING OR DCE/DTE | CABLE DEMARCATION POINT (V) | CDCNET TDI/NDI LIM -->

ACLA/SCLA CABLE | LIM CABLE -- LIM

10400-1			YA324-C (2618-31) -- 8-PORT LIM DY267		
DCE PIN	DESCRIPTION	DEMARC PIN	DEMARC PIN	DESCRIPTION	SIG. FLOW
1	PROT. GND	1	1 (NC)	---------	
2	TX DATA	2	2	TX DATA	<------
3	RX DATA	3	3	RX DATA	------>
4	RTS	4	4	RTS	<------
5	CTS	5	5 (NC)	---------	
6	DSR	6	6	DSR	------>
7	SIG. GND	7	7	SIG. GND	<----->
8	DCD	8	8	DCD	------>
20	DTR	20	20	DTR	<------
22	RI	22	22 (NC)	---------	
25	TERM. BUSY	25	25	CN	<------

10400-2 Cable

The 10400-2 cable (tables E-2 and E-3) is used to connect an asynchronous terminal (DTE) to the ACLA.

NOTE

Due to the 10400-2 construction (RTS/CTS connected together), DTE Hardware Flow Control cannot be supported from the TDI/NDI. If this option is required, review Interconnecting DIs and Terminal Devices in the CDCNET Product Descriptions manual for connectivity options.

Table E-2. 10400-2 Cable (4-Port LIM)

```
<-- PREMISES WIRING OR     CABLE DEMARCATION POINT      CDCNET TDI/NDI LIM -->
    DCE/DTE                            |
                                       V
             ACLA/SCLA CABLE                           LIM CABLE -- LIM
---------------------------------------|--------------------------------------
|              10400-2                 |TN108 (2612-1XX) -- 4-PORT LIM DY229B|
|--------------------------------------|-------------------------------------|
|DTE PIN      DESCRIPTION    DEMARC PIN|DEMARC PIN     DESCRIPTION   SIG. FLOW|
|--------------------------------------|-------------------------------------|
| 1            PROT. GND           1   |    1          PROT. GND     <-----> |
| 3             TX DATA            2   |    2           TX DATA      <------ |
| 2             RX DATA            3   |    3           RX DATA      ------> |
| 8 <-------------------------     4   |    4             RTS        <------ |
|               RTS&CTS         |-> 5   |    5             CTS        ------> |
| 20          DTR -> DSR           6   |    6             DSR        ------> |
| 7             SIG. GND           7   |    7          SIG. GND      <-----> |
| 4&5 -<------ RTS&CTS --------->  8   |    8             DCD        ------> |
| 6           DSR <- DTR          20   |   20             DTR        <------ |
```

Table E-3. 10400-2 Cable (8-Port LIM)

```
|              10400-2                 |YA324-C (2618-31) -- 8-PORT LIM DY267|
|--------------------------------------|-------------------------------------|
|DTE PIN      DESCRIPTION    DEMARC PIN|DEMARC PIN     DESCRIPTION   SIG. FLOW|
|--------------------------------------|-------------------------------------|
| 1            PROT. GND           1   |    1  (NC)    -------               |
| 3             TX DATA            2   |    2           TX DATA      <------ |
| 2             RX DATA            3   |    3           RX DATA      ------> |
| 8 <-------------------------     4   |    4             RTS        <------ |
|               RTS&CTS         |-> 5   |    5  (NC)    -------               |
| 20          DTR -> DSR           6   |    6             DSR        ------> |
| 7             SIG. GND           7   |    7          SIG. GND      <-----> |
| 4&5 -<------ RTS&CTS --------->  8   |    8             DCD        ------> |
| 6           DSR <- DTR          20   |   20             DTR        <------ |
| ---         ----------    (NC)  25   |   25             CN         <------ |
---------------------------------------|--------------------------------------
```

10400-3 Cable

The 10400-3 cable (table E-4) is intended for use with a DCE that supports either SRTS or Originate Mode. CDCNET does not support DCEs which require/offer the SRTS/Originate Mode options. Therefore, if the equipment connected to the 10400-3 requires SRTS/Originate Mode support, it cannot be connected to a LIM.

Table E-4. 10400-3 Cable

```
<-- PREMISES WIRING OR     CABLE DEMARCATION POINT      CDCNET TDI/NDI LIM -->
    DCE/DTE                          |
                                     V
        ACLA/SCLA CABLE                              LIM CABLE -- LIM
-------------------------------------|--------------------------------------
|               10400-3              |TN108 (2612-1XX) -- 4-PORT LIM DY229B|
-------------------------------------|-------------------------------------|
                                     |YA324-C (2618-31) -- 8-PORT LIM DY267|
                                     ---------------------------------------
```

DU184-A/B or DU138-A with XA129-A/YA224-A Cable

This cable (table E-5) is intended for use with a DCE that supports a Quality Monitor, New Sync, and/or Signal Quality Detector signal at the interface. These options are typically associated with Bell Type 209 Data Set (DCE). CDCNET does not support DCEs which require/offer these particular options. Therefore, if the equipment connected to the XA129-A/YA224-A cable requires support of these options, then they cannot be connected to a LIM.

NOTE

Although the CLA hardware permits connection to the SRTS, SDCD, Originate Mode, Quality Monitor, New Sync, and/or Signal Quality Monitor DCE signals, the 255x CCP software does not support them. Those options, and their associated equipment, are documented for customer convenience only.

Table E-5. DU184-A/B or DU138-A with XA129-A/YA224-A Cable

ACLA/SCLA CABLE	LIM CABLE -- LIM
DU184-A/B or DU138-A w/ XA129A/YA224-A	TN108 (2612-1XX) -- 4-PORT LIM DY229B
	YA324-C (2618-31) -- 8-PORT LIM DY267

DU185-A or DU138 with XA132-A/YA227-A Cable

The XA132-A/YA227-A cable (table E-6) is used to connect the specified SCLA to a synchronous terminal (DTE). An example would be a HASP terminal or a workstation not requiring a bit rate in excess of 9.6 K bps. This type of connection does not supply a clocking signal to the SCLA.

NOTE

This conversion process assumes that the DTE at the other end of this cable is a device supported on CDCNET.

NOTE

The 8-port LIM can only be used for asynchronous connections. Therefore, the synchronous equipment (DCEs/DTEs) connected to the above SCLA must use the 4-port LIM.

Table E-6. DU185-A or DU138 with XA132-A/YA227-A Cable

```
<-- PREMISES WIRING OR     CABLE DEMARCATION POINT      CDCNET TDI/NDI LIM -->
    DCE/DTE                            |
                                       V
            ACLA/SCLA CABLE                          LIM CABLE -- LIM
--------------------------------------|-------------------------------------
|DU185-A/B or DU138-A w/ XA132-A/YA227A|TN108 (2612-1XX) -- 4-PORT LIM DY229B|
|--------------------------------------|------------------------------------|
|DTE PIN      DESCRIPTION   DEMARC PIN|DEMARC PIN     DESCRIPTION   SIG. FLOW|
|--------------------------------------|------------------------------------|
|  1             PROT. GND          1  |    1          PROT. GND     <-----> |
|  3              TX DATA           2  |    2           TX DATA      <------ |
|  2              RX DATA           3  |    3           RX DATA      ------> |
|  8 <-------------------------     4  |    4             RTS        <------ |
|                 RTS&CTS        |-> 5  |    5             CTS        ------> |
|  20           DTR -> DSR          6  |    6             DSR        ------> |
|  7              SIG. GND          7  |    7          SIG. GND      <-----> |
|  4&5 -<------ RTS&CTS --------> 8  |    8             DCD        ------> |
|  15 --+--------------------+-- 15  |    15      TX CLK. (DB)     ------> |
|  17 --|    RX CLK. (DD)     |-- 17  |    17      RX CLK. (DD)     ------> |
|  6            DSR <- DTR      |  20  |    20            DTR        <------ |
|  24  (NC)   EXT. CLK.(DA)     --- 24  |    24     EXT. CLK. (DA)   <------ |
```

DU193-A/B or DU140 with XA137/YA232-A Cable

The XA137/YA232-A cable (table E-7) establishes a connection to a DCE with a CCITT V.35 interface. This SCLA cable incorporates an ISO 2593-1973 34-pin connector at the DCE end, and a 25-pin male connector at the DEMARC end. A similar arrangement exists with the CDCNET TN490 cable. The TN490 connects a DCE to the V.35 LIM via an ISO 2573-1973 34-pin connector at the DCE end and a 25-pin connector at the LIM end. Due to these cabling schemes, direct cable/equipment conversion from the 255x to CDCNET cannot be accomplished due to connector incompatibilities. For this reason, it is recommended that a direct cable run be installed between the V.35 LIM and the V.35 DCE/DTE.

Refer to the CDCNET Product Descriptions manual for available options and supported equipment.

Table E-7. DU193-A/B or DU140 with XA137/YA232-A Cable

```
<-- PREMISES WIRING OR     CABLE DEMARCATION POINT      CDCNET TDI/NDI LIM -->
    DCE/DTE                           |
                                      V
        ACLA/SCLA CABLE                                 LIM CABLE -- LIM
--------------------------------------|--------------------------------------
|DU193-A/B or DU140-A w/ XA137/YA232-A |* NO DIRECT CABLE CONVERSION TO LIM *|
--------------------------------------|--------------------------------------
```

Interpreting General and Detailed Status from HPA Reports F

Interpreting General and Detailed Status from HPA Reports F

This appendix describes the MCI general and detailed status information that appears on HPA (hardware performance analyzer) reports. Figure F-1 is an example of this status as it appears on a NOS/VE Error Incident report. NOS HPA provides similar reports.

The topics covered here are as follows:

- Definition of MCI General Status
- Definition of MCI Detailed Status
- Examples of How to Interpret HPA Reports

```
REPORT 000000
ERROR INCIDENT REPORT
OPEN
PROCESSOR MODEL; CYBER 855 CLASS       S/N  109
PRODUCT ID:2621_210
S/N: 23
ELEMENT NAME: MDI1_23
REPORT GENERATED: 1988-11-01  08:35:18
==========================================================================
****                      MDI USER REQUESTED REPORT                   ****

DATA TIME RANGE: 12:31:34 (1988-10-14)  TO 11:38:20 (1988-10-17)

MESSAGE SUMMARY:                                                     TOTAL
INDETERMINATE ERROR                                                      1

--------------------------------------------------------------------------
12:31:34 1988-10-14 INTERMEDIATE WRITE
     INDETERMINATE ERROR
     PP= 26  CH= 21 GS=4100<--------General Status(Octal)             RETRY=01
    --DS01-DS13: 4007 0101 0800 2520 0075 0200 0110 0118 0000 0082 0001 0000 0000
    |
    |
    |
    |
____|_______
Detailed Status(Hex)
```

Figure F-1. Sample NOS/VE HPA Error Incident Report Example

Definition of MCI General Status

MCI general status (figure F-2) is a 12 bit status word maintained by MCI hardware. The peripheral processor reads the word to determine the status of the MCI. Figure F-2 shows each status bit and the following paragraphs describe their function.

```
                  Meaning
 Bit       _________________
          |                 |
 11       |      Error      |
          |_________________|
          |                 |
 10       |  Memory Error   |
          |_________________|
          |                 |
  9       | Data Available  |
          |_________________|
          |                 |
  8       |    Send Data    |
          |_________________|
          |                 |
  7       |    MCI Busy     |
          |_________________|
          |                 |
  6       | MCI Operational |
          |_________________|
          |                 |
  5       |                 |
          |       MCI       |
  4       |    Interface    |
          |      State      |
  3       |                 |
          |_________________|
          |                 |
  2       |                 |
          |      Flow       |
  1       |     Control     |
          |                 |
  0       |                 |
          |_________________|
```

Figure F-2. General Status Byte

Bit 11 - Error Bit

The MCI sets bit 11 if it detects an error condition. The bit is cleared when the peripheral processor program disconnects the channel after obtaining a general status byte.

The following error conditions set bit 11. The first six of these errors are defined in the Status 1 field of detailed status.

- MCI internal transfer bus (ITB) error
- MCI internal transfer bus read parity error
- Channel timeout
- Input data truncated
- Channel parity error
- Peripheral processor overrun
- Peripheral processor error
- MCI offline

When the MCI interface is in the MDI Reset or Diagnostics states (see bits 3, 4, and 5), the Error bit may be set and cleared as a part of running diagnostics on the MCI card. So in those states, it may be set as a result of something other than a true error condition.

Bit 10 - Memory Error

The MCI sets bit 10 if it detects an error while accessing SMM memory. Setting Memory Error results in bit 11 also being set. Bit 10 is cleared when the peripheral processor disconnects the channel after obtaining a general status byte.

When the MCI interface is in the MDI Reset or Diagnostics states (see bits 3, 4, and 5), the Memory Error bit may be set and cleared as a part of running diagnostics on the MCI card. So in those states, it may be set as a result of something other than a true error condition.

Bit 9 - Data Available

Bit 9 is valid only if bit 7 (MCI Busy) is not set. The MCI sets Data Available to indicate that it is ready to transmit data to the peripheral processor. MCI hardware clears the bit after transmitting the first data word. The following events also clear bit 9.

- Error during data transfer in any direction.
- Master Clear function from the peripheral processor program.
- Deadstart master clear signal on the channel.
- Reset of MCI by the MPB.
- MDI internal system bus (ISB) master clear.

Bit 8 - Send Data

Bit 8 is valid only if bit 7 (Busy) is not set. The MCI sets the Send Data bit to indicate that it is ready to receive write data from the peripheral processor. The MCI clears Send Data after receiving the first data word from the peripheral processor. The following events also clear bit 8.

- Error during data transfer in any direction.
- Master Clear function from the peripheral processor program.
- Deadstart master clear signal on the channel.
- Reset of MCI by the MPB.
- MDI internal system bus (ISB) master clear.

Bit 7 - MCI Busy

When set, bit 7 indicates that the MCI will not respond to any function other than a Master Clear or a request to send general status. Note that even though the peripheral processor can read general status when the Busy bit is set, the resulting general status byte is not valid.

Bit 6 - MCI Operational Bit

When set, bit 6 indicates that the MCI is in the operational state and ready for normal data transfer. The term normal data, as used here, does not include load and dump data transferred during the initialization phase. When clear, bit 6 indicates that the MCI interface is in a nonoperational state and not available for normal data transfer (see State Bits definitions below).

Bits 5,4,3 - State Bits

State bit definitions depend on the value of the MCI Operational bit, as described below.

- If the MCI Operational bit is clear, the MCI is in the nonoperational state specified by bits 3, 4, and 5. table F-1 gives State bit encoding and a brief definition for each nonoperational state.

  One of the nonoperational states, defined in table F-1, is the Diagnostics state. The Diagnostics state is a special case because general status bits 10 and 11 may be set as a result of errors intentionally induced during testing. Other error indications, however, may be unintentional. Use table F-2 to determine general status during the Diagnostics state.

  During diagnostics testing, the MCI also sends command codes to the peripheral processor. The command codes indicate the next test function to be performed and allow the peripheral processor to take whatever steps are necessary to accommodate that test. If an error occurs that prevents completion of diagnostic testing, the peripheral processor shows the last command code as part of the HPA error message. Table F-3 lists the command codes.

- If both the MCI Operational and Data Available bits (6 and 9) are set, then bits 3, 4, and 5 specify the next data unit (if any) to be transmitted to the peripheral processor program. The bit encoding depends on whether the MCI connects to a CYBER 180 or CYBER 170 mainframe (see tables below).

Bits 5 4 3	Next Data Unit for CYBER 180
0 0 0	CYBER 180 format pdu
0 0 1	CC format pdu
1 0 1	Inline Diagnostics pdu
Other	Illegal

Bits 5 4 3	Next Data Unit for CYBER 170
0 0 0	Non-PRU data of size < 256 bytes
0 0 1	Non-PRU data of size > 256 bytes
0 1 0	PRU data of size = 1 PRU
0 1 1	PRU data of size = 2 PRUs
1 0 0	PRU data of size = 3 PRUs
1 0 1	Inline Diagnostics Data
Other	Illegal

Bits 2,1,0 - Flow Control

Bits 0,1, and 2 definitions depend on the value of the MCI Operational bit, as described below.

- If the MCI is in the Operational state (bit 6 set), these bits define the normal connection global-flow-control state:

Bits 2 1 0	Meaning
0 0 0	Normal flow control is off
0 0 1	Normal flow control is on
Other	Illegal

- If the MCI is in the Diagnostics state, as indicated by the State bits, then bits 0, 1, and 2 are part of the general status defined by the MCI onboard diagnostic programs (see table F-2).

- The bits are not used for the other states.

Table F-1. General Status State Bit Encoding

Bits 5,4,3	MCI Interface State Description
0 0 0	MDI Reset - Indicates the MCI will not accept any peripheral processor function except a request for general status. The interface can enter this state for many reasons, including the following: • MDI reset. • MCI interface is not configured. • MCI interface fails diagnostics. • Peripheral processor issued a Master Clear, Shut Down or Request Diagnostics function. • MCI failure threshold was exceeded (too many errors detected). • Normal entry from another state.
0 0 1	Diagnostics - The MCI interface enters the diagnostic state following a reset due to an error recovery failure or power on. The purpose of this state is to indicate that the MDI wants to execute diagnostics on itself. After entering the diagnostics state, the MCI expects the peripheral processor to initiate the MCI diagnostics sequence. If the peripheral processor program fails to send the proper function within the specified time period, the MCI interface state changes to MDI Reset. The MDI Reset state is always re-entered at the conclusion of the diagnostics sequence.
1 0 0	Loading - Indicates that the MCI interface is being used to load and dump the MDI across the channel. This state is entered from the MDI Reset state. The MDI Reset state is always re-entered at the conclusion of the load process.
0 1 1	Starting - Indicates that the MCI interface is available for protocol version negotiation. The MCI interface enters this state from the MDI Reset state, after software is loaded and the DI is ready to enter normal operation with the peripheral processor. The MCI interface goes to the Operational state upon successful negotiation of a common protocol version. If negotiation fails, the MCI interface stays in the Starting state.

Table F-2. General Status During the Diagnostic State

-------------- Bits [1]------------- 11. 0	Interpretation
0 0 0 0 0 0 0 0 1 0 0 0	Diagnostics state
0 0 1 0 0 0 0 0 1 0 0 0	Diagnostic data available
0 0 0 1 0 0 0 0 1 0 0 0	Send diagnostic data
1 0 0 0 0 0 0 0 1 0 0 1	An expected error occurred during testing
1 1 0 0 0 0 0 0 1 0 1 0	An expected memory error occurred during testing
1 0 x x 0 0 0 0 1 x x 0	Unexpected error occurred during testing
1 1 x x 0 0 0 0 1 x 0 x	Unexpected memory error occurred during testing

1. x = don't care

Table F-3. Command Codes Sent By MCI During Diagnostic State

Bit Code (hex)[1]	Description
0 1 V S	Test mode request
0 2 V S	Data transfer to peripheral processor request
0 4 V S	Return data from peripheral processor request
0 8 V S	Set byte packing
0 8 V S	Read and pack byte data request
0 A V S	Set bit packing
1 A V S	Read and pack bit data request

1. Where V and S are interpreted as follows:

   V = Version number of MCI_DEQ diagnostic program.

   1 for release 1

   2 for MCI boards that contain FCO CA49716 or for release 1.3 or later MCI_DEQ.

   S = Care slot of MCI under test. This is used by the peripheral processor program in any error messages generated.

