AREA CODE CHANGE

Please note that the area code for Paradyne Corporation in Largo, Florida has changed from 813 to 727.

For any Paradyne telephone number that appears in this manual with an 813 area code, dial 727 instead.

ACCULINK 316x DATA SERVICE UNIT/ CHANNEL SERVICE UNIT

OPERATOR'S GUIDE

Document No. 3160-A2-GB21-50

January 1997

PARADYNE™

ACCULINK
316x Data Service Unit/Channel Service Unit

Operator's Guide
3160-A2-GB21-50

6th Edition (January 1997)

Changes and enhancements to the product and to the information herein will be documented and issued as a new release.

Standalone

FCC Registration number:	See label on unit
Ringer Equivalence number (REN):	See label on unit
Canadian Certification number:	See label on unit
Canadian DOC Load number:	See label on unit

Carrier Card

FCC Registration number:	See label on unit
Ringer Equivalence number (REN):	See label on unit
Canadian Certification number:	See label on unit
Canadian DOC Load number:	See label on unit

Warranty, Sales, and Service Information

Contact your sales or service representative directly for any help needed. For additional information concerning warranty, sales, service, repair, installation, documentation, or training, use one of the following methods:

- **Via the Internet:** Visit the Paradyne World Wide Web site at http://www.paradyne.com
- **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
  - — Within the U.S.A., call 1-800-870-2221
  - — International, call 813-530-2340

Trademarks

All products and services mentioned herein are the trademarks, service marks, registered trademarks or registered service marks of their respective owners.

Printed on recycled paper

COPYRIGHT © 1997 Paradyne Corporation. All rights reserved.

This publication is protected by federal copyright law. No part of this publication may be copied or distributed, transmitted, transcribed, stored in a retrieval system, or translated into any human or computer language in any form or by any means, electronic, mechanical, magnetic, manual or otherwise, or disclosed to third parties without the express written permission of Paradyne Corporation, 8545 126th Avenue North, P.O. Box 2826, Largo, Florida 33779-2826.

Paradyne Corporation makes no representation or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose. Further, Paradyne Corporation reserves the right to revise this publication and to make changes from time to time in the contents hereof without obligation of Paradyne Corporation to notify any person of such revision or changes.

Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. When an ac power source is used, this product is intended to be used with a three-wire grounding type plug – a plug which has a grounding pin. This is a safety feature. Equipment grounding is vital to ensure safe operation. Do not defeat the purpose of the grounding type plug by modifying the plug or using an adapter.

   Prior to installation, use an outlet tester or a voltmeter to check the ac receptacle for the presence of earth ground. If the receptacle is not properly grounded, the installation must not continue until a qualified electrician