F

Definition of MCI Detailed Status

The MCI detailed status contains information about the last error, detected by the MCI. In addition, it identifies the MDI and the software currently loaded. The peripheral processor program can request detailed status during all states except MDI Reset and Diagnostics. Figure F-3 shows the overall format of the MCI detailed status provided to the peripheral processor. The following paragraphs define the meaning of each field and bit.

```
                      FIELDS AND BITS
                  1 1 1 1 1 1 9 8 7 6 5 4 3 2 1 0
                  5 4 3 2 1 0
                 ---------------------------------
         1       |   Protocol    |   Card slot   |
                 |-------------------------------|
         2       |            Version            |
                 |-------------------------------|
         3       |                               |
         4       |           System ID           |
     W   5       |                               |
                 |-------------------------------|
     O   6       |   Last I/O    |  Transparent  |
                 |-------------------------------|
     R   7       |         Last Function         |
                 |-------------------------------|
     D   8       |         Last But One          |
                 |-------------------------------|
     S   9       | S flg |    General Status     |
                 |-------------------------------|
        10       |   Status 1    |   Status 3    |
                 |-------------------------------|
        11       |          S/W Status           |
                 |-------------------------------|
        12       |                               |
        13       |       Maximum pdu size        |
                 ---------------------------------
```

Figure F-3. Detailed Status

Protocol Field

The Protocol field shows the version of the channel protocol being executed by the MCI. The contents of the protocol field are defined as follows:

Protocol Version	Description
0	Original protocol. Supports basic NOS protocol with data units in CYBER 170 format. Supports basic NOS/VE protocol with data units in CYBER 180 format. No negotiation to other protocol version.
1	Adds protocol negotiation and changes BIP protocol to pass coupler node from host. It can be negotiated to protocol version 0.
2	Adds padding to NAM network header for better NOS peripheral processor performance. It can be negotiated to protocol version 0 or 1.
3	Adds starting state to the peripheral processor. It can be negotiated to protocol version 2.
4	Adds starting state to the DI and independent peer failure detection. In addition, the Request Protocol Version transparent function is used for protocol negotiation rather than the sequence of a Set Protocol Version transparent function followed by a Write Data function and Start/Stop Regulation transparent functions. Can be negotiated to protocol version 3.
20	Original Pacer protocol. No negotiation to other protocol version.
21	Adds starting state, protocol negotiation, and independent peer failure detection. No negotiation to other protocol version.
40	Adds protocol negotiation to NOS/VE. It can be negotiated to protocol version 0.
41	Adds starting state to the peripheral processor. It can be negotiated to protocol version 40.
42	Finishes adding protocol negotiation to NOS/VE. Adds starting state to the DI, configurable maximum ccpdu size, global flow control by class, independent peer failure detection, and intermixing of CC and CYBER 180 format pdu's. It can be negotiated to protocol version 41.
43	Version 43 is equivalent to protocol version 42 except that only CC format pdu's are allowed. Version 43 cannot be negotiated to other protocol versions.

Card Slot Field

The Card Slot field shows the MDI slot slot number containing MCI board.

Version Field

The Version field shows the version of DCNS software loaded into the MDI.

System ID Field

The System ID field shows the system id of this MDI.

Last I/O Field

The Last I/O field indicates the last I/O operation. The following values are effective.

0 = last I/O operation not known

1 = peripheral processor issued Read

2 = peripheral processor issued Write

Transparent Field

The Transparent field shows the lower eight bits of the last transparent function received by the MCI, not including detailed status or normal operation.

Last Function Field

The Last Function field shows the last function that the MCI knows was issued by the peripheral processor. This does not include General Status, Detailed status, Normal Operation, Master Clear, and Set Packing Mode.

Last But One Field

The Last But One field contains the last function previous to the one in the Last Function field. The same restrictions apply.

S Flag Field

The S flag field contains four flags summarizing the following errors in the MCI subsystem. They are cleared by a successful I/O, hardware reset, master clear from peripheral processor, or deadstart-master-clear signal from channel.

- General Error (bit 15) - Indicates that the MCI subsystem knows of some error condition.
- Hardware Error (bit 14) - Indicates that the MCI detected a hardware error.
- Channel Error (bit 13) - Indicates that the MCI detected a channel error.
- Peripheral Processor Error (bit 12) - Indicates that the MCI detected an error by the peripheral processor.

General Status Field

The General Status field is not currently used.

Status 1 Field

The Status 1 field contains the most recent image of the MCI Internal Control Bus (ICB) Status Register 1 (table F-4).

Status 3 Field

The Status 3 field contains the most recent image of the MCI Internal Control Bus (ICB) Status Register 3 (table F-5).

S/W (Software) Status Field

The S/W Status field is defined as follows:

- Bit 0 (Length Error) - Indicates that the MCI software detected a length error after a write operation.
- Bits 1 through 15 - Not currently used.

Maximum PDU Size Field

The Maximum pdu size field contains the maximum ccpdu size the DI can send or receive.

Table F-4. MCI Internal Control Bus Status Register 1

Bit	Description
Bit 7	ITB Error - Indicates the MCI detected an error during an ITB (internal transfer bus) access. The MCI internal transfer bus carries bus contention and data transfer signals between the MPB, MCI, CIM, and memory boards in the MDI.
Bit 6	ITB Parity Error - Indicates a parity error on the ITB.
Bit 5	Channel Timeout - MCI sets this bit if it disconnects from the channel due to inactivity (channel is active but data is not transferred before specified timeout period).
Bit 4	Input Data Truncated - MCI sets this bit to indicate that the last read operation was terminated because the peripheral processor disconnected the channel prior to completion of the transfer.
Bit 3	Peripheral Processor Overrun - MCI sets this bit when the peripheral processor attempts to write more data than the MCI is prepared to transfer.
Bit 2	Channel Parity Error - Indicates detection of a parity error on the channel.
Bit 1	Not Used. This bit will always be zero.
Bit 0	Peripheral Processor Master Clear - Indicates the MCI received a master clear from the channel or a master clear function has been executed.

Table F-5. MCI Internal Control Bus Status Register 3

Bit	Description
Bit 7	Channel Active - Indicates the channel is active.
Bit 6	Packing Mode - Indicates the current packing mode selected by the MCI. A zero indicates bit packing and a one indicates byte packing.
Bits 5-3	Packing State - Indicates the extent of packing of the last operation.
Bit 2	Chaining - Set each time the MCI direct memory access controller chains.
Bit 1	Write - Indicates that the most recent direct memory access operation was a write to the DI system main memory (SMM).
Bit 0	Read - Indicates that the most recent direct memory access operation was a read from DI system main memory (SMM).

Examples of How to Interpret HPA Reports

This topic provides examples of how to use the general status (GS) and detailed status to find the cause of an error reported by HPA. The examples here show errors reported by NOS/VE. NOS reports have a different format but the process is the same for interpreting general and detailed status. These examples do not prepare you for every possible error condition. However, you should be able to determine if the MCI is failing or if the problem is due to something else. If the problem appears to be software related, refer it to a network analyst or the next level of support.

Example 1

The report shown below is an example of an HPA error incident report from a NOS/VE system. The detailed status area (lower third of report) shows the general status code and detailed status bytes associated with the error.

The following subsection describes how you could proceed to interpret this report.

```
--------------------------------------------------------------------------------

REPORT 000000
ERROR INCIDENT REPORT
OPEN
PROCESSOR MODEL; CYBER 855 CLASS       S/N  109
PRODUCT ID:2621_210
S/N: 23
ELEMENT NAME: MDI1_23
REPORT GENERATED: 1988-11-01  08:35:18
================================================================================
****                    MDI USER REQUESTED REPORT                          ****

DATA TIME RANGE: 12:31:34 (1988-10-14)  TO 11:38:20 (1988-10-17)

MESSAGE SUMMARY:                                                          TOTAL
INDETERMINATE ERROR                                                           1

--------------------------------------------------------------------------------
12:31:34 1988-10-14 INTERMEDIATE WRITE
     INDETERMINATE ERROR
     PP= 26  CH= 21  GS=4101                                           RETRY=01
     DS01-DS13: 4007 0101 0800 2520 0075 0200 0110 0118 0000 0082 0001 0000 0000




--------------------------------------------------------------------------------
```

Interpreting General Status

1. Check the message summary. The message reads: Indeterminate Error. This is no help, but by looking at general and detailed status it may be possible to isolate the cause.

2. Check General Status (GS) on line 3 of the detailed status for the failure. It is: 4101 (octal).

3. Converting general status to binary form you get:

```
BIT             BIT
11.. ... ... ..0
 100 001 000 001
```

4. Check the state bit (6) to see if it is set or clear. This bit determines how you should interpret most of the other bits. Here, bit 6 is set, so general status is as follows:

Bit 11 - Error	Set, indicating the MCI detected an error condition.
Bit 10 - Memory Error	Clear, indicating it was not a memory error.
Bit 9 - Data Available	Not valid because bit 6 is set.
Bit 8 - Send Data	Not valid because bit 6 is set.
Bit 7 - MCI Busy	Clear, indicating the MCI was not in a busy state when the error occurred. It also means that the related detailed status is valid. Detailed status is not valid if the MCI is busy.
Bit 6 - MCI Operational	Set, indicating the MDI was in the operational state when the error occurred.
Bits 3, 4, 5 - State	Operational bit is set, so these bits contain information about the next data unit to be sent during a data transfer.
Bits 0, 1, 2 - Flow Control	Operational bit (6) is On, so bits 0, 1, and 2 indicate flow control setting. Flow control is On in this example.

5. Based on the above interpretation, you can make the following assumptions:

   - MCI detected an error, but it was not a memory error (bits 10 and 11).
   - Because the Busy bit (7) is clear, the MCI was probably not in the middle of a data transfer. Also, detailed status is valid.
   - The MCI was in the operational state (bit 6), so the MCI passed onboards and software was successfully loaded.

6. Proceed to examine detailed status to see if the cause of the error (bit 11) was due to the MCI, channel, or software.

Interpreting Detailed Status

For this example, a good place to start is the Status 1 and Status 3 fields (see report on opposite page). Those fields contain detailed information from the associated MCI registers and should give an indication of what happened.

1. Interpret the Status 1 and 3 registers as follows:

Status 1 = 00000000	All bits are zero, thus eliminating any of the errors normally recorded in the MCI status 1 register.
Status 3 = 1000 0010	Bit 8 indicates the channel was active at the time of the error. Bit 1 indicates that the most recent direct memory operation was a write to system main memory (SMM) in the MDI. This correlates with the Last I/O field, which indicates the last I/O function was a Write.

2. The contents of the Status 3 field indicate a write problem so we will look at bit 1 of the S/W field to see if it was a length error.

S/W Field (Bit 1) = 1	This bit is set, thus indicating that MCI software detected a length error after the write operation.

3. Based on the detailed status, an MDI hardware failure caused an error during a write operation to system main memory (SMM). Run onboard, online, and inline diagnostics to find the problem.

F

```
------------------------------------------------------------------------------

REPORT 000000
ERROR INCIDENT REPORT
OPEN
PROCESSOR MODEL; CYBER 855 CLASS       S/N  109
PRODUCT ID:2621_210
S/N: 23
ELEMENT NAME: MDI1_23
REPORT GENERATED: 1988-11-01  08:35:18
==============================================================================
****                    MDI USER REQUESTED REPORT                         ****

DATA TIME RANGE: 12:31:34 (1988-10-14)  TO 11:38:20 (1988-10-17)

MESSAGE SUMMARY:                                                        TOTAL
INDETERMINATE ERROR                                                         1

------------------------------------------------------------------------------
12:31:34 1988-10-14 INTERMEDIATE WRITE
     INDETERMINATE ERROR
     PP= 26  CH= 21  GS=4101                                          RETRY=01
     DS01-DS13: 4007 0101 0800 2520 0075 0200 0110 0118 0000 0082 0001 0000 0000

                                                                Status 1 & 3 Registers

------------------------------------------------------------------------------
```

Example 2

The report shown on the next page is an example of a NOS/VE HPA error incident report that has a general status but no detailed status. The detailed status area (lower third of report) shows a value for general status, but no detailed status bytes.

The following describes how you could proceed.

1. Check the message summary. The message reads: Diagnostic Mode General Status Content Failure (Diagnostic Command = 417). This message indicates it was probably in the diagnostics state and 417 was the last command code sent by the MCI to the peripheral processor. Verify this by checking the general status.

2. Check general status code (GS) on line 3 of the detailed status for the failure. This code is: 4010 (octal).

3. Converting general status code to binary form you get:

```
BIT             BIT
11.. ... ... ..0
 100 000 001 000
```

4. Check the state bit (6) to see if it is set or clear. This bit determines how you should interpret most of the other bits. Here, bit 6 is clear, indicating the MCI interface is in a nonoperational state defined by bits 3, 4, and 5. Only bit 3 is set, indicating the MCI was in the Diagnostics state when the error occurred (see table F-1). This corresponds to what was implied by the message summary.

5. Determine the meaning of the general status word by comparing the bit pattern (100000001000) to those in table F-2. In this case, the general status indicates an unexpected error occurred during testing.

6. Determine the meaning of the command code shown in the message summary by referring to table F-3. Code 417 indicates the last command was a request to return data from the peripheral processor. The MCI was using version 1 of the MCI_DSEQ program, and the board is in slot 7.

7. Based on the above interpretation, the MCI in slot 7 probably failed during onboard diagnostics. Run onboards on that MCI and check the error LEDs.

```
--------------------------------------------------------------------------------

REPORT 005677
ERROR INCIDENT REPORT
OPEN
PROCESSOR MODEL; CYBER 855 CLASS        S/N  109
PRODUCT ID:2621_210
S/N: 381
ELEMENT NAME: GREEN_DI_300119
REPORT GENERATED: 1988-11-01  08:35:18
================================================================================
****                       MDI DOWNED BY SYSTEM                             ****

DATA TIME RANGE: 09:11:51 (1988-09-25)  TO 09:11:51 (1988-09-25)

MESSAGE SUMMARY:                                                           TOTAL
  DIAGNOSTIC MODE GENERAL STATUS CONTENT FAILURE (DIAGNOSTIC COMMAND = 417)    1

--------------------------------------------------------------------------------
09:11:51 1988-09-25 UNRECOVERED ************************************************
     DIAGNOSTIC MODE GENERAL STATUS CONTENT FAILURE (DIAGNOSTIC COMMAND = 417)
     PP= 05  CH= 02  GS=4010                                            RETRY=00

--------------------------------------------------------------------------------
```

Commands G

G

Commands G

This appendix defines commands used frequently during maintenance. See the CDCNET Commands Reference manual for information on others.

ACTIVATE_ALARMS (ACTA) NETOU Command

Purpose

Initiates receipt of alarms from DIs. This command must be entered after invoking NETOU to allow alarms to be reported to you.

Format

ACTIVATE_ALARMS
GROUPS = list of name
OUTPUT = file
STATUS = status variable (NOS/VE only)

Parameters

GROUPS or *GROUP (G)*

Specifies the names of the alarm groups for which alarms are to be collected. Default is CATENET. In this release of CDCNET, CATENET is the only value accepted for this parameter.

OUTPUT (O)

Specifies the file to receive the alarm messages. Default is $OUTPUT.

STATUS (NOS/VE only)

See basic status concepts for NOS/VE System Command Language in the NOS/VE System Usage manual.

Responses

--ERROR-- Alarms already active.

Remarks

To ensure that alarms are activated each time you log in to NOS/VE and access NETOU, include this command in your NETOU prolog.

Examples

```
NOU/activate_alarms

NOU/
```

DEACTIVATE_ALARMS (DEAA) NETOU Command

Purpose Terminates receipt of alarms from CDCNET DIs.

Format **DEACTIVATE_ALARMS**
STATUS = *status variable* (NOS/VE only)

Parameters *STATUS* (NOS/VE only)

See basic status concepts for NOS/VE System Command Language in the NOS/VE System Usage manual.

Responses Alarms deactivated.

--ERROR-- Alarms not active.

Examples

```
deactivate_alarms

NOU/
```

CANCEL_SOURCE_ALARM_MESSAGE (CANSAM) NETOU Command

Purpose Cancels the reporting of specified alarm messages by a DI. The message numbers specified are removed from the list of alarms to be sent from a DI.

Format **CANCEL_SOURCE_ALARM_MESSAGE**
MESSAGE_NUMBER = list 1..63 range of 1..32999

Parameters **MESSAGE_NUMBER (MN)**

Specifies alarm message numbers of one or more alarm messages to be cancelled. Refer to the online CDCNET Diagnostic Messages manual for the complete list of alarm messages and their identifier numbers.

Responses Source alarm messages cancelled.

Examples

```
cancel_source_alarm_message mn=(3,42..45,87)

Source alarm messages cancelled.
```

CANCEL_SOURCE_LOG_GROUP (CANSLG) NETOU Command

Purpose

Cancels the current definition of the logging function for DIs acting as sources of log messages. This release allows definition of only one log group per system; therefore this command cancels all logging by a DI. To reenable logging, a DEFINE_SOURCE_LOG_GROUP command should immediately follow a CANCEL_SOURCE_LOG_GROUP command.

Format

CANCEL_SOURCE_LOG_GROUP
LOG_GROUP = name

Parameters

LOG_GROUP (LG)

The logical name for the log group to cancel from reporting. The default log group is CATENET.

Responses

Source log group cancelled.

--WARNING-- Specified source log group cancelled. Source log group <name> was not defined.

--WARNING-- No source log groups defined.

Examples

```
cancel_source_log_group log_group=catenet

Source log group cancelled.
```

CHANGE_ELEMENT_STATE (CHAES) NETOU Command

Purpose

Changes the operational state of DI hardware. DI hardware may be placed in the OFF, ON, or DOWN state (states described below). If you use this command, you must also stop the communications traffic or the diagnostics being run on the device whose state you are changing, using the appropriate STOP command. DI hardware devices are addressed by their physical names.

Format

CHANGE_ELEMENT_STATE
DEVICE_NAME = name
STATE = keyword value

Parameters

DEVICE_NAME (DN)

Physical name of the device. This name may have the following values.

For boards:	$, board type (0..7) and board slot number, as in $ESCI6.
For LIM ports:	$, the keyword LIM followed by the LIM board slot number and the keyword PORT followed by the port number on the LIM, as in $LIM5_PORT1.

STATE (S)

Desired new state for the device. The following keyword values are allowed.

Keyword Value	Description
OFF	Sets the device as inactive, so that the device cannot be used or have commands sent to it. The only action allowed against a device in the OFF state is to send a CHANGE_ELEMENT_STATE command to change the state from OFF to another state.
ON	Sets the device in the ON state. ON is the required state for using the device for CDCNET communications.
DOWN	Sets the device as available for diagnostics only. Executing a diagnostic test for a device changes its state to DOWN. If the diagnostic fails, the device remains in the DOWN state. If the diagnostic test passes, the device is placed in the ON state.

Responses Device <device_name> <state> (ON, OFF, or DOWN).

--ERROR-- Device <device_name> is not installed in system.

--ERROR-- Device <device_name> active. Stop communications or diagnostics before changing device state.

Examples

```
change_element_state device_name=$cim4,state=down

Device $CIM4 down.
```

CREATE_CDCNET_ANALYSIS_REPORT (CRECAR)

Purpose

CRECAR is used to generate NPA reports. The parameters you use identify the reports you want to generate, the time interval that your reports cover, the identity of the system (DI) to which the reports apply, the output file name, whether the output file is added to or rewound, and the name of the catalog from which the database files are to be acquired.

Format

CREATE_CDCNET_ANALYSIS_REPORT
REPORT_NAME=report name (or **list of report names** [NOS/VE only])
DATA_BASE_FILE_USER_NAME=username
BEGIN_DATE=yymmdd
BEGIN_TIME=hhmm
END_DATE=yymmdd
END_TIME=hhmm
BEGIN_DATE_OFFSET=days
END_DATE_OFFSET=days
SYSTEM_ID=hexadecimal number (or *list of hexadecimal numbers* [NOS/VE only])
OUTPUT=filename/reference
APPEND=yes or *no* (NOS only)
LOG_ID=decimal number (or *list of decimal numbers* [NOS/VE only])
EXCLUDE_LOG_ID=decimal number (or *list of decimal numbers* [NOS/VE only])
SEVERITY=i, w, e, f, or *c*
COMPRESS=yes or *no*
STATUS=status variable (NOS/VE only)

Parameters

REPORT_NAME (RN)

On NOS, this parameter specifies the report name you want to generate. On NOS/VE, this parameter specifies a list of report names you want to generate. On both NOS and NOS/VE, the output is written to the file specified by the OUTPUT parameter.

One or more of the following keywords can be entered as valid report name values:

Keyword	Description
ALL	All reports are created except USERRP1.
DAILY	All daily reports are created. These include CONNRP2, DIOSRP2, DIOSRP4, HDLCRP2, MCISRP2, TELNRP2, and X25CRP2.
HOURLY	All hourly reports are created. These include CONNRP1, DIOSRP1, DIOSRP3, ETHRRP1, ETHRRP2, HDLCRP1, HDLCRP3, LOADRP1, MCISRP1, MCISRP3, SESSRP1, TELNRP1, TERMRP1, TERMRP2, and X25CRP1.

Keyword	Description
MESSAGS	All hardware and software message reports that are sorted by date and time are created. These include EVNTRP1, HRDWRP1, and SFTWRP1.
SEVERTY	All hardware and software message reports that are sorted by severity are created. These include EVNTRP2, HRDWRP2, and SFTWRP2.
STATIST	All statistical reports are created. These include CONNRP1, CONNRP2, DIOSRP1, DIOSRP2, DIOSRP3, DIOSRP4, ETHRRP1, ETHRRP2, HDLCRP1, HDLCRP2, HDLCRP3, LOADRP1, MCISRP1, MCISRP2, MCISRP3, SESSRP1, TELNRP1, TELNRP2, TERMRP1, TERMRP2, X25CRP1, and X25CRP2.
TERMINL	All terminal and connection reports are created. These include CONNRP1, CONNRP2, TERMRP1, and TERMRP2.
CONFRP1	Configuration report on an hourly status of DI hardware and software.
CONNRP1	Hourly connection report on the number of connections initiated and terminated.
CONNRP2	Daily connection report on the number of connections initiated and terminated.
DIOSRP1	Hourly device operating report on central processor unit (CPU) and memory utilization statistics.
DIOSRP2	Daily device operating report on CPU and memory utilization statistics.
DIOSRP3	Hourly device operating report on memory state transitions statistics.
DIOSRP4	Daily device operating report on memory state transitions statistics.
ETHRRP1	Hourly Ethernet report on transmit and collision channel statistics.
ETHRRP2	Hourly Ethernet report on frames and error statistics.
EVNTRP1	Event log report sorted by date and time.
EVNTRP2	Event log report sorted by severity.
EVNTRP3	Event log message frequency and severity summary.
EVNTRP4	Event log message frequency and severity summary reported by DI.

Keyword	Description
HDLCRP1	Hourly HDLC report on usage.
HDLCRP2	Daily HDLC report on usage.
HDLCRP3	Hourly HDLC report on error statistics.
HRDWRP1	Hardware message report sorted by date and time.
HRDWRP2	Hardware message report sorted by severity.
HRDWRP3	Hardware log message frequency and severity summary.
HRDWRP4	Hardware log message frequency and severity summary reported by a DI.
LOADRP1	Hourly loader statistics report.
MCISRP1	Hourly mainframe channel report on input/output block statistics.
MCISRP2	Daily mainframe channel report on input/output block statistics.
MCISRP3	Mainframe channel report on bad/good block input/output statistics.
SESSRP1	Hourly session statistics report on PDUs received and transmitted.
SFTWRP1	Software message report sorted by date and time.
SFTWRP2	Software message report sorted by severity.
SFTWRP3	Software log message frequency and severity summary.
SFTWRP4	Software log message frequency and severity summary reported by a DI.
TELNRP1	Hourly TELNET connection report for number of connections initiated, terminated, average connect time, and maximum connect time.
TELNRP2	Daily TELNET connection report for number of connections initiated, terminated, average connect time, and maximum connect time.
TERMRP1	Hourly terminal report on good/bad block input/output statistics.
TERMRP2	Hourly terminal statistics report online characters input/output.

G

Keyword	Description
USERRP1	Unsorted user message report.
X25CRP1	X.25 connection statistics report for number of connections initiated and terminated, average connect time, and maximum connect time.
X25CRP2	Daily X.25 connection statistics report for number of connections initiated, terminated, average connect time, and maximum connect time.

DATA_BASE_FILE_USER_NAME (DBFUN)

Specifies the user name (catalog) from which the database(s) are to be acquired. The databases must be permanent files (direct access file on NOS). If a local file exists with the same name as the database file you want, it is returned and then reattached. Default is the current user for NOS. For NOS/VE, default is current working catalog if permanent; otherwise, $USER.

BEGIN_DATE (BD)

Specifies the date that begins your selected reporting period (yy=year, mm=month, dd=day). Default is 000101.

BEGIN_TIME (BT)

Specifies the time that report generation is to begin (hh=hour, mm=minute). This time applies only to records with the same date as the BEGIN_DATE parameter. Default is 0000.

END_DATE (ED)

Specifies the final date of the report period (yy=year, mm=month, dd=day). Default is 991231.

END_TIME (ET)

Specifies the time that report generation is to end (hh=hour, mm=minute). This applies only to records with the same date as the END_DATE parameter. Default is 2400.

BEGIN_DATE_OFFSET (BDO)

Specifies the offset backwards in days (range of 0 through 365) from the current date. For example, a value of 1 indicates that the current day minus one, or yesterday, is the first day to begin generating reports. This parameter cannot be specified with the BEGIN_DATE parameter. Default is the BEGIN_DATE value.

END_DATE_OFFSET (EDO)

Specifies the offset backwards in days (range of 0 through 365) from the current date. For example, a value of 1 indicates that the current day minus one, or yesterday, is the last day that reports are generated. This parameter cannot be specified with the END_DATE parameter. Default is the END_DATE value.

SYSTEM_ID (SID)

For NOS, this parameter specifies the last six hexadecimal digits of the system identification address of the DI for which the reports are being selected. The first six hexadecimal digits are always 080025. If the selected SID equals 000000, all SIDs are selected.

For NOS/VE, this parameter specifies a list of the last six hexadecimal digits of one to ten SIDs to include in the report. If one of the list of SIDs equals 000000, all SIDs are selected.

On both NOS and NOS/VE, if the parameter is selected, only log messages with SIDs matching the designated SIDs are used in creating reports. Default is all SIDs selected for inclusion in reports.

OUTPUT (O)

Specifies the file name (seven-character file name on NOS or standard file reference on NOS/VE) that is to contain the report. For NOS, the default value is CREOUT. For NOS/VE, the default value is $LOCAL.CREOUT.

NOTE

On NOS, this file is a Control Data display code file. It must be viewed interactively in normal mode or appropriately printed; otherwise, some data may appear garbled.

APPEND (NOS only)

YES specifies that the report created is to be directly written to the end of the output file. NO specifies that the output file is rewound before the created report is added. If the file is OUTPUT, reports are always appended. If not specified, the output file position remains as is.

LOG_ID (LI)

On NOS, this parameter specifies a single one- to five-digit log ID to select for report generation.

On NOS/VE, this parameter specifies a list of one to ten log IDs of one to five digits to select for report generation.

On both NOS and NOS/VE, this parameter is processed by the CONF, EVNT, HRDW, SFTW, and USER type reports only. When specified, only log messages with log IDs matching the designated log ID(s) are used in creating reports. When omitted, the selection of log IDs is determined by the presence or absence of the EXCLUDE_LOG_ID parameter. If both the LI and ELI parameters are omitted, all log IDs are selected for inclusion in the reports.

The LI and ELI may not be specified together.

EXCLUDE_LOG_ID (ELI)

On NOS, this parameter specifies a single one- to five-digit log ID to exclude from the reports.

On NOS/VE, this parameter specifies a list of one to ten log IDs of one to five digits to exclude from the reports.

On both NOS and NOS/VE, this parameter is processed by the CONF, EVNT, HRDW, SFTW, and USER type reports only. When specified, only log messages with log IDs matching the designated log ID(s) are excluded from the reports. When omitted, the selection of log IDs is determined by the presence or absence of the LOG_ID parameter. If both the LI and ELI parameters are omitted, all log IDs are selected for inclusion in the reports.

The LI and ELI may not be specified together.

SEVERITY (S)

Specifies the starting severity level to include in the reports. All log messages with this severity level or higher are reported. The highest level of severity is C (Catastrophic).

This parameter is processed by the EVNT, HRDW, and SFTW reports only. The default value is I (Informative). All severity levels are then included. Any of the following characters can be entered as a valid severity level:

Character	Severity
I	Informative
W	Warning
E	Error
F	Fatal
C	Catastrophic

COMPRESS (C)

YES specifies that reports are compressed. Default is NO, which specifies that no reports are compressed.

A compressed report does not contain a report heading page, data page headers, column headers or embedded page eject characters. It consists of an initial page eject followed by log message text (event type reports) or data (statistics reports).

This parameter increases report generation time.

STATUS (NOS/VE only)

This is the standard NOS/VE System Command Language (SCL) status variable. There is no default value.

Examples In this NOS example, report ETHRRP2 is created to report statistics generated from the DI with the system ID of 123456 between 00:00 hour on January 1, 1985, and 24:00 January 2, 1985. ETHRRP2 is added to the end of the default output file CREOUT. The database file user name is the current user.

```
CRECAR,RN=ETHRRP2,BD=850101,ED=850102,SID=123456,APPEND=yes
```

DEFINE_SOURCE_ALARM_MESSAGE (DEFSAM) DI Configuration Procedure/NETOU Command

Purpose

Defines the alarm messages (by specifying alarm message numbers) that the DI should send to the network operator. If this command is not used to configure a DI, no alarms are generated by the DI.

Format

DEFINE_SOURCE_ALARM_MESSAGE
MESSAGE_NUMBER = list 1..63 of integer 1..32999

Parameters

MESSAGE_NUMBER (MN)

List of message numbers the DI is to send as alarms to the network operator. If omitted, a set of default alarm message numbers are enabled. See the online list of default log and alarm messages for the alarm message numbers and their message identifiers. The CDCNET Configuration Guide further explains how to access these messages. You may add alarms to this list using additional DEFSAM commands. You may also cancel messages using the CANCEL_SOURCE_ALARM_MESSAGE command.

NOTE

Canceling any of the default alarms is not recommended.

For the complete list of diagnostic messages, refer to the online CDCNET Diagnostic Messages manual.

Responses

Source alarm messages defined.

--ERROR-- Source alarm messages are already defined.

--FATAL-- Not enough memory currently exists for required table space.

Remarks

If more than one DEFSAM command is issued to a DI, the set of alarm messages defined for the DI is the set specified on the most recent occurrence of the command, in addition to any messages specified on any previous DEFSAM commands (including the default alarm message numbers).

Examples

```
define_source_alarm_message
```

DISPLAY_DATE_AND_TIME (DISDAT) NETOU Command

Purpose Displays the current date and time that is maintained by the DIs to which you send this command.

Format DISPLAY_DATE_AND_TIME
DATE_FORMAT = keyword value
TIME_FORMAT = keyword value

Parameters *DATE_FORMAT (DF)*

Specifies how date information is to be displayed. Allowed keyword values include the following, using as an example a date of November 1, 1986, and dd for day, mm for month, and yy for year.

Keyword Value	Description
MDY	Date formatted as mm/dd/yy, as in 11/01/86.
DMY	Date formatted as dd/mm/yy, as in 01/11/86.
ISO	Date formatted as yyyy-mm-dd, as in 1986-11-01.

Default is DMY.

TIME_FORMAT (TF)

Specifies how time information is to be displayed. Allowed keyword values include the following, using as an example a time of 2:41 PM, and hh for hour, mm for minute, ss for second, and XX for AM or PM identifier.

Keyword Value	Description
AMPM	Time formatted as hh:mm XX, as in 2:41 PM.
HMS	Time formatted as hh:mm:ss, as in 14:41:38.

Default is HMS.

Responses System date and time
(Followed by date and time in selected format. See example.)

Examples

```
display_date_and_time

System date and time
   14/10/86 15:09:24

display_date_and_time df=mdy,tf=ampm

System date and time
   02/20/86 10:36 AM.
```

DISPLAY_DI_SYSTEM_STATUS (DISDSS) NETOU Command

Purpose Returns general information about the operation of a DI and resource usage in the DI, such as date and time of the last reload, version of load file used, states of buffers and memory, and CPU usage. An expanded status display also includes the responses to the DISPLAY_HARDWARE_STATUS, DISPLAY_LINE_STATUS, and DISPLAY_NETWORK_STATUS commands.

Format **DISPLAY_DI_SYSTEM_STATUS**
DISPLAY_OPTION = keyword value

Parameters *DISPLAY_OPTION (DO)*

Selects a summary or expanded status response. There are two possible values for this parameter.

Keyword Value	Description
SUMMARY (S)	Selects general DI operating system status and does not include the additional hardware, line, and network status displays.
EXPANDED (E)	Selects general system status and status for the hardware component(s) in the DI. The hardware display is a combination of the hardware status, line status, and network status displays, and is appended to the end of the summary display.

Default is SUMMARY.

Responses DI System Status.
(Followed by status display. See example.)

Remarks A DI containing an MPB-II board cannot contain a PMM board. Instead, the MPB-II RAM is treated as if it were PMM. The DISDSS display gives information on the PMM status, but the memory reflected is actually MPB-II.

Examples In this example, the DISPLAY_DI_SYSTEM_STATUS command is entered, omitting the DISPLAY_OPTION parameter. The command returns a summary status response.

```
display_di_system_status

DI System Status
system name = MTI_83
system address = 080025100083(16)
boot version number = 1511(16)
software release level = 1511(16)
number of tasks = 64
free SMM memory = 445490
percent CPU utilization = 4
buffer state = good
memory state = good
date and time of last reload = 86/04/27  11:23:45

Buffer Status
type         total buffers       available buffers       buffer size
data         4216                3820                    144
descriptor   1436                1394                    32

SMM Memory Status
total memory    available memory    extents     deloadable memory
1572864         279752              55          119816

PMM Memory Status
total memory    available memory    extents     deloadable memory
131072          31500               9           0

MPB RAM Status
total memory    available memory    extents     deloadable memory
16384           1902                1           0
Largest SMM memory extent available = 71602
```

DI System Status Display Description

The DI System Status Display includes general DI operating system information, buffer and memory usage status and, optional hardware, line, and network status displays. For descriptions of the hardware, line, and network status displays, see the commands that generate those status displays.

The general DI information section includes:

`system name`	The DI's name, assigned during configuration.
`system address`	The DI's unique address.
`boot version number`	Version number of the boot file currently loaded in and running on the DI. Taken from exception list or INITMDI.
`software release level`	Version number of the compiled software currently loaded in and running on the DI. This value is defined in a common deck and indicates the released version level.
`number of tasks`	Number of tasks that can run on this system.
`free SMM memory`	Amount of memory on the SMM board that is not currently assigned to a software process.
`free PMM memory`	Amount of memory on the PMM board that is not currently assigned to a software process.
`percent CPU utilization`	Percentage of time the CPU on the MPB board is performing work as opposed to being idle.
`buffer state`	Describes level of buffer availability. The four states of buffer availability are GOOD, FAIR, POOR and CONGESTED. See the BUFFER_BOUNDARY_PERCENTAGES parameter in the DEFINE_SYSTEM command description. Each boundary is expressed as a percentage of total resources allocated after the DI is configured.
`memory state`	Describes level of memory availability. The four levels of memory availability are GOOD, FAIR, POOR, and CONGESTED. See the MEMORY_BOUNDARY_PERCENTAGES parameter in the DEFINE_SYSTEM command description. Each boundary is expressed as a percentage of total resources allocated after the DI is configured.
`date and time of last reload`	The time when the DI software was last reloaded.

Buffer Status	Displays the following information:	
	Total Buffers	The total number of buffers allocated for use by the DI.
	Available Buffers	The number of allocated numbers that are now currently in use.
	Buffer Size	The size, in bytes, of a particular buffer.
Memory Status (PMM, SMM, MPB)	Displays the following information:	
	Total Memory	The total number of bytes of memory for this DI.
	Available Memory	The total number of bytes of memory available for loading modules and allocating structures by these modules.
	Extents	The number of memory extents into which available memory is divided.
	Deloadable Memory	The number of bytes that can be used when a deloadable threshold is reached.

For expanded status displays only, the remainder of the display is a summary status of the various DI components in the DI, network solutions, and communication lines. For specific information about these status entries, see the other display status commands (DISPLAY_HARDWARE_STATUS, DISPLAY_LINE_STATUS, DISPLAY_NETWORK_STATUS) described in this manual.

DISPLAY_HARDWARE_STATUS (DISHS) NETOU Command

Purpose

Displays status of the logic boards in a DI or the status of an ICA-II in a CDCNET host. If you issue the command, with no parameters, to a DI, you receive the status of all boards. If you issue the command, with parameters, to a DI, you receive the status of the specified devices. If you issue the command, with no parameters, to a CDCNET host, you receive the status of the ICA and all the associated interfaces. If you issue the command, with parameters, to a CDCNET host, you receive the status of the specified ICA-II interface.

This command supports two levels of display: summary and expanded. A summary display includes the status of large boards, LIMs and URIs (if no device names are entered for a DI), or the status of boards specified by device name with the command. If no device name is entered for an ICA-II, the status of the ICA-II board and the ICI/IEI interfaces are displayed. An expanded display includes the summary display information plus the status of all subassemblies to a board, for example, LIM or URI boards controlled by a named CIM board. Hardware status displays are described following the command examples.

Format

DISPLAY_HARDWARE_STATUS
DEVICE_NAME = list 1..30 of name
DISPLAY_OPTION = keyword value

Parameters

DEVICE_NAME (DN)

The physical name of the device for which status is to be returned. This parameter is optional and has no default value.

DISPLAY_OPTION (DO)

Displays level of status display. There are two possible values for this parameter.

Keyword Value	Description
SUMMARY (S)	Provides status of large boards, LIMs, and URIs (if no device names are entered), or status of boards you specifically select using the DEVICE_NAME parameter.
EXPANDED (E)	Includes the summary display information plus the status of all subassemblies to a board (such as LIM ports), or boards controlled by a card specified by the DEVICE_NAME parameter (such as LIM or URI boards controlled by a CIM board).

Default is SUMMARY.

Responses

Hardware Status
(Followed by the requested hardware status. See example.)
Within the status display, the following responses are inserted if a device name is unknown or if the device is not installed.

Device name <name> unknown or not installed.

Examples This example shows summary status for all boards in a TDI.

```
display_hardware_status

Hardware Status
                                                                 boot ROM
device name  state   status          version   lim/bank/port  type  enab level
$MPB0        on      active          0000(16)                       n/a  160A
$PMM1        on      active          0008(16)                       n/a  160A
$SMM2        on      active          0001(16)  2                    n/a  0000
$MCI3        on      protocol mism.  0000(16)                       yes  050C
$CIM4        on      configured      0001(16)  0,1,2,3              no   2702
$CIM5        down    not config.     0000(16)                       yes  2702
$ESCI6       on      active          0000(16)                       no   0806
$MCI7        on      active          0000(16)                       yes  050C

$LIM0        on      configured      0008(16)  4              RS232
$LIM1        down    configured      0009(16)  4              RS232
$LIM2        on      not config.     0000(16)  2              RS449
$LIM3        on      not config.     0000(16)  2              RS449
$URI4        on      configured
```

This example shows the summary status display for a LIM.

```
display_hardware_status dn=$lim4_port0

Hardware Status
                                                                boot  ROM
device name  state  status      version   lim/bank/port  type   enab  level
$LIM4_PORT0  down   configured                           ASYNC
```

This example shows the summary status display for a MPB.

```
dishs dn=$mpb0

Hardware Status
                                                                boot  ROM
device name  state   status     version   lim/bank/port  type   enab  level
$MPB0        on      configured 0000(16)                        n/a   100A
```

This example shows the expanded status display for all LIMs.

```
dishs do=expanded
```

Hardware Status

device name	state	status	version	lim/bank/port	type
$LIM0	on	configured		4	RS232
$LIM1	on	configured		4	RS232
$LIM2	on	configured		4	RS232
$LIM3	on	configured		4	RS232
$LIM4	on	configured		4	RS232
$LIM5	on	configured		4	RS232
$LIM6	on	configured		4	RS232
$LIM7	on	configured		4	RS232
$LIM0_PORT0	on	configured			ASYNC
$LIM0_PORT1	on	configured			ASYNC
$LIM0_PORT2	on	configured			ASYNC
$LIM0_PORT3	on	configured			ASYNC
$LIM1_PORT0	on	configured			ASYNC
$LIM1_PORT1	on	configured			ASYNC
$LIM1_PORT2	on	configured			ASYNC
$LIM1_PORT3	on	configured			ASYNC
$LIM2_PORT0	on	configured			ASYNC
$LIM2_PORT1	on	configured			ASYNC
$LIM2_PORT2	on	configured			ASYNC
$LIM2_PORT3	on	configured			ASYNC
$SMM2_BANK0	on	configured		2	
$SMM2_BANK1	on	configured		2	

This example shows the summary status display for an ICA-II system.

```
display_hardware_status

Hardware Status
                                                                 boot  ROM
device name  state    status      version    lim/bank/port  type  enab  level
$ICA         on       active      1300(16)                        n/a   5204
$ICA_ICI     on       configured                            ICI
$ICA_IEI     down     configured                            IEI
```

This example show the summary status display for a specific ICA-II system (DEVICE_NAME=$ICA)

```
display_hardware_status dn=$ica

Hardware Status
                                                                     boot  ROM
device name    state     status     version    lim/bank/port   type  enab  level
$ICA           on        active     1300(16)                         n/a   5204
```

This example shows the summary status display for a specific ICA-II interface (DEVICE_NAME=$ICA_ICI).

```
display_hardware_status dn=$ica_ici

Hardware Status
                                                                     boot  ROM
device name    state     status     version    lim/bank/port   type  enab  level
$ICA_ICI       on        configured                             ICI
```

Hardware Status Display Description

The hardware status display describes each board as follows.

device name
: The physical name of the board or LIM port, specified as $board type_slot number, as in $MPB0, $PMM1, $CIM4 or $ICA. An empty board slot for a major board is assigned the slot number.

state
: Operational state of the board, which may be:

on	Operational; available for use by the communications system.
down	Not operational; available for diagnostic tests only.
off	Not operational or not installed; not available for use without intervention, such as installing boards and changing the board's operational state by the CHANGE_ELEMENT_STATE command.

status
: Indicates how the board is being used by the DI's communications system. A board may have one of the following status conditions.

not avail.	The port exceeds the 48-port limit for LIM ports connected to one CIM board and is unavailable for use.
configured	Board has been configured (prepared) for use by the communications system.
not config.	Board is not configured for use by the communications system.
enabled	Board is configured, and is in use by the communications system.
active	Active communications are being carried over the device. Appropriate communications protocols are being exchanged.
protocol mismatch	MCI cannot support protocol version requested by peripheral processor. Reflects status of MCI board.

version
: The current hardware version of the board (not applicable to ports).

lim/bank/port	This section gives information about the different types of boards and any subordinate DI hardware that a board controls. This status information is provided under the following headers.	
	lim	The LIM and URI boards a CIM board controls.
	bank	The number of memory banks on a SMM board.
	port	The number of ports defined for a LIM board.
	type	For LIMs, this field describes the physical connection type on LIM board, such as RS-232 and RS-449. For ports, this field describes the terminal interface program (TIP) controlling the port, such as the asynchronous TIP. Compare the information under the Type column in the first and second examples to see how information in the Type column differs between LIMs and ports.
	boot enabled	Specifies whether boot is allowed over this device. (Applicable to only ESCI, CIM, and MCI boards.)
	ROM level	Specifies the level of the major boards.

DISPLAY_ICA_SYSTEM_STATUS (DISISS) NETOU Command

Purpose Returns general information about the operation of an ICA-II and resource usage in the ICA. The DISISS command is an alias of the DISPLAY_DI_SYSTEM_STATUS command. See the DISDSS command description, earlier in this appendix, for more information.

DISPLAY_LINE_STATUS (DISLS) NETOU Command

Purpose

Displays operational status of communication lines and URI lines connected to a DI. You may choose status of all lines (by specifying no parameters), lines controlled by specific terminal interface programs (TIPs) (by specifying the TIP's name), or individual lines (by specifying the names of the lines). This command also returns the status of the terminal/batch devices attached to the lines and the status of the connections for the devices in expanded or detailed displays.

If multiple parameters are specified, status is displayed for lines matching the combination of parameter values specified. For example, if you request status by both TIP name and line name, then the status for all enabled lines controlled by the TIP and status for all the lines of the names you specify is displayed. A named line that is also controlled by a named TIP appears twice in the status display.

Line status displays are described following the command examples.

Format

DISPLAY_LINE_STATUS
LINE_NAME = list 1..32 of name
TIP_NAME = list 1..7 of name
LINE_STATE = list 1..5 of keyword value
DISPLAY_OPTION = list 1..3 of keyword value

Parameters

LINE_NAME (LN)

Logical name of one or more communication lines for which you are requesting status.

TIP_NAME (TN)

Logical name of the TIP controlling the lines for which you are requesting status.

LINE_STATE (LS)

Selects the lines to display by line state or line states if neither the TIP_NAME nor LINE_NAME parameter is specified, or if only TIP_NAME is specified. The following values are allowed for the LINE_STATE parameter.

Keyword Value	Description
ACTIVE (A)	Selects display of active lines only.
AUTOREC_ACTIVE (AA)	Selects display of lines for which auto recognition of line speed, parity, and/or character set is taking place.
DISABLED (D)	Selects display of disabled lines.

Keyword Value	Description
ENABLED (E)	Selects display of active and enabled lines.
LOADING_TIP (LT)	Selects display of lines for which the controlling TIP is being loaded.
ALL	Selects display of all lines in all line states.

Default is ALL.

If you do not specify TIP_NAME or LINE_NAME, all lines that are in the specified line state are displayed. If you specify TIP_NAME, all lines supported by the specified TIP that are in the selected line state are displayed. Selecting display by the LINE_NAME parameter overrides selecting display by LINE_STATE. The status of a specific line name is given regardless of the line state specified.

DISPLAY_OPTION (DO)

Selects a level of status response. The following display options are allowed.

Keyword Value	Description
SUMMARY (S)	Selects general line status.
EXPANDED (E)	Selects status of terminal devices connected by the lines.
DETAIL (D)	Selects status of the active connections for the terminal devices connected by the lines.

Default is SUMMARY.

Responses

Line Status
(Followed by the line status display. See examples.) Within the status display, the following responses are inserted if a line name or TIP name is not defined in the DI's logical configuration, or if no lines match the requested line state.

Line_name <name> not defined.

No <line_state> lines found for the <tip_name> tip.

No <line_state> lines found.

No lines defined for the <tip_name> TIP.

No lines defined. No line status to report.

No devices defined.

No connections active.

Examples This command returns the status of all communication lines connected to a DI named North_TDI_2. The display option is SUMMARY.

```
display_line_status

Line Status
line name     line          line   tip    line   physical
              state         type   name   speed  device name
ENGIN_BLD_1   disabled      swt.   async  1200   $LIM0_PORT0
COMPSCI_02    active        ded.   async  9600   $LIM1_PORT0
COMPSCI_03    enabled       ded.   async  9600   $LIM1_PORT1
COMPSCI_04    active        ded.   async  9600   $LIM1_PORT2
COMPSCI_05    loading_tip   ded.   async  9600   $LIM1_PORT3
COMPSCI_06    autorec_act   ded.   async  AUTO   $LIM2_PORT3
```

This command returns the status of a specific line, using the LINE_NAME (LN) parameter.

```
display_line_status ln=compsci_02

Line Status

line name     line      line   tip    line   physical
              state     type   name   speed  device name
COMPSCI_02    enabled   ded.   async  9600   $LIM1_PORT0
```

This example requests an expanded status display for two lines.

```
display_line_status ln=(line01,line10),do=e

Line Status

LINE01                          tip name:  ASYNC
  device name: $CONSOLE_100081_00010001 address: 00/01 state: active

LINE10                          tip name:  ASYNC
  device name: $CONSOLE_100081_00010000 address: 00/00 state: active
```

This example requests a detail status display for one line.

```
display_line_status ln=line01,do=d

Line Status

$CONSOLE_100081_00010001           line name: line01
  service name: ARH907                           INTERACTIVE
  input state: off      output state: hold   output queued: 4/2875

> service name: ARH817                           INTERACTIVE
  input state: send     output state: send   output queued: 1/572

$CONSOLE_100081_00010002           line name: line01
> service name: $CDCNET_COMMAND                  INTERACTIVE
  input state: send     output state: send   output queued: 0/0
```

Line Status Display Description

The summary line status display information includes:

`line name`	The logical name of the communication line.	
`line state`	Operational state of the line, which may be:	
	`active`	Communications are being carried over the line; appropriate communications protocols are being exchanged.
	`deleting`	The line is in the process of being logically deleted.
	`enabled`	The line is configured for use by the DEFINE_LINE command, but the line may not be active.
	`disabling`	The line is in the process of being disabled.
	`disabled`	The line is configured but not enabled for communications by the TIP controlling the line. The line is not started or communications have failed on the line.
	`switching`	The line is in the process of being switched.
	`downing`	The line is in the process of being disabled. For example, if a STOP_LINE were being sent to a line, the status for the line would be DOWNING. Once the command executed, the status changes to DISABLED.
	`reenabling`	In process of being enabled. Periodic retry of communications on a disabled line have succeeded.
	`autorec_active`	Auto recognition of speed, parity, and/or character code set is taking place.
	`loading_tip`	The controlling TIP for the line is being loaded.
`line type`	Type of line, which may be either switched (swt.) or dedicated (ded.).	
`tip name`	The name of the TIP that is controlling the communication line.	
`line speed`	Communication line speed in bits per second.	
`physical device name`	The physical name of the LIM/Port used for the communication line.	

The expanded line status display describes the devices for each line as follows.

line name	The logical name of the communication line.
tip name	The name of the controlling TIP.
device name	The logical name of the device.
address	The physical address (cluster address/device address) of the device.
state	The state of the device, as follows:

active	Communications with the device are active.
inactive	Communications with the device are inactive.
down	The device is down.
stopped	Data transfer for the device has been stopped by the terminal user.
not ready	The device is not ready.

The detail line status display describes the active connections for the interactive and batch devices for each line as follows.

device name	The logical name of the device.
working connection	Indicated by a > character preceding its status.
service name	The logical name of the service to which the device is currently connected. $CDCNET_COMMAND is displayed if no connections are present.
connection type	Type of terminal connection for the line, which may be INTERACTIVE or BATCH.
input state	The input state for the connection, which may be:

active	Input is active.
off	Input is off; the connection is not the working connection.
flow cntl	Transmission of further input stopped due to network flow control.
sync	Input interrupted (for example, a user has entered an interrupt sequence).

`output state`	The output state for the connection, which may be:	
	`send`	Output sent to the device as received.
	`hold`	Output held by the network until reenabled by the user.
	`discard`	Output discarded until reenabled by the user.
	`interrupt`	Output aborted (interrupted) by the user.
	`flow cntl`	Transmission of further output stopped due to network flow control.
	`sync`	Output interrupted.
	`output queued`	The number of messages / number of bytes queued for output.

DISPLAY_NETWORK_STATUS (DISNS) NETOU Command

Purpose

Displays the status of network solutions connected to a DI. The command returns status for specific network solutions, or, if you do not specify a network name status of all network solutions connected to the DI. Network status displays are described following the command examples.

Format

DISPLAY_NETWORK_STATUS
NETWORK_NAME = list 1..15 of name

Parameters

NETWORK_NAME (NN)

Logical name of a network solution. You may specify one name or a list of names. Default is a status display of all network solutions connected to the DI.

Responses

Network Status
(Followed by the network status display. See example.) Within the status display, the following response is inserted if a network solution name is not defined in the DI's logical configuration.

Network name <name> not defined.

No network solutions defined. No network status to report.

Examples

```
display_network_status

Network Status
network_name = ESCI_NET
network_type = ESCI
network_id = 00000001(16)
network_status = active
network_cost = 000A(16)
trunk_name = ESCI_TRUNK
device_name = $ESCI6
average time network is congested = 0 %
date and time network last became active = 88/03/13 08.04.01
```

The following example displays the network status with an ICA.

```
display_network_status

Network Status
network_name = ICA_IEI_NET
network_type = Ethernet
network_id = 00000001(16)
network_status = active
network_cost = 0064(16)
trunk_name = IEI_TRUNK
device_name = $ICA_IEI
average time network is congested = 0 %
date and time network last became active = 88/03/13   08.04.01
```

Network Status Display Description

The network status display includes the following information.

`network_name` — The logical name of network solution.

`network_type` — Type of network solution, such as ESCI (Ethernet).

`network_id` — Network ID for the network solution.

`network_status` — Operational status of the network. Possible values for status include the following:

- `configured` — Network solution is defined, but not in use by the communications system.
- `enabled` — Network solution is in use by the CDCNET communications system but communications are not being carried on. This occurs when the network solution was in use, but is no longer. The operator may have stopped the network, or the other side of an HDLC or X.25 connection stopped communicating.
- `active` — Network solution is active, and communications are being carried over the network. Link and network protocols are being exchanged.
- `congested` — Network solution is active, but the depth of the transmit queue (the number of messages being sent from the DI) is greater than the congestion threshold established on the configuration command that configured the network solution. (See the CONGESTED_THRESHOLD parameter on the DEFINE_xxxx_NET command in the CDCNET Commands Reference manual for more information on the congestion threshold concept).
- `loading remote` — Network solution is being used exclusively to load a DI system connected through the network. Only HDLC networks return this state.

`cost`	The routing cost assigned to the network solution. This is a relative measure that is determined from a routing algorithm created and maintained by the Routing Management Entity in the DI. Cost may change depending upon the amount of traffic on the network solution, the state of the network solution, and other factors.
`trunk_name`	The name assigned to the trunk(s) to which the network solution is connected.
`device_name`	The physical name of the interface board in the DI to which the network solution is connected. For Ethernet networks, the board type is ESCI. For channel networks, the board type is MCI or ICA. For X.25 networks, the board type is CIM.
`average time network is congested`	The percent of time the network is congested.
`last operational transition`	The date and time operational state of network last changed. Displays either the date and time the network last became active, or the date and time the network was last active. Date and time in YY/MM/DD HH.MM.SS format.

DISPLAY_SOURCE_ALARMS (DISSA) NETOU Command

Purpose Displays the list of alarms to be sent to your network operations station from a DI and the alarm groups supported by the Log Support Application in the DI.

Format **DISPLAY_SOURCE_ALARMS**

Parameters None.

Responses

Source Alarms

Alarm groups:

<list of alarm groups>

Alarm message numbers defined:

<list of alarm message numbers>

(If no source alarm groups are defined for the system, the following response replaces the source alarm group display):

No source alarm groups defined.

(If no source alarm messages are defined, the following response replaces the list of alarm message numbers):

No alarm message numbers defined.

Examples

```
display_source_alarms

                   Source alarms
Alarm groups:
    CATENET
Alarm message numbers defined:
    17..82        198        252..280
```

DISPLAY_SOURCE_LOG_GROUP (DISSLG) NETOU Command

Purpose Displays the log groups to which the DI belongs and the messages to be logged for each group. The messages for each log group comprise the log messages reported by a DI.

Format **DISPLAY_SOURCE_LOG_GROUP**

Parameters None.

Responses

Source Log Groups

Log Group <name>
Log message numbers defined:
<list of message numbers>

(Returns a response for each defined log group. If a log group has no enabled messages, the following response replaces the message list for the group):

No log message numbers defined.

(If the DI has no defined source log groups, the following response replaces the log group display):

No source log groups defined.

Examples

```
display_source_log_group

             Source Log Groups
Log Group CATENET
Log message numbers defined:
1..200         300          350
```

DISPLAY_TEST_STATUS (DISTS) NETOU Command

Purpose

Allows you to monitor the progress of an online diagnostics test or display the completion status of an onboard or online diagnostics. The command response indicates the current status of online diagnostics in progress or the completion status of the last onboard, online, or inline diagnostics that was executed on the specified device. Use this command to get the results of online, onboard, and inline diagnostics. For online diagnostics, send this command after you receive a response to the command that starts the diagnostic test. The fields in the test status display are described at the end of this command description.

Format

DISPLAY_TEST_STATUS
DEVICE_NAME = name or *keyword value*
STATUS_TYPE= keyword value
DISPLAY_OPTION = keyword value

Parameters

DEVICE_NAME (DN)

Physical name of a single hardware device or a group keyword value. Specify a hardware device name with a $ character, a board type, and board slot number. Example physical names include $MCI2, $CIM3, $LIM1, $LIM2_PORT1, $ESCI4, $URI3, and NETWORK_1. Specify a group with the appropriate group keyword value. Example group keywords include ALL (A), MAJOR (M), LIMS (L), PORTS (P), or SUBNET (S). Default is ALL.

STATUS_TYPE (ST)

Specifies the type of test status to be returned for the specified devices. The allowable keywords include the following:

Keyword Value	Description
ALL (A)	Displays the status of all tests.
RUNNING (R)	Displays the status of only the running tests.
FAILED (F)	Displays the status of only the failed tests.
EXCEPTION (E)	Displays the status of only the exception tests.

Default is ALL.

DISPLAY_OPTION (DO)

Specifies the format and level of status of the test to be returned in the response.

Keyword Value	Description
SUMMARY (S)	Displays a single line of information per device.
EXPANDED (E)	Displays multiple lines of information per device.

Default is SUMMARY.

Responses

<device><status><test_type>test (Followed by test status information. See examples.)

Subnet <subnet_name> has not been run. The last reset was at <date> <time>.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- No RUNNING devices found.

--ERROR-- No FAILED devices found.

--ERROR-- No EXCEPTION devices found.

--ERROR-- Subnet <subnet_name> is unknown.

Examples The following example shows a status display for an online test that is currently running.

```
display_test_status device_name=$lim1_port2 do=expanded

PORT test status
CIM slot number = 3
LIM slot number = 1
PORT number = 2
RUNNING online version 0901
Testing internal loopback
pass count = 50  total errors = 3
```

The following example shows a status display for online and onboard tests that failed.

```
display_test_status device_name=$cim5

                  $CIM5      FAILED  on-line  test.

                  $CIM5      FAILED  on-board test.

display_test_status device_name=$cim5 do=expanded

                  CIM test status
                  CIM slot number= 5
                  FAILED  on-line version 10H1 01/24/85 14.43.31
                  Testing CIM/SMM interface
                  pass count= 5  total errors= 1

                  CIM test status
                  CIM slot number= 1
                  FAILED  on-board version 09A1 01/24/85 14.43.31
```

Displays for device-passing tests:

```
display_test_status device_name=$mci1

MCI test status
MCI slot number = 1
PASSED on-board version 08H1 01/16/86 14.34.21

display_test_status device_name=$esci3 do=summary

$ESCI3     PASSED  on_line test.

or

$ESCI3     PASSED  on_board test.

display_test_status device_name=$esci3 do=expanded

ESCI test status
ESCI slot number= 3
PASSED  on-line version 2301 01/16/87 14.34.21
pass count= 10

or

ESCI test status
ESCI slot number= 3
PASSED  on-board version 0806 01/16/87 14.34.21
```

In the following two examples, multiple devices were tested with online and inline diagnostics.

```
display_test_status status_type=exception do=summary

$LIM7_PORT2  RUNNING on-line  test
$ESCI4       RUNNING on-line  test
$LIM7_PORT5  FAILED  on-line  test
$MCI7        FAILED  in-line  test
$NET_1 RUNNING subnet connect test

display_test_status dn=major st=exception do=summary

$ESCI4       RUNNING on-line  test.
$MCI7        FAILED  in-line  test
```

In this example, a CIM online test passed on 01/16/85, a LIM online test failed on 03/18/85, a PORT online test failed 04/28/85, and a URI online test failed on 04/29/85. This example illustrates the use of a URI/LIM/PORT failure summary on the CIM test's PASSED response to indicate the actual status of the CIM and its URIs, LIMs and PORTs.

```
display_test_status device_name=$cim1 do=summary

$CIM1     PASSED  on-line  test.  Lim/Port errors detected.

display_test_status device_name=$cim1 do=expanded

CIM test status
CIM slot number = 1
PASSED on-line version 10H1 01/16/85 14.34.21
pass count = 10
  LIM/PORT failure summary:
    FAILED lim 4        on-line  version 10H1 03/18/85 04.18.01
    FAILED lim 5 port 1 on-line  version 10H1 04/28/85 10.21.12
    FAILED uri 6        on-line  version 2301 04/29/85 07.55.20
```

In this example, a LIM onboard test passed on 01/16/85, and a PORT online test failed on 01/24/85 and 01/25/85. This example illustrates the use of a PORT failure summary on the LIM test's PASSED response to indicate the actual status of the LIM and its PORTS.

```
display_test_status device_name=$lim3 do=summary

$LIM1     PASSED  on-board test.  Port errors detected.

display_test_status device_name=$lim3 do=expanded

LIM test status
CIM slot number = 6
LIM slot number = 3
PASSED on-board version 10H1 01/16/85 14.34.21
  PORT failure summary:
    FAILED port 1 on-line  version 10H1 01/24/85 14.34.21
    FAILED port 3 on-line  version 10H1 01/25/85 10.21.12
```

In this example, an onboard diagnostic issued a PASSED response following a nonfatal error. The ESCI transceiver has failed during onboard execution. This is a nonfatal error.

```
display_test_status device_name=$esci3 do=summary

$ESCI3     PASSED  on_board test.  Transceiver errors detected.

display_test_status device_name=$esci3 do=expanded

ESCI test status
ESCI slot number= 3
PASSED  on-board version 0806 01/16/87 14.34.21
Transceiver errors detected.
```

In this example, the last inline diagnostic on this device PASSED.

```
display_test_status device_name=$mci1 do=expanded

MCI test status
MCI slot number= 1
PASSED  in-line version 2601 04/16/86 14.34.21
```

In this example, the last inline diagnostic on this device FAILED.

```
display_test_status device_name=$mci3 do=summary

$MCI3       FAILED  in_line  test.

display_test_status device_name=$mci3 do=expanded

MCI test status
MCI slot number= 3
FAILED  in-line version 2601 04/16/85 14.53.31
pass count= 1  total errors= 8
```

In the following two examples, the inline subnet test PASSED.

```
display_test_status device_name=$net_1 do=summary

$NET_1 PASSED subnet connect test

display_test_status device_name=$net_1 do=expanded

$NET_1 PASSED subnet connect test
Network type = Ethernet
Network device = $ESCI5
Test Date/Time = 03/01/89 15:22:17
Destination = TDI_C2
Message Length = MIXED
Message Count = 20
Message Interval (msec.)= 200
repeat Pass = 2
Total Messages sent = 40
Total Bytes sent = 18921
Total Messages Rcvd = 40
Total Bytes Rcvd = 18921
Pass count = 2
```

In the following two examples, the command entry and subnet test FAILED.

```
display_test_status device_name=$net_2 do=summary

$NET_1 FAILED subnet connect test

display_test_status device_name=$net_2 do=expanded

$NET_1 FAILED subnet connect test
Network type = Ethernet
Network device = $ESCI5
Test Date/Time = 02/22/89 09:12:37
Destination = TDI_C2
Message Length = MIXED
Message Count = 20
Message Interval (msec.)= 0
repeat Pass = 0
Total Messages sent = 20
Total Bytes sent = 9342
Total Messages Rcvd = 12
Total Bytes Rcvd = 4921
Pass count = 1
Total Errors = 1
Buffer Length = 217
Data checksum error in a returned message
```

Diagnostic Test Status Display Description

The diagnostic test status display provides either a summary or expanded level of information about the status of device diagnostics. The summary level provides a single display line reporting the status of the diagnostics on each device or subnet. The expanded level provides multiple display lines reporting the status of the diagnostics on each device or subnet, as well as other information.

The summary test status display includes the following information (as appropriate for the device being tested).

Device name

Physical name of the tested device

Status of last test on device, including the following:

Test status (RUNNING, PASSED, FAILED or blank). The field is blank no test has run on the device since the DI was last reset.

Test type (on-board, online, or inline).

An indication that a subassembly has errors or that nonfatal errors exist.

The summary display for a subnet includes the following information:

Physical name of the subnet (Subnet_name)

Test status (RUNNING, PASSED, or FAILED)

Date/time stamp of the last test activity. If a test has not been run on this subnet, the summary line shows the date and time of the last reset.

The expanded test status display includes the following information (as appropriate for the device being tested).

Slot numbers for the device:

Slot number for large board devices (such as CIM and ESCI).

For LIM or URI devices, the CIM slot number as well as the LIM or URI slot number.

For PORT devices, the CIM and LIM slot numbers as well as the PORT number.

Status of last test on device, including the following:

Test status (RUNNING, PASSED, FAILED, or NO TEST HAS RUN ON DEVICE <device_name> SINCE DI WAS LAST RESET).

Test type (on-board, online, or inline).

Version number of test.

For completed tests that PASSED:

Date and time of test.

Pass count (only for online tests).

For online diagnostics tests:

Pass count.

A summary of the failed tests on device subassemblies, such as the status of failed URI, LIM, or port tests for CIM tests. If no subassembly tests have failed, NO ERRORS FOUND is reported for the summary.

For completed tests that FAILED:

Date and time of test.

For online diagnostics tests:

Failed operation (the area in which test failed).

Pass count.

Total errors.

For devices for which no test has run since the last DI reset (device is not tested by onboard diagnostics):

Date and time of last DI reset.

For inline diagnostics tests:

Error code of last failure.

Total errors.

A summary of the failed tests on subassemblies to a board, such as the status of failed LIM, URI or port tests for CIM tests. If no tests on subassemblies have failed, the message NO ERRORS FOUND is reported for the summary.

For RUNNING online tests:

Current operation (the area that is being tested).

Pass count.

Total errors.

The expanded display for a subnet includes the summary line containing the subnet name, status and date/time stamp, as well as the following information:

Network type and the physical network device name

Parameters from the command input:

Destination system.

Message length.

Message count.

Message interval.

Repeat pass count.

Total number of actual messages sent/received.

Total number of actual bytes sent/received.

Actual number of passes completed.

For a test that has FAILED, the following additional information is displayed:

Total error count.

Buffer length of the failed message.

An additional error message indicating the cause of the failure.

EXECUTE_ECHO_TEST (EXEET) NETOU Command

Purpose

Executes the inline diagnostic path test between any two CDCNET OSI systems. This test does not involve sending any data.

There is no STOP command for this test. Instead, a response is issued by the command processor indicating the test status. The response includes the destination system name tested.

Format

EXECUTE_ECHO_TEST
DESTINATION_SYSTEM = name

Parameters

DESTINATION_SYSTEM (DS)

Specifies the system name of the OSI systems to be verified.

Responses

. Echo Test to <destination_system> PASSED. Response time (msec.) = <integer>

--ERROR--System <destination_system> is unknown.

--ERROR--Source system <system_name> is NOT a CDCNET OSI system.

--ERROR--Destination system <system_name> is not a CDCNET OSI system.

--ERROR--Echo Test to <destination_system> FAILED. < one line of additional error message >

"Unsuccessful CLNS Data Request."

"No response from the Destination System."

"Destination System is NOT a CDCNET OSI system."

"No Echo Test Task ID Table Space Available."

"System Error - No data buffers available."

Remarks

The only restriction on the path used to to reach the destination system is that all systems in the path must be OSI systems. The path selection is done by CLNS software.

Examples

The following example verifies that a path exists between the two DIs on system name tdi_e3.

```
exeet ds=tdi_e3

 Echo Test to TDI_E3 PASSED
 Response time (msec) = 3420
```

KILL_SYSTEM (KILS) NETOU Command

Purpose

Shuts off a DI's system hardware clock without a graceful shutdown. You must reload the DI software. You may optionally request a dump of DI memory contents.

NOTE

Notify all active users that they are going to be disconnected from CDCNET services by sending them a message using the WRITE_TERMINAL_MESSAGE command described later in this appendix.

Format

KILL_SYSTEM
DUMP = boolean
COMPRESS_DUMP = boolean

Parameters

DUMP (D)

Requests a full DI memory dump before reload. Possible parameter values are YES and NO. Default is NO.

COMPRESS_DUMP (CD)

Requests a compressed dump (omits free memory and buffers) of DI memory. Possible parameter values are YES and NO. Default is YES.

Remarks

The KILL_SYSTEM command is one of the error conditions defined for DIs. KILL_SYSTEM with a dump is assigned DI error condition code 32 hexadecimal; KILL_SYSTEM without a dump is assigned error condition code 33 hexadecimal. These error conditions are significant in the configuration process for a DI, as they can be used when defining the loading and dumping conditions for a DI. For more information see the CDCNET Configuration Guide.

Responses

System being reset and reloaded.

Examples

```
senc c='kill_system',s=north_tdi_1

System being reset and reloaded.
```

EDIT_CDCNET_LOG_MESSAGE (EDICLM)

Purpose

You use EDICLM to create, add to, or change the site information section of a CDCNET log message.

Format

EDIT_CDCNET_LOG_MESSAGE
MESSAGE_NUMBER=log id number
EDITOR=type (NOS only)
STATUS=status variable (NOS/VE only)

Parameters

MESSAGE_NUMBER (MN)

Specifies the log identifier number of the log message to be edited. On NOS, this parameter must consist of five digits and must be zero-filled on the left (a log message number of 984 is represented as 00984.)

EDITOR (E) (NOS only)

Specifies the type of editor to be used during your edit. Valid types are FSE, EDIT, or XEDIT. Default is FSE.

STATUS (NOS/VE only)

This is the standard NOS/VE SCL status variable. There is no default value.

Examples

In this NOS example, log message number 00001 appears on your terminal screen, and you may edit the site information portion of the message using FSE.

```
EDICLM,MN=00001,FSE
```

EXPLAIN_CDCNET_LOG_MESSAGE (EXPCLM)

Purpose

You use EXPCLM to receive the following information on CDCNET log messages:

- The purpose of the message
- Actions required, if any
- Site information concerning the log message

The message purpose section is an expanded explanation of your CDCNET log message. The actions required section tells you the action to be taken for the log message. The site information is provided by your site and contains any information you consider relevant to the log message.

Format

EXPLAIN_CDCNET_LOG_MESSAGE
MESSAGE_NUMBER=log id number or **LIST**
STATUS=status variable (NOS/VE only)

Parameters

MESSAGE_NUMBER (MN)

Specifies the log message number of the log message for which you want information. For NOS, this parameter must consist of five digits and must be zero-filled on the left. (A log message number of 984 is represented as 00984.) If LIST is selected, it specifies that all the log message numbers with their associated names are listed.

STATUS (NOS/VE only)

This is the standard NOS/VE SCL status variable. There is no default value.

Examples

In this example, log message number 00001 appears on your terminal screen.

```
EXPCLM,MN=00001
```

SEND_COMMAND (SENC) NETOU Command

Purpose Sends a CDCNET command to a DI or list of DIs.

Format **NOS Only**

SEND_COMMAND
COMMAND = string
SYSTEM = list 1..15 of name

NOS/VE Only

SEND_COMMAND
COMMAND = string
SYSTEM = list of name
OUTPUT = file name
STATUS = status_variable

Parameters **COMMAND (C)**

The network operations command to be sent to the specified DI. Enter the command as a string value enclosed by apostrophes ('). You may use the abbreviated form of the command. If the command you are sending contains a string value (such as WRITE_TERMINAL_MESSAGE), you must use two consecutive apostrophes at the beginning and end of the string in order for the enclosed string to be recognized (see examples). You cannot substitute the quotation mark character for two apostrophes.

SYSTEM (S) (NOS/VE only)

The logical or physical DI name or list of DI names to which the command is to be sent. If a CDCNET command is sent to more than one CDCNET system, a response must be received from each system for the command to complete. If no response is received in 2 minutes, a timer terminates the command.

SYSTEM (S)

The logical or physical DI name or list of DI names to which the command is to be sent. If you omit this parameter, the name of the last DI or list of DIs to which you sent a command is used. The default DI for the first use of SEND_COMMAND during your session is the MDI through which you are connected to the network.

OUTPUT (O) (NOS/VE only)

The file to which a normal command response is written. Default value is $OUTPUT.

STATUS (NOS/VE only)

See basic status concepts for NOS/VE System Command Language in the NOS/VE System Usage manual.

Examples

```
senc c='dishs',s=mdi83

send_command c='write_terminal_message,..
m=''Engineering''''s network will be down until 10:00''',..
s=tdil
```

SEND_COMMAND_SEQUENCE (SENCS) (NOS Only) NETOU Command

Purpose

Allows you to send one or more commands to the same system(s) without enveloping the command within a SENC command. This command puts you in a special type of command entry mode (SENCS mode). You receive a prompt after entering the SENCS command: /SENCS. All commands you enter following the prompt are sent only to those systems specified in the system parameter of the command. As you enter each command, the command is sent to the specified system(s) for processing.

NOTE

When you are within SENCS mode, READY.. is the prompt at a K-display system console. SENCS/ is the prompt at an operator console.

The SENCS command may be included in a prolog or command file. If so, all subsequent commands are sent directly to the system specified by the command.

To leave the SENCS mode, you enter **. If a prolog or command file contains the SENCS command, all subsequent commands on that file are sent to the specified system for processing until a ** is detected.

If you want to send a network command to other systems while in the SENCS mode, use an escape character (a single asterisk *). To use the escape character, type the escape character * followed by the network command on the same line. This one command is then sent to the specified systems and need not be encapsulated within the SENC command. Subsequent commands are again processed in the SENCS mode unless they are preceded with the escape character. When a command is continued on more than one line, the * applies only to the first line. In other words, if * is entered anywhere in the subsequent lines, it is treated as part of the command text.

Format

SEND_COMMAND_SEQUENCE
SYSTEM = list 1..15 of name

Parameters

SYSTEM (S)

Specifies the logical or physical DI name or list of DI names to which the command is to be sent. A maximum of 15 system titles may be specified.

Responses Entering SENCS mode, type ** to exit.

SENCS/ --ERROR-- Parameter SYSTEM is required but was omitted.

Examples The following command sends a DISPLAY_DI_SYSTEM_STATUS command to the DI named North_TDI_1.

```
send_command_sequence system = north_tdi_1
SENCS/display_di_system_status
SENCS/**
```

The following command sends a DISPLAY_DI_SYSTEM_STATUS command to DIs North_TDI_1 and East_TDI_2.

```
send_command_sequence system=(north_tdi_1,east_tdi_2)
SENCS/display_di_system_status
SENCS/**
```

** Command (NOS Only)
NETOU Command

Purpose Terminates the SEND_COMMAND_SEQUENCE execution mode.

Format **

Parameters None.

Remarks Use this command when in SENCS mode. The command allows you to exit (quit) the SENCS mode of execution begun when you entered the SENCS command earlier in your session.

Examples `SENCS/**`

SEND_DIAGNOSTIC_DATA (SENDD) NETOU Command

Purpose

Sends a diagnostic data string to a LIM port. Use this command to send commands to an intelligent modem on an asynchronous line. Place the LIM port in the DOWN state before executing this command.

Format

SEND_DIAGNOSTIC_DATA
DEVICE_NAME = name
DATA = string of 1..64
CARRIAGE_RETURN = boolean
RESPONSE_TIMEOUT = integer 1..10

Parameters

DEVICE_NAME (DN)

Specifies the physical name of the device. The name consists of the keyword LIM, the LIM board slot number, the keyword PORT, and the port number on the LIM.

DATA (D)

Specfies the desired diagnostic data string to be sent to the LIM port. The data string must be enclosed in two single quotes. Thus, when the data string ends the command, two single quotes end the data string and a third single quote ends the entire command. See the Examples below.

CARRIAGE_RETURN (CR)

Specifies a flag indicating whether a carriage return should be appended to the diagnostic data string. Default is TRUE.

RESPONSE_TIMEOUT (RT)

Specifies the time in seconds to wait for the intelligent modem to return its response. Default is 1 second.

Responses

Response data follows: <response data>

--WARNING-- Device <device_name> test already started.

--WARNING-- Response data was not received.

--ERROR-- Expecting device name $LIMx_PORTx, found <device_name>

--ERROR-- Device <device_name> not installed in system

--ERROR-- Device <device_name> not in "DOWN" state.

--ERROR-- Configured line is not ASYNC.

--FATAL-- Aborted trying to start up line.

Examples

```
send_diagnostic_data device_name=$LIM4_PORT0 D=''ATU0''

Response data follows:
```

The following example illustrates how to use the SEND_DIAGNOSTIC_DATA command to test an intelligent modem without using the existing online port diagnostic.

Place the port in the DOWN state, with the CHANGE_ELEMENT_STATE command.

```
change_element_state device_name=$LIMO_PORTO ..
s=down
```

The following response appears:

```
Device $limO_portO down
```

Place the modem in local analog loopback mode with the SEND_DIAGNOSTIC_DATA command.

```
send diagnostic_data dn=$LIMO_PORTO ..
data=''ATUO'' RT=1
```

The following response appears:

```
Response data follows:

ATUO
```

Send a data string to the modem, with the SEND_DIAGNOSTIC_DATA command. The data should loop back to the modem.

```
send_diagnostic_data device_name=$LIMO_PORTO ..
data=''UUUUUUUUUUUUUUUUUUUU''
```

The following response appears:

```
Response data follows:

UUUUUUUUUUUUUUUUUUUU
```

Terminate the modem local analog loopback mode with the SEND_DIAGNOSTIC_DATA command.

```
send_diagnostic_data device_name=$LIMO_PORTO ..
data=''+++''carriage_return=FALSE
```

The following response appears:

```
Response data follows:

+++
```

Return the port to the ON state with the CHANGE_ELEMENT_STATE command.

```
change_element_state device_name=$LIMO_PORTO ..
state=ON
```

The following response appears:

```
Device $limO_portO on
```

The following example illustrates how to use the SEND_DIAGNOSTIC_DATA command to test an intelligent modem with the existing online port diagnostic in modem loopback mode.

Put the port in the DOWN state with the CHANGE_ELEMENT_STATE command.

```
change_element_state device_name=$LIMO_PORTO ..
state=DOWN
```

The following response appears:

```
Device $limO_portO down
```

Place the modem in local analog loopback mode with the SEND_DIAGNOSTIC_DATA command.

```
send_diagnostic_data device_name=$LIMO_PORTO ..
data=''ATU0''
```

The following response appears:

```
Response data follows:

ATU0
```

Execute the port online diagnostic in modem loopback mode with the START_PORT_TEST command.

```
start_port_test device_name=$LIMO_PORTO ..
loop_mode=MODEM success_state=DOWN modem_class=4
```

NOTE

The example assumes the test passes. SUCCESS_STATE=DOWN is required to eliminate the need for another CHAES command to place the port in the DOWN state. MODEM_CLASS=4 is needed if the line (port) is undefined or defined as an auto_rec line.

Terminate modem local analog loopback mode and return port to the ON state as in previous example.

SET_COMMAND_MDI (SETCM) (NOS Only) NETOU Command

Purpose

Selects the MDI (or MTI) through which you send commands to the network and from which you receive responses and alarms from the network. At any time, you can communicate with only one MDI. If only one DI (MDI or MTI) is connected to a host, this command is not needed. It is only needed in configurations supporting more than one MDI or MTI per host. When you select an MDI for the first time, your user prolog automatically executes. Subsequent, consecutive selection of the same MDI causes recovery of the operator environment for that MDI. Using this command, you may switch communications from one MDI to another. Whenever you select a different MDI, the session with the currently selected MDI is broken. You may specify whether or not the operations session should be terminated with the old MDI (using the RETAIN parameter).

You receive responses only from the currently selected MDI. However, you receive alarms from all MDIs with which you have active NETOU sessions. If a session with a previously selected MDI is retained (see RETAIN parameter) and the previously selected and currently selected MDI are in the same catenet, you receive the same alarm twice, once from each MDI. Because of this, the RETAIN parameter should only be used when switching between MDIs belonging to disjoint catenets.

Format

SET_COMMAND_MDI
MDI = name
RETAIN = boolean

Parameters

MDI (M)

The system name of the MDI or MTI to which your operations session is switched. If you omit this parameter, NETOU attempts to use the MDI specified on the NETOU job statement as the default MDI to be selected, if an MDI is specified and it is available. Otherwise, NETOU selects the longest-connected available MDI as the default.

RETAIN (R)

Indicates whether or not the operations session with the currently selected MDI or MTI should be retained. Possible values are YES, Y, NO, or N. If you select YES, the current session is retained. You may subsequently resume that session using another SET_COMMAND_MDI command. If you select NO, the operations session with the MDI or MTI you have been using is ended. If you are switching between MDIs or MTIs on disjoint catenets, RETAIN should be set to YES. NETOU displays received alarms for both the retained session and your currently selected session at your operations session as well as sending them to the alarm history buffer. You may also review the alarms for a retained session using the DISPLAY_ALARM_HISTORY command. If you are switching between MDIs or MTIs on a common catenet, RETAIN should be set to NO. This prevents NETOU from displaying duplicate alarms for the new and previous sessions. Default is NO.

Responses MDI selected = <system_title>

--ERROR-- The value <value> is not valid as a RETAIN option.

--ERROR-- MDI not available, MDI = <system_name>.

Remarks This command cannot be contained in a CDCNET network operations command file.

Examples

```
set_command_mdi mdi=mdi_3

MDI selected = MDI_3
```

SET_DATE_AND_TIME (SETDAT) NETOU Command

Purpose

Sets the master date and time for a catenet. For NOS-based CDCNET environments, the master date and time is maintained by one DI in the network that is configured as the clocking_system DI. A clocking_system DI contains the Independent Clock Management Entity. For NOS/VE-based CDCNET environments, the master date and time is maintained in a NOS/VE host. For NOS environments, this command must be sent to the clocking_system DI.

Each CDCNET DI reports date and time in command responses, logs, and alarms. Each DI also contains a Dependent Clock ME, which obtains the master Catenet clock from the clocking_system DI (or from the master clock on the NOS/VE host in NOS/VE environments). When the correct date and time are set, you can send the SYNCHRONIZE_CLOCK command to each DI in the network (see SYNCHRONIZE_CLOCK command description in this appendix), to reset each DI's clock to the master date and time.

Format

SET_DATE_AND_TIME
DATE = string
TIME = string
DATE_FORMAT = keyword value
TIME_FORMAT = keyword value

Parameters

DATE (D)

Current date, represented in the format specified by the DATE_FORMAT parameter (see parameter description). If this parameter is not entered, the CDCNET date is not changed. The allowable range for the day component is depends on the month and year. Range for January, March, May, July, August, October, December is 1..31; for April, June, September, November, 1..30; and for February, 1..28 or 1..29. The allowable range for the month component is 01..12. If the DATE_FORMAT selected is ISO, the ISO year range is 1900..2155.

TIME (T)

Current time, represented in the format specified by the TIME_FORMAT parameter (see parameter description). If time is not entered, the current time is used. The allowable range for the minute and second components is 00..59. If the TIME_FORMAT selected is AMPM, the hour component may be in the range 01..12, otherwise the range is 00..23.

DATE_FORMAT (DF)

Specifies how date information is specified. Allowed keyword values include the following, using as an example a date of November 1, 1985, and dd for day, mm for month, and yy for year.

Keyword Value	Format	Example
MDY	mm/dd/yy	11/01/85
DMY	dd/mm/yy	01/11/85
ISO	yyyy-mm-dd	1985-11-01

Default is DMY.

TIME_FORMAT (TF)

Specifies how time information is specified. Allowed keyword values include the following, using as an example a time of 2:41 PM, and hh for hour, mm for minute, ss for second, and XX for AM or PM identifier.

Keyword Value	Format	Example
AMPM	hh:mm XX	2:41 PM
HMS	hh:mm:ss	14:41:38

Default is HMS.

Responses

Master clock for catenet set.
(Followed by date and time in selected format. See example.)

--WARNING-- Master clock for catenet set

(Followed by date and time in selected format)
Power on reset <text> used, please correct.

--WARNING-- Master clock for catenet set

(Followed by date and time in selected format)
Power on reset date and time used, please correct.

--ERROR-- Alphabetic character in date: <text>.

--ERROR-- Alphabetic character in time: <text>.

--ERROR-- Day value <text> out of range.

--ERROR-- Day value <text> out of range for month <text>, year <text>.

--ERROR-- Month value <text> out of range.

--ERROR-- Year value <text> out of range.

--ERROR-- Hour value <text> out of range.

--ERROR-- Minute value <text> out of range.

--ERROR-- Second value <text> out of range.

--ERROR-- Expecting date in format <text>, found <text>.

--ERROR-- Expecting time in format <text>, found <text>.

--ERROR-- Independent clock ME not installed in system.

Remarks

The clocking_system DI is configured by the CLOCKING_SYSTEM parameter on the DEFINE_SYSTEM command described in the CDCNET Commands Reference manual. To determine which DI is configured to be the clocking_system, send the DISPLAY_SYSTEM_OPTIONS (DISSO) command, described in the CDCNET Commands Reference manual, to each DI. Specify the display option CLOCKING_SYSTEM, as shown in the following example.

```
SEND_COMMAND SYSTEM=di_name,COMMAND='DISPLAY_SYSTEM_OPTIONS..
DISPLAY_OPTION=CLOCKING_SYSTEM'
```

The DI that contains the master clock returns the following response.

```
clocking_system = yes
```

If any component of the date or time is omitted, the corresponding component of the current date or time is used. For example, if you enter df=dmy,d="//86", the year changes to 1986, but the current day and month do not change. Leading zeros may be omitted from any component number, provided that the component is preceded by a delimiter or a letter. The following are valid delimiters.

blank	space
/	slant
-	hyphen
:	colon

Examples

```
set_date_and_time d=''24/11/85'',..
t=''08:25:49''

Master clock for catenet set
24/11/85 08:25:49
```

START_CIM_TEST (STACT) NETOU Command

Purpose

Starts an online diagnostics test for a Communications Interface Module (CIM), all its connected URIs and LIM boards, and their ports.

The CIM diagnostic test should be used only if there are problems on more than one LIM, since all line users must be disconnected and lines must be stopped to run the CIM diagnostic. If problems seem to be confined to one LIM, the LIM test should be run (see START_LIM_TEST command later in this appendix), and if no errors occur while running the LIM test, the Port test should be run (see START_PORT_TEST command later in this appendix).

Format

START_CIM_TEST
DEVICE_NAME = keyword value
REPEAT_PASS = integer 0..65535
SUCCESS_STATE = keyword value
LOGGING = boolean
STOP_ON_ERROR = boolean

Parameters

DEVICE_NAME (DN)

The physical name of the CIM being tested. This name consists of a dollar sign $, the board type (CIM), and the board slot number (0..7), as in $CIM3 for a CIM board in slot 3.

REPEAT_PASS (RP)

Specifies how many times you want the test to repeat (pass). The parameter value may be any positive integer. The value 0 (zero) specifies that the test is run continuously until you stop the test by a STOP_CIM_TEST command described in this manual. Default is 1 (one). Negative numbers are not accepted.

NOTE

If the STOP_ON_ERROR parameter is set to OFF, an error causes the test to terminate the current pass and restart testing at the beginning of the next pass.

SUCCESS_STATE (SS)

Determines the state in which the hardware device is left upon successful completion of the diagnostic test. Possible values are ON and DOWN. ON specifies that the device state is set to ON if the test completes without error, but remains set to the DOWN state if the test detects an error. DOWN specifies that the state remains set to DOWN regardless of the test outcome. Default is ON.

LOGGING (L)

Specifies whether you want the diagnostic messages logged in a log file. There are two possible values for this parameter: ON and OFF. ON specifies that diagnostic messages are logged in the log file. OFF specifies that diagnostic messages are not logged. Default is ON.

STOP_ON_ERROR (SOE)

Specifies whether or not you want the test to end if an error condition is encountered. There are two possible values for this parameter: ON and OFF. ON specifies that the test is stopped if any error occurs. OFF specifies that the test is not stopped if any error occurs. See note with the REPEAT_PASS parameter. Default is ON.

Responses

CIM test started, version <version_number>.
CIM slot number = <cim slot number>.

--WARNING-- Device <device_name> test already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "DOWN" state.

--FATAL-- CIM test aborted, version <version_number>.

CIM slot number= <cim slot number>
Unable to start test task.

--FATAL-- CIM test aborted, <version number>.

CIM slot number= <cim slot number>.
Test task stop flag set.

Remarks

In order for this test to run, the device state must be DOWN. Use the CHANGE_ELEMENT_STATE command, described in this manual, to change the state of the device.

To get the results of the CIM test, send the DISPLAY_TEST_STATUS command, described in this manual, to the DI that contains the device being tested.

If you start the CIM test, and the CIM test runs without failure, you do not also have to start the LIM test using START_LIM_TEST (described in this appendix). However, you should still run the port test (using START_PORT_TEST described in this appendix), using the EXTERNAL and MODEM loop mode options, to check for problems outside of the CIM and LIM, such as communication line and modem problems.

You can best test LIM select logic failures by running multiple port tests concurrently, using the START_PORT_TEST command described in this manual. Running the CIM or LIM tests only tests the ports sequentially.

Examples This example starts an online diagnostics test for a CIM and all its LIMs, running one pass of the test and stopping on the first occurrence of an error.

```
start_cim_test device_name=$cim5

CIM test started, version 0901
CIM slot number = 5
```

This example starts an online diagnostics test for a CIM and all its LIMs. The test is run continuously without stopping for errors. However, since logging is on, any errors encountered during the test are logged.

```
start_cim_test dn=$cim5,rp=0,soe=off

CIM test started, version 0901
CIM slot number = 5
```

START_ESCI_TEST (STAET) NETOU Command

Purpose

Starts the online diagnostics test on an ESCI board. The ESCI diagnostic test can be used to isolate possible failures on an ESCI board or Ethernet transceivers.

An online diagnostics test affects only the board being tested. Operations and communications traffic for other boards or ports are unaffected. However, during a test the board or port is not available for normal communications traffic. This means that you may not execute online diagnostics on the only board or port supporting the network solution over which the DI receives operations commands from you. This restriction is enforced through the STOP_NETWORK command described in this manual; since communications must be stopped on the device being tested before the diagnostics can be executed.

Format

START_ESCI_TEST
DEVICE_NAME = keyword value
REPEAT_PASS = integer 0..65535
SUCCESS_STATE = keyword value
LOGGING = boolean
STOP_ON_ERROR = boolean

Parameters

DEVICE_NAME (DN)

The physical name of the ESCI being tested. This name consists of a dollar sign $, the board type (ESCI), and the board slot number (0..7). For example, $ESCI4 is the physical name for a ESCI board in slot 4. This parameter has no default parameter.

REPEAT_PASS (RP)

Specifies how many times you want the test to repeat. The parameter value may be any integer. Default is 1 (one). The value 0 (zero) specifies that the test is run continuously until you stop the test by a STOP_ESCI_TEST command described in this manual.

NOTE

If the STOP_ON_ERROR parameter is set to OFF, an error causes the test to terminate the current pass and restart testing at the beginning of the next pass.

SUCCESS_STATE (SS)

Determines the state in which the hardware device is left upon successful completion of the diagnostic test. Possible values are ON and DOWN. ON specifies that the device state is set to ON if the test completes without error, but remains set to the DOWN state if the test detects an error. DOWN specifies that the state remains set to DOWN regardless of the test outcome. Default is ON.

LOGGING (L)

Specifies whether you want the diagnostic messages logged in a log file. There are two possible values for this parameter: ON and OFF. ON specifies that diagnostic messages are logged in the log file. OFF specifies that diagnostic messages are not logged. Default is ON.

STOP_ON_ERROR (SOE)

Specifies whether or not you want the test to end if an error condition is encountered. There are two possible values for this parameter: ON and OFF. ON specifies that the test is stopped if any error occurs. OFF specifies that the test is not stopped if any error occurs. See note with the REPEAT_PASS parameter. Default is ON.

Responses

ESCI test started, version <version_number>.
ESCI slot number = <esci slot number tested>.

--WARNING-- Device <device_name> test already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "DOWN" state.

--FATAL-- ESCI test aborted, version <version_number>.

ESCI slot number= <esci slot number>
Unable to start test task.

Remarks

In order for this test to run, the device state must be DOWN. Use the CHANGE_ELEMENT_STATE command described in this manual to change the state of the device.

To get the results of the ESCI test, send the DISPLAY_TEST_STATUS command described in this manual to the DI that contains the device being tested.

If you specify SUCCESS_STATE=DOWN, you must use the CHANGE_ELEMENT_STATE command described in this manual, when the diagnostic completes to put the device in the ON state.

Examples

This example shows an ESCI online diagnostics test being started for an ESCI board in slot 6 of a DI called North_TDI_1. Logging is to be turned off for this test and no errors are logged.

```
start_esci_test device_name=$esci6,l=off

ESCI test started, version 0901
ESCI slot number = 6
```

START_LIM_TEST (STALT) NETOU Command

Purpose

Starts an online diagnostics test on a LIM board and its ports.

The LIM diagnostic test should be run if failures are reported on two or more ports on the same LIM. If no errors occur while running the LIM test, the Port diagnostic test should be run (see START_PORT_TEST command described in this appendix). If problems are reported on more than one LIM, the CIM diagnostic test should be run (see START_CIM_TEST described in this appendix).

Format

START_LIM_TEST
DEVICE_NAME = keyword value
REPEAT_PASS = integer 0..65535
SUCCESS_STATE = keyword value
LOGGING = boolean
STOP_ON_ERROR = boolean

Parameters

DEVICE_NAME (DN)

Physical name of LIM device, consisting of a dollar sign $, board type (LIM) and slot number, as in $LIM5 (device name for LIM board in slot 5).

REPEAT_PASS (RP)

Specifies how many times you want the test to repeat. The parameter value may be any integer. Default is 1 (one). The value 0 (zero) specifies that the test is run continuously until you stop the test by a STOP_LIM_TEST command described in this manual.

NOTE

If the STOP_ON_ERROR parameter is set to OFF, an error causes the test to terminate the current pass and restart testing at the beginning of the next pass.

SUCCESS_STATE (SS)

Determines the state in which the hardware device is left upon successful completion of the diagnostic test. Possible values are ON and DOWN. ON specifies that the device state is set to ON if the test completes without error, but remains set to the DOWN state if the test detects an error. DOWN specifies that the state remains set to DOWN regardless of the test outcome. Default is ON.

LOGGING (L)

Specifies whether you want the diagnostic messages logged in a log file. There are two possible values for this parameter: ON and OFF. ON specifies that diagnostic messages are logged in the log file. OFF specifies that diagnostic messages are not logged. Default is ON.

STOP_ON_ERROR (SOE)

Specifies whether or not you want the test to end if an error condition is encountered. There are two possible values for this parameter: ON and OFF. ON specifies that the test is stopped if any error occurs. OFF specifies that the test is not stopped if any error occurs. See note with the REPEAT_PASS parameter. Default is ON.

Responses LIM test started, version <version_number>.
CIM slot number= <CIM slot number>.
LIM slot number= <lim slot number>.

--WARNING-- Device <device_name> test already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "DOWN" state.

--FATAL-- LIM test aborted, version <version_number>.

CIM slot number= <cim slot number>.
Unable to start test task.

--FATAL-- LIM test aborted, version <version_number>.

CIM slot number= <cim slot number>.
LIM slot number= <lim slot number>.

You receive one of the following abort reasons whenever the START_LIM_TEST aborts.

- You receive the following response when the test task started but terminated prematurely.

  Test task stop flag set.

- You receive the following response when the LIM test cannot run because all ports on the LIM are turned OFF. Use the CHANGE_STATE_ELEMENT command to change the hardware to the appropriate state. See the CHANGE_STATE_ELEMENT command described in this manual.

  State of all ports is "OFF".

- You receive the following response when no ports are supported on the LIM as indicated by the LIM Status Table. This may occur if the LIM on-board tests fail. Use the DISPLAY_TEST_STATUS command described in this manual to determine the status of on-board tests.

  LIM Status Table indicates no ports supported on lim.

- You receive the following response if the LIM specified on the last line of the response is not one of the following supported types.

  4-channel RS232 (xx=08 (16) through 0F (16))
  RS449 (xx=00 (16) through 07 (16))
  V.35 (xx=20 (16) through 27 (16))

  --FATAL-- LIM test aborted, version <version_number>.

  CIM slot number= <cim slot number>.
  LIM slot number= <lim slot number>.
  Test not allowed for LIM type xx.

- As seen in the following response, there is a special case defined for CIM failures that prohibits starting a lower level test such as a LIM or a port test. That is, if the CIM has failed, you can not start a LIM test until you run a CIM test (using the START_CIM_TEST command described in this manual).

  --FATAL--

  LIM test aborted, version <version number>.
  CIM slot number= <cim slot number>.
  LIM slot number= <lim slot number>.
  Previous CIM failure requires CIM to be tested first.
  ENTER "start_cim_test dn= <device name>".

Remarks

In order for the LIM test to run, the device state must be DOWN. Use the CHANGE_ELEMENT_STATE command described in this manual to change the state of the device.

To get the results of the LIM test, send the DISPLAY_TEST_STATUS command, described in this manual, to the DI that contains the device being tested.

If you specify SUCCESS_STATE=DOWN, you must use the CHANGE_ELEMENT_STATE command described in this manual when the diagnostic completes to put the device in the ON state.

Examples

```
start_lim_test device_name=$lim5

LIM test started, version 10H3.
CIM slot number = 6.
LIM slot number = 5.
```

START_LINE (STAL) NETOU Command

Purpose Starts communications over a communication line or a URI line. The terminal interface program (TIP) supporting the line must be defined for this command to succeed.

Format **START_LINE**
LINE_NAME = name

Parameters **LINE_NAME (LN)**

The logical name of the line assigned by the DEFINE_LINE configuration command.

Responses Line <line_name> started.

--ERROR-- Line <line_name> already started.

--ERROR-- Line <line_name> not defined.

--ERROR-- TIP for line <line_name> not configured.

--FATAL-- Line start-up failed.

Examples

```
start_line line_name=line31

Line LINE31 started.
```

START_MCI_INLINE_TEST (STAMIT) NETOU Command

Purpose

Starts the inline diagnostics testing of an MCI board. An inline diagnostics test shares access to the device being tested with nondiagnostic software, while an online diagnostics test has exclusive access to and control of the device being tested.

Format

START_MCI_INLINE_TEST
  DEVICE_NAME = name
  MESSAGE_COUNT = 1..10000
  MESSAGE_LENGTH = keyword value
  MESSAGE_INTERVAL = 0..60000

Parameters

DEVICE_NAME (DN)

Specifies the physical name of the MCI to be tested.

MESSAGE_COUNT (MC)

Specifies the number of messages to be transmitted and received as part of this inline test. Default is 100.

MESSAGE_LENGTH (ML)

Length of the test messages to be transmitted as part of the inline test. The following keywords are valid for this parameter.

N1
N2
N3
N4
N5
N10
N500
N1500
SMALL
LARGE
MIXED

The keywords allow a test message to be either a fixed or relative length (in bytes).

Specify one of the fixed keywords when you want all messages transmitted during the test to be the same length. The fixed length keywords and their values are as follows.

Keyword	Value
N1	1 byte
N2	2 bytes
N3	3 bytes
N4	4 bytes
N5	5 bytes
N10	10 bytes
N500	500 bytes
N1500	1500 bytes

Specify a relative keyword when the transmitted message length can be within a certain range. If you select a relative value, the inline test diagnostic determines the test message length. The same size is not used for all messages. The diagnostic software distributes the test messages length within a range you selected.

The relative length keywords and their values are as follows.

Keyword	Value
SMALL	1 through 500 bytes
LARGE	500 through 1500 bytes
MIXED	1 through 1500 bytes

Default is MIXED.

MESSAGE_INTERVAL (MI)

Specifies the time interval between test messages. Specify the value in milliseconds. The diagnostic inline software delays the specified time before transmitting the next test message. A parameter value of 0 means test messages are transmitted as fast as possible. Default is 0.

Responses

MCI in line test, version <version>
started for device <device_name>

--WARNING-- In line test for device <device_name> is already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "ON" status.

--ERROR-- Device <device_name> not a MCI board.

--ERROR-- Channel trunk for device (device_name) is not defined.

--ERROR-- An NP interface, VE interface, or channel network solution for device <device_name> is not defined).

--ERROR-- NP interface for device <device_name> is not up.

--ERROR-- VE interface for device <device_name> is not up.

--ERROR-- Unable to start the MCI in line test.

Not enough memory is available for the required table space.

--ERROR-- Unable to start the MCI inline diagnostics task.

Examples

```
start_mci_inline_test device_name = $mci7

MCI in line test, version 2605
started for device $mci7
```

START_MCI_TEST (STAMT) NETOU Command

Purpose Starts the online diagnostic test on an MCI board.

NOTE

STAMT does not work on NOS/VE channels.

Format

START_MCI_TEST
DEVICE_NAME = keyword value
REPEAT_PASS = integer 0..65535
SUCCESS_STATE = keyword value
LOGGING = boolean

Parameters

DEVICE_NAME (DN)

Physical name of the MCI to be tested. The physical name consists of a dollar sign $, board type (MCI), and the slot number, as in $MCI6 (device name for an MCI in slot 6). There is no default value.

REPEAT_PASS (RP)

Specifies how many times you want the test to repeat. The parameter value may be any integer. Default is 1 (one). The value 0 (zero) specifies that the test is run continuously until you stop the test by a STOP_MCI_TEST command described in this manual.

SUCCESS_STATE (SS)

Determines the state in which the hardware device is left in upon successful completion of the diagnostic test. Possible values are ON and DOWN. ON specifies that the device state is set to ON if the test completes without error, but remains set to the DOWN state if the test detects an error. DOWN specifies that the state remains set to DOWN regardless of the test outcome. Default is ON.

LOGGING (L)

Specifies whether you want the diagnostic messages logged in a log file. There are two possible values for this parameter: ON and OFF. ON specifies that diagnostic messages are logged in the log file. OFF specifies that diagnostic messages are not logged. Default is ON.

Responses MCI test started, version <version number>.

MCI slot number= <mci slot number>.

--WARNING-- Device <device_name> test already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "DOWN" state.

--ERROR-- Device <name> test already started. Only one MCI test is allowed to be active at one time. Stop Active test or wait for it to complete.

--FATAL-- MCI test aborted, version <version number> MCI slot number= <mci slot number> Unable to start test task.

--FATAL-- MCI test aborted, version <version number> MCI slot number= <mci slot number> Test task stop flag set.

Examples

```
start_mci_test device_name=$mci7

MCI test started, version 10H3
MCI slot number= 7
```

START_NETWORK (STAN) NETOU Command

Purpose

Starts communications over an X.25, Ethernet, or HDLC network solution. Also starts the underlying X.25, Ethernet, or HDLC trunk.

Format

START_NETWORK
NETWORK_NAME = name

Parameters

NETWORK_NAME (NN)

The logical name of the network assigned by a define command that configured the network solution.

Responses

<Network_type> network <name> started for trunk <trunk_name>.

<Network_type> network <name> started for trunks (<trunk_name> <trunk_name>..).

--WARNING-- The 3A Command Processor has timed-out waiting for response from SSR. Please check network status for completion of request.

--ERROR-- Network <name> already started for trunk <trunk_name>.

--ERROR-- Trunk <trunk_name> down. Unable to start network <network_name>.

--ERROR-- Trunk <trunk_name> off. Unable to start network <network_name>.

--ERROR-- Network <name> is not defined.

--FATAL-- Stream Service Error.

This response includes one of the following error messages.

The device manager did not accept a function for the ESCI board.

Unable to initialize ESCI board.

HDLC SSR received error when sending command to DVM.

HDLC SSR received error on start port services.

Not enough memory is currently available for required table space.

Unable to open statisics SAP.

Unable to open memory management SAP.

--FATAL-- Unable to start task <entry_point_name>.

Examples

```
start_network network_name=plymouth_net_1

ETHERNET Network PLYMOUTH_NET_1 started for trunk
PLYMOUTH_TRUNK_1.
```

START_NP_INTERFACE (STANI) (NOS MDI Only) NETOU Command

Purpose

Starts the Network Products (NP) protocol over a NOS mainframe channel to a NOS system and starts the underlying channel trunk protocol if it has not already been started.

Format

START_NP_INTERFACE
INTERFACE_NAME = name

Parameters

INTERFACE_NAME (IN)

The logical name of the interface assigned by the DEFINE_NP_INTERFACE command described in the CDCNET Commands Reference manual.

Responses

NP_interface <interface_name> started.

--WARNING-- NP interface <interface_name> command processor has timed-out waiting for a response from the NP interface task.

--ERROR-- NP interface <interface_name> is not defined.

--ERROR-- NP interface <interface_name> already started.

--FATAL-- Unable to start NP interface <interface_name>. Unable to start task SVM.

--FATAL-- Unable to start NP interface <interface_name>. Unable to start task BIP.

--FATAL-- Unable to start NP interface <interface_name>. Unable to send ITM to NP interface task.

--FATAL-- Unable to start NP interface <interface_name>. Memory management sap table not found.

--FATAL-- Not enough memory is currently available for required table space.

--FATAL-- Unable to start NP interface <interface_name>. Unknown status returned from open memory sap.

Examples

```
start_np_interface in=cyber_109

NP interface CYBER_109 started.
```

START_PORT_TEST (STAPT) NETOU Command

Purpose

Starts an online diagnostics test on an individual LIM port.

This diagnostic test should be run if failures are reported on only one port or on lines associated with multiple LIMs. Multiple port tests should be run at the same time if failures are reported on lines associated with multiple LIMs.

NOTE

Do not run diagnostics on a port configured with a trunk or line speed of 56 Kbs, that is attached to a CIM which is also supporting other activity. The port diagnostics fail.

Format

START_PORT_TEST
DEVICE_NAME = name
REPEAT_PASS = integer 0..65535
SUCCESS_STATE = keyword value
LOGGING = boolean
STOP_ON_ERROR = boolean
LOOP_MODE = keyword value
MODEM_CLASS = integer 1..6

Parameters

DEVICE_NAME (DN)

Physical name of the device to be tested, consisting of a dollar sign ($), board type (LIM), its slot number, the keyword PORT, and port number. For example, $LIM3_PORT1 is the device name for port 1 on the LIM board in slot 3.

REPEAT_PASS (RP)

Specifies how many times you want the test to repeat. The parameter value may be any positive integer. The value 0 (zero) specifies that the test is run indefinitely until you stop the test by a STOP_PORT_TEST command described in this manual. Default is 1.

NOTE

If the STOP_ON_ERROR parameter is set to OFF, an error causes the test to terminate the current pass and restart testing at the beginning of the next pass.

SUCCESS_STATE (SS)

Determines the state in which the hardware device is left upon successful completion of the diagnostic test. Possible values are ON and DOWN. ON specifies that the device state is set to ON if the test completes without error, but remains set to the DOWN state if the test detects an error. DOWN specifies that the state remains set to DOWN regardless of the test outcome. Default is ON.

LOGGING (L)

Specifies whether you want the diagnostic messages logged in a log file. There are two possible values for this parameter: ON and OFF. ON specifies that diagnostic messages are logged in the log file. OFF specifies that diagnostic messages are not logged. Default is ON.

STOP_ON_ERROR (SOE)

Specifies whether or not you want the test to end if an error condition is encountered. There are two possible values for this parameter: ON and OFF. ON specifies that the test is stopped if any error occurs. OFF specifies that the test is not stopped if any error occurs. See note with the REPEAT_PASS parameter. Default is ON.

LOOP_MODE (LM)

Selects method of loopback for the LIM port. The following three keyword values, and corresponding loopback modes are allowed.

Keyword	Description
INTERNAL (I)	Checks the internal logic of the LIM port by sending a signal through it, but not through the board's drivers or receivers. Does not check anything past the LIM port.
EXTERNAL (E)	Checks transmitters and receivers on the LIM port. This loopback mode requires a loopback plug jumper to be placed on the LIM port before running the loopback test.
MODEM (M)	Checks the LIM port including external cables, the modem or modems, and the communication line. The modem (local or remote) must be manually switched to loopback data towards the LIM. See the specific modem user manual to determine the proper switch setting. To run the modem loopback test, specify MODEM when entering the START_PORT_TEST command and select the loopback on the local or remote modem before starting the test. The use of the external clock is a strap selectable feature on the RS-449 Model A LIM. The strap must be removed to run the external loopback test.

Port	Strap Location	Pins
0	63G3	9-12
1	44K6	4-17

Keyword	Description
	The MODEM loopback test can also be used to check the LIM port to terminal connections when modems are not present. This can be done by using a loopback plug at any point in the LIM port to terminal path. The modem loopback test raises RTS and DTR and checks for CTS and DCD to be active and for TxD to be tied to RxD. RS-232-C and RS-449 loopback plugs are included in the Customer Maintenance Kit (see chapter 10). To run the modem loopback test on this type of configuration, specify MODEM when entering the START_PORT_TEST command and ensure that the correct loopback plug is installed. Also, if the LIM port has not yet been configured as an ASYNC line, the MODEM_CLASS parameter must be specified with a value of 2, 4, or 6 (see MODEM_CLASS parameter description).
	The following table shows the functional loopback required to run the modem loopback test.

Signal Name	RS-232	CCITT	RS-449
Transmit Data (TxD)	BA	103	SD
Receive Data (RxD)	BB	104	RD
Request to Send (RTS)	CA	105	RS
Clear to Send (CTS)	CB	106	CS
Data Terminal Ready (DTR)	CD	108/2	TR
Data Carrier Detect (DCD)	CF	109	RR

Default is INTERNAL.

Both EXTERNAL and MODEM loopback first executes INTERNAL loopback testing. Also, EXTERNAL and MODEM loopback methods may only be selected for LIM port testing, not for other board tests. Run the INTERNAL and EXTERNAL options before running the MODEM option.

MODEM_CLASS (MC)

Selects the maximum modem speed for a group of MODEM types. This parameter is only used when LOOP_MODE=MODEM is selected, and it is required if you choose MODEM loopback, and if the port has not been configured or has been configured as a line with autorecognition. The following modem class table provides information about modem classes and speeds. There is no default value for this parameter.

Modem Type	Operating Mode	Maximum Speed (bps)	Modem Class
Bell 201C	Sync	2,400	1
Bell 103	Async	300	2
Bell 113	Async	300	2
Bell 212A	Sync	1,200	3
Bell 212A	Async	1,200	4
Avanti 2200	Sync	56,000	5
Gandalf LDS260	Sync	56,000	5
Avanti 2200	Async	19,200	6

Responses PORT test started, version <version_number>.
CIM Slot number = <cim slot number>.
LIM Slot number = <lim slot number>.
PORT number = <port number>.

--WARNING-- Device <device_name> test already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "DOWN" state.

--ERROR-- Modem class (MC) parameter required for modem loopback.

--FATAL-- PORT test aborted, version <version_number>.

CIM slot number= <cim slot number>.
LIM slot number= <lim slot number>.
PORT number= <port number>.
<abort reason - See below*>.

*You receive the following response if the test task could not start.

Unable to start test task

*You receive the following response if the LIM is none of the listed supported types.

4-channel RS232 (xx=08 (16) through 0F (16))

RS449 (xx=00 (16) through 07 (16))
V.35 (xx=20 (16) through 27 (16))

*Test not allowed for LIM type xx.

*You receive the following response when you try a port test on a RS-232 LIM with an invalid ID type. Only LIM testing is allowed. The port test is allowed on RS-232 LIMs with an ID type of 09 through 0E (16).

Port test is not allowed for LIM type xx

ENTER START_LIM_TEST DN= <device_name>

*You receive the following response when the test task started but terminated prematurely.

Test task stop flag set.

*You receive the following response after an attempt was made to run the modem loopback test without indicating the modem class. The modem class parameter is required if the line has not been configured or has been configured as an autorecognition line. Include the modem class parameter or reconfigure the line and reenter the START command to run the test.

Modem class (MC) parameter is required for modem loopback when line has not been configured or is an autorecognition line.

Remarks

There is a special case defined for CIM and LIM failures that prohibits starting a lower level test such as a port test. That is, if the CIM or LIM has failed, you cannot start a port test until you run a CIM or LIM test (using the START_CIM_TEST or START_LIM_TEST commands). In such a case, if a START_LIM_TEST command is attempted, an abort response is issued with a reminder to run the higher level test, as in the following example.

```
--FATAL--
PORT test aborted, version 0901
CIM slot number = 6
LIM slot number = 3
Port number = 2
Previous LIM failure requires LIM to be tested first
Enter "START_LIM_TEST DN=$LIM3"
```

In order for the port test to run, the device state must be DOWN. Use the CHANGE_ELEMENT_STATE (CHAES) command described in this manual to change the state of the device.

To get the results of the port test, send the DISPLAY_TEST_STATUS command described in this manual, to the DI that contains the device being tested.

If you specify SUCCESS_STATE=DOWN, you must use the CHANGE_ELEMENT_STATE command when the diagnostic completes to put the device in the ON state.

Examples

```
start_port_test device_name=$lim3_port1

PORT TEST STARTED, VERSION 10H3.
CIM slot number = 5.
LIM Slot number = 3.
Port number = 1.
```

START_SUBNET_CONNECT_TEST (STASCT) NETOU Command

Purpose Starts the inline diagnostic test between a directly connected source and destination system.

Format

START_SUBNET_CONNECT_TEST
DESTINATION_SYSTEM = name
SUBNET_NAME = name
MESSAGE_LENGTH = keyword
MESSAGE_COUNT = 0..60
MESSAGE_INTERVAL = 0..1000
REPEAT_PASS = integer
LOGGING = boolean
STOP_ON_ERROR = boolean

Parameters

DESTINATION_SYSTEM (DS)

Specifies the system name to which the CLNS PDU is sent. The system name is designated by the DEFINE_SYSTEM command (described in the CDCNET Commands Reference manual).

SUBNET_NAME (SN)

Specifies the subnet name used to reach the destination system. This name is designated by the DEFINE_xxx_NET commands (described in the CDCNET Commands Reference manual). When the subnet name is not specified, the routing software determines the subnet used to reach the destination system.

MESSAGE_LENGTH (ML)

Specifies a random or fixed range of length for each message which is transmitted in the test. If a random value is selected, the length of the messages varies within the selected range as determined by the test. The value of the fixed range is from 1 to 512.

The following range value keywords maybe used:

Keyword	Range (bytes)
MAX	Maximum size per subnet
SMALL (S)	1 to 256
LARGE (L)	256 to MAX
MIXED (M)	1 to MAX

Default is MIXED.

MESSAGE_COUNT (MC)

Specifies the number of messages sent in each pass of the test. The values are from 1 to 60. Default is 1.

MESSAGE_INTERVAL (MI)

Specifies the time interval in milliseconds between transmissions of the messages. Zero indicates immediate transmission. The maximum time allowed between transmissions is 1 second (1000 milliseconds). Default is 0 millisecond.

REPEAT_PASS (RP)

Specifies the number of times the test is repeated. If 0 is used, the test runs continuously until stopped by the operator. Default is 1.

LOGGING (L)

Specifies whether log messages are issued (ON) or not (OFF). Default is ON.

STOP_ON_ERROR (SOE)

Specifies whether the test stops when an error is detected (ON) or if it continues running (OFF) until the pass counter is reached or an operator stops the test. Default is ON.

Remarks

The source system is always the system to which the SENC command is issued and in which the STASCT is executing.

Responses

. Subnet Connect Test STARTED. Destination System = <destination_system> Subnet = <subnet_name>

. --INFORMATIVE-- Subnet <subnet_name> is not available for testing.

. --ERROR-- Subnet Connect Test of <subnet_name> is already running.

. --ERROR-- Subnet <subnet_name> is congested, the test may not be started.

. --ERROR-- System <destination_system> is unknown.

. --ERROR-- <system_type> system <system_name> is NOT a CDCNET OSI system.

. --ERROR-- Subnet <subnet_name> is not directly connected.

. --ERROR-- System <destination_system> is not directly connected via subnet <subnet_name>. The Subnet Connect Test only allows directly connected systems to be tested.

. --ERROR-- System <destination_system> is not directly connected. The Subnet Connect Test only allows directly connected systems to be tested.

. --FATAL-- Unable to start test task.

. --FATAL-- NIL pointer for status record in the NIB.

. --FATAL-- No test task response before a timeout.

The FATAL responses indicate that the test task started but terminated prematurely.

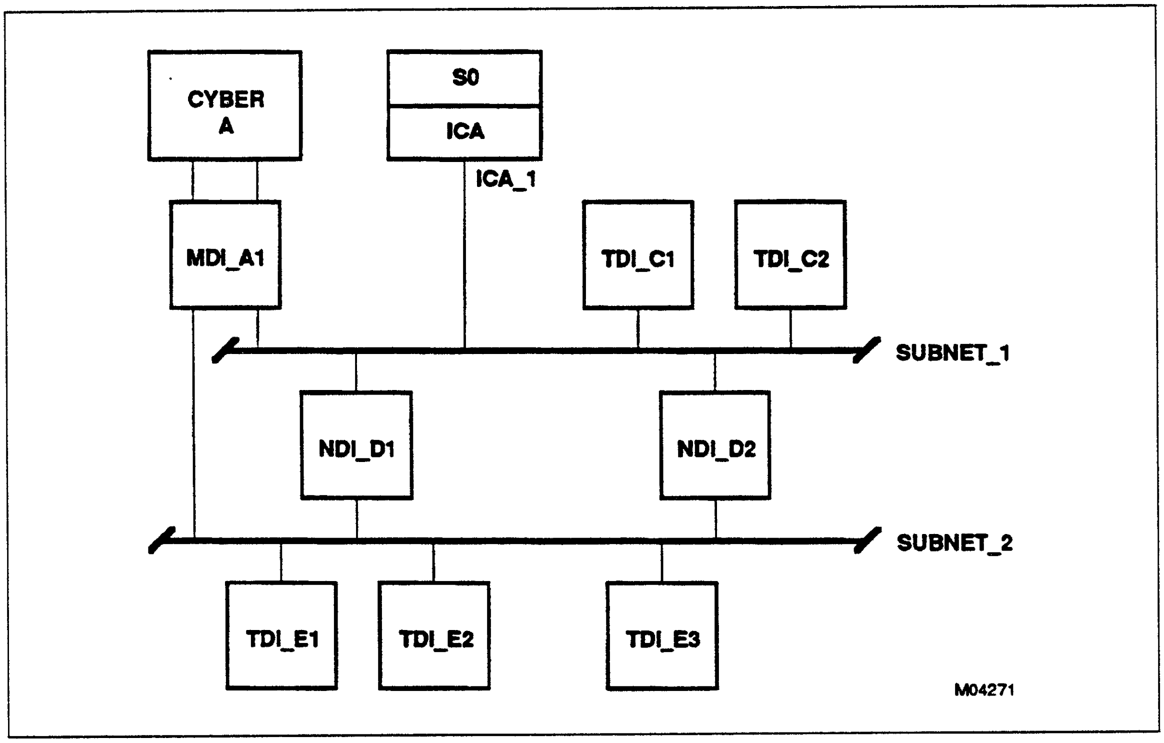

Figure G-1. Catenet Example

Examples

Figure G-1 shows a hypothetical catenet consisting of two subnets connected by two NDIs. The connection from CYBER A through MDI_A1 to both Subnet_1 and Subnet_2 illustrates dual paths from a system. In the following examples, references are made to this catenet.

```
senc c='start_subnet_connect_test destination_system=ndi_d2' s=mdi_a1
```

FROM MDI_A1

Subnet Connect Test STARTED.
Destination System = NDI_D2
Subnet = SUBNET_2

In this example, there are two possible paths to the destination system. Since no subnet was specified in the command, the response indicates the subnet used to reach system NDI_D2.

```
senc c='stasct ds=ndi_d1 sn=subnet_1 rp=0' s=mdi_a1
```

FROM MDI_A1

Subnet Connect Test STARTED.
Destination System = NDI_D1
Subnet = SUBNET_1

In this example, a subnet_name is specified, so the test must test between the two directly connected DIs on SUBNET_1.

START_URI_TEST (STAUT) NETOU Command

Purpose

Starts the online diagnostics test on an individual unit record interface (URI).

Format

START_URI_TEST
DEVICE_NAME = name
REPEAT_PASS = integer
SUCCESS_STATE = keyword value
LOGGING = boolean
STOP_ON_ERROR = boolean
LOOP_MODE = keyword value

Parameters

DEVICE_NAME (DN)

Physical name of the device to be tested, consisting of a dollar sign ($), board type (URI), and its slot number.

REPEAT_PASS (RP)

Specifies how many times you want the test to repeat. The parameter value may be any integer. Default is 1 (one). The parameter value 0 (zero) specifies that the test is run indefinitely until you stop the test by a STOP_URI_TEST command described in this manual.

NOTE

If the STOP_ON_ERROR parameter is set to OFF, an error causes the test to terminate the current pass and restart testing at the beginning of the next pass.

SUCCESS_STATE (SS)

Determines the state in which the hardware device is left upon successful completion of the diagnostic test. Possible values are ON and DOWN. ON specifies that the device state is set to ON if the test completes without error, but remains set to the DOWN state if the test detects an error. DOWN specifies that the state remains set to DOWN regardless of the test outcome. Default is ON.

LOGGING (L)

Specifies whether you want the messages logged in a log file. This parameter has two possible values: ON and OFF. ON specifies that messages are logged in the log file. OFF specifies that messages are not logged. Default is ON.

STOP_ON_ERROR (SOE)

Specifies whether you want the test to end if an error condition is encountered. This parameter has two possible values: ON and OFF. ON specifies that the test is stopped if any error occurs. OFF specifies that the test is not stopped if any error occurs. See note with the REPEAT_PASS parameter. Default is ON.

LOOP_MODE (LM)

Selects method of loopback for the URI. The following keyword values are allowed.

Keyword	Description
EXTERNAL (E)	External loopback executes internal loopback testing before executing external loopback testing. Install the appropriate loopback plug on the URI board or the printer end of the URI/Printer cable before executing the external loopback tests.
INTERNAL (I)	Internal loopback executes internal loopback testing of the logic of the URI board.

Default is INTERNAL.

Responses

URI test started, version <version number>
CIM slot number= <cim slot number>
URI slot number= <uri slot number>

--WARNING-- Device <device_name> test already started.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Device <device_name> not in "DOWN" state.

--FATAL-- URI test aborted, version <version_number>
CIM slot number= <cim slot number>
URI slot number= <uri slot number>
Unable to start test task

The following response indicates the test task started but terminated prematurely.

--FATAL--
URI test aborted, version <version_number>
CIM slot number= <cim slot number>
URI slot number= <uri slot number>
Test task stop flag set

The following response identifies a CIM failure that does not allow you to start a lower level test such as a URI test. When a CIM fails, you cannot start a URI test until you run a CIM test (using the START_CIM_TEST command). When you receive the response, run the START_CIM_TEST command before attempting to run the START_URI_TEST again.

--FATAL--
URI test aborted, version <version number>
CIM slot number= <cim slot number>
URI slot number= <uri slot number>
Previous CIM failure requires CIM to be tested first
ENTER "start_cim_test dn=<device_name>

Examples

```
start_uri_test device_name = $uri5

URI test started, version 2301
CIM slot number= 6
URI slot number= 5
```

STOP_CIM_TEST (STOCT) NETOU Command

Purpose Stops an online diagnostics test running on a Communications Interface Module (CIM) and its LIMs.

Format STOP_CIM_TEST
DEVICE_NAME = name

Parameters **DEVICE_NAME (DN)**

Physical name of the CIM, derived from its type (CIM) and its board slot number. Allowed range is $CIM 0..7. For example, $CIM3 is the physical name for a CIM board in slot 3.

Responses CIM test stop flag set, version <version_number>.
CIM slot number = <cim slot_number>.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- CIM test not running.

CIM slot number= <cim slot number>.

Remarks To get the results of the CIM test, send the DISPLAY_TEST_STATUS command, described in this manual, to the DI that contains the device being tested.

Examples

```
stop_cim_test device_name=$cim5
```

```
CIM test status
CIM slot number = 5.
PASSED on-line version <version_number> <date> <time>
pass count = <pass_count>
```

STOP_ESCI_TEST (STOET) NETOU Command

Purpose Stops an online diagnostics test running on an Ethernet Serial Channel Interface (ESCI).

Format **STOP_ESCI_TEST**
DEVICE_NAME = name

Parameters **DEVICE_NAME (DN)**

Physical name of an ESCI board consisting of a dollar sign ($), board type (ESCI) and its board slot number (0..7). For example, $ESCI4 is the physical name of an ESCI board in slot 4.

Responses ESCI test stop flag set, version <version_number>.
ESCI slot number = <ESCI_slot_number>.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- <Device> test not running ESCI slot number= <esci slot number>.

Remarks To get the results of the ESCI test, send the DISPLAY_TEST_STATUS command described in this manual to the DI that contains the device being tested.

Examples

```
stop_esci_test device_name=$esci6

ESCI test status
ESCI slot number = 6.
PASSED on-line version <version_number> <date> <time>
pass count = <pass_count>
```

STOP_LIM_TEST (STOLT)
NETOU Command

Purpose Stops the online diagnostics running on a LIM board and its ports.

Format **STOP_LIM_TEST**
DEVICE_NAME = name

Parameters **DEVICE_NAME (DN)**

Physical name of LIM device, consisting of a dollar sign ($), board type (LIM) and slot number, as in $LIM5 (device name for LIM board in slot 5).

Responses LIM test stop flag set, version <version_number>.
CIM Slot number = <cim_slot_number>.
LIM Slot number = <lim_slot_number>.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- LIM test not running.

Remarks To get the results of the LIM test, send the DISPLAY_TEST_STATUS command described in this manual to the DI that contains the device being tested.

Examples

```
stop_lim_test device_name=$lim2

LIM test status
CIM Slot number = 5.
LIM Slot number = 2.
PASSED on-line version <version_number> <date> <time>
pass count = <pass_count>
```

STOP_LINE (STOL) NETOU Command

Purpose Stops communications over a communication line or a URI line.

Format

```
STOP_LINE
   LINE_NAME = name
```

Parameters LINE_NAME (LN)

Logical name of the line assigned by the DEFINE_LINE command that configured the line.

Responses Line <line_name> stopped.

--WARNING-- Line <line_name> already stopped.

--ERROR-- Line <name> not defined for this system.

--ERROR-- Line <name> down, hardware status indicates port is in a DOWN or OFF state.

--FATAL-- Line shutdown failure.

Examples

```
stop_line line_name=engin_bld_31

Line ENGIN_BLDG_31 stopped.
```

STOP_MCI_INLINE_TEST (STOMIT) NETOU Command

Purpose Stops the inline diagnostics test executing on an MCI board.

Format **STOP_MCI_INLINE_TEST**
DEVICE_NAME = name

Parameters **DEVICE_NAME (DN)**

Physical name of the device to be tested, consisting of a dollar sign ($), board type (MCI, in this case), and slot number. This parameter has no default value.

Responses Stopped the MCI in line test
for device <device name>.

--ERROR-- Device <device_name> is not installed in system.

--ERROR-- Device <device_name> is not a MCI board.

--ERROR-- MCI in line test for device <device_name> is not running.

--ERROR-- MCI in line test for device <device_name> was terminated. However, no termination response was received from the in line diagnostics test.

Examples

```
stop_mci_inline_test dn=$mci6

Stopped the MCI in line test
for device $mci6
```

STOP_MCI_TEST (STOMT)
NETOU Command

Purpose Stops the online diagnostic running on the MCI.

Format

STOP_MCI_TEST
DEVICE_NAME = name

Parameters

DEVICE_NAME (DN)

Physical name of the MCI. The physical name consists of a dollar sign $, board type (MCI), and the slot number, as in $MCI6 (device name for an MCI in slot 6). There is no default value.

Responses

MCI test stop flag set, version <version number>
MCI slot number= <mci slot number>.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- MCI test not running.
MCI slot number= <mci slot number>

Examples

```
stop_mci_test dn=$mci6

MCI test stop flag set, version 10G2
MCI slot number= 6
```

STOP_NETWORK (STON) NETOU Command

Purpose

Stops communications over a network solution, such as Ethernet, X.25, HDLC. For an Ethernet network, STOP_NETWORK also stops the underlying Ethernet trunk. For an X.25 network, STOP_NETWORK clears the virtual circuit underlying the network, but does not stop the Packet Level interface or X.25 trunk supporting the network. Those elements of the X.25 interface must be stopped by the STOP_X25_INTERFACE command described in the CDCNET Commands Reference manual.

Format

STOP_NETWORK
NETWORK_NAME = name

Parameters

NETWORK_NAME (NN)

The logical name of the network assigned by a define command.

Responses

<Network_type> network <name> stopped for trunk <trunk_name>.

<Network_type> network <name> stopped for trunks (<trunk_name> <trunk_name>..).

--WARNING-- Network <name> already stopped for trunk <trunk_name>.

--WARNING-- The 3A Command Processor has timed-out waiting for response from SSR.
Please check network status for completion of request.

--ERROR-- Network <name> is not defined.

--FATAL-- Stream Service Error. (See below.)

The device manager did not accept a function for the ESCI board.
HDLC SSR received error when sending command to DVM.

Examples

```
stop_network network_name=tymnet_net_1

X.25 Network TYMNET_NET_1 stopped for trunk TYMNET_TRUNK1.
```

STOP_NP_INTERFACE (STONI) (NOS MDI Only) NETOU Command

Purpose

Stops the Network Products (NP) protocol over a mainframe channel to a NOS system and stops the underlying channel trunk protocol. The Network Products interface is addressed by its interface name.

Format

STOP_NP_INTERFACE
INTERFACE_NAME = name

Parameters

INTERFACE_NAME (IN)

The logical name of the Network Products interface assigned by a define command.

Responses

NP_interface <interface_name> stopped.

--WARNING-- NP interface <interface_name> already stopped.

--ERROR-- NP interface <interface_name> is not defined.

--FATAL-- NP interface <interface_name> command processor has timed-out waiting for a response from the NP interface task.

--FATAL-- Unable to stop the NP interface <interface_name>. Unable to send ITM to NP interface task.

Examples

```
stop_np_interface in=cyber_109

NP interface CYBER_109 stopped.
```

STOP_PORT_TEST (STOPT) NETOU Command

Purpose Stops an online diagnostics test running on an individual LIM port.

Format STOP_PORT_TEST
DEVICE_NAME = name

Parameters DEVICE_NAME (DN)

Physical name of the port, consisting of a dollar sign ($) board type (LIM) its slot number, the keyword PORT and port number. For example, $LIM3_PORT1 is the device name for port 1 on the LIM board in slot 3.

Responses PORT test stop flag set, version <version_number>.
CIM Slot number = <slot_number>.
LIM Slot number = <slot_number>.
PORT Slot number = <slot_number>.

--ERROR-- Device <device_name> not installed in system.

--ERROR-- Port test status

CIM slot number= <cim slot number>
LIM slot number= <lim slot number>
Port number= <port number>

Remarks To get the results of the LIM test, send the DISPLAY_TEST_STATUS command (described in this manual) to the DI that contains the device being tested.

Examples

```
stop_port_test device_name=$lim3_port2

PORT test status
CIM slot number = 5
LIM slot number = 3
Port slot number = 2
PASSED on-line version <version_number> <date> <time>
pass count = <pass_count>.
```

STOP_SUBNET_CONNECT_TEST (STOSCT) NETOU Command

Purpose Stops the test execution of the online diagnostic started by the STASCT command described earlier in this manual.

Format **STOP_SUBNET_CONNECT_TEST**
SUBNET_NAME = name

Parameters **SUBNET_NAME (SN)**

Specifies the name of the subnet being tested by the STASCT command.

Responses

. Subnet Connect Test on <subnet_name> is being stopped.

. --ERROR-- Subnet <subnet_name> is unknown.

. --ERROR-- Subnet Connect Test on <subnet_name> is not running.

Examples

```
stop_subnet_connect_test sn=SUBNET_1

Subnet Test on SUBNET_1 is being stopped.
```

STOP_URI_TEST (STOUT) NETOU Command

Purpose Stops the online diagnostic test running on a URI.

Format

STOP_URI_TEST
DEVICE_NAME = name

Parameters

DEVICE_NAME (DN)

Physical name of the URI, consisting of a dollar sign ($), board type (URI), and its slot number.

Responses

URI test stop flag set, version <version number>
CIM slot number= <cim slot number>
URI slot number= <uri slot number>

--ERROR-- Device <device_name> not installed in system.

--ERROR-- URI test not running.
CIM slot number= <cim slot number>
URI slot number= <uri slot number>

Examples

```
stop_uri_test dn=$uri3

URI test stop flag set, version 2301
CIM slot number= 3
URI slot number= 5
```

SYNCHRONIZE_CLOCK (SYNC) NETOU Command

Purpose Sets a DI's date and time to the master date and time for a catenet.

The master date and time is maintained by a DI or NOS/VE system that contains the network-wide clock management function. The master date and time for the catenet is set in a DI by the SET_DATE_AND_TIME command (described in this manual) and on the NOS/VE system according to the system's date and time. When the SYNCHRONIZE_CLOCK command is sent to a DI, the DI's clock is set to the master date and time.

Format **SYNCHRONIZE_CLOCK**

Parameters None.

Remarks System clock synchronized.

--FATAL-- Unable to access master clock through Independent Clock M-E.

--FATAL-- Unable to synchronize system clock, version number mismatch.

--FATAL-- Unable to synchronize system clock, retry limit reached.

Examples

```
synchronize_clock

System clock synchronized.
```

WRITE_TERMINAL_MESSAGE (WRITM) NETOU Command

Purpose

Sends a message to an interactive terminal or group of terminals, including the control consoles for batch workstations. This command allows you to send informative or warning messages to network users or to respond to a network user's request.

You may choose the terminals to which the message is sent by three attributes: line name, terminal device name, or connected service. Specifying these attributes limits the number of terminals receiving a message to those terminals that match the specified attributes.

If you do not specify any attributes with the command and message, then all terminals with at least one active session receive the message.

You can restrict the number of terminals receiving a message by sending the WRITM command to only the DIs to which the desired terminals are attached.

Format

WRITE_TERMINAL_MESSAGE
MESSAGE = list 1..15 of string
LINE_NAME = list 1..15 of name
DEVICE_NAME = list 1..15 of name
SERVICE_NAME = list 1..15 of name

Parameters

MESSAGE (M)

Text of the message to the terminal user. This message must be enclosed by apostrophes. Since this command is sent as a string value within SEND_COMMAND, you must begin and end the message with two consecutive apostrophes so that the message is distinguished as a string value within another string value. For a list of strings, each string is output as one display line. The message may be any text up to 245 characters long. For example, the text ('Please log off by 14:00','Network temporarily down for diagnostics') produces the following output:

```
Please log off by 14:00
Network temporarily down for diagnostics
```

LINE_NAME (LN)

Logical name(s) of the line or lines to receive the message.

DEVICE_NAME (DN)

Logical name(s) of the terminal or terminals to receive the message.

SERVICE_NAME (SN)

Name of the service or services to which terminals must be connected if they are to receive the message.

Responses Message written.

--WARNING-- No terminal matched attributes, message not written.

--FATAL-- Message output process failed.

NOTE

A success response is returned even if no terminals are active, if no terminal interface program (TIP) is installed in the DI to which the terminal is connected, or if the terminal user has disabled output of operator messages.

Remarks At an interactive terminal, the message begins on the next line following the current cursor position. If output from a working connection is ready for a terminal, the message is inserted in the output. If the terminal has multiple working connections, the message appears immediately, regardless of the connection currently in use. If the user disables output of operator messages, the messages sent to the terminal are discarded, and are not retained for display at a later time.

Each message begins with the date and time from the DI to which the terminal is connected. A message appears in the following format, where the message text may be one or more lines of text.

```
yy/mm/dd hh.mm.ss   FROM NETWORK OPERATOR
<message te>
```

Messages are sent from terminal users to the network operator by the REQUEST_NETWORK_OPERATOR (REQNO) terminal user command described in the CDCNET Commands Reference manual.

Examples

```
send_command c='write_terminal_message,..
m=(''New communications configuration tomorrow'',''Network down ..
until 10:00.'')',s=tdil

Message written.
```

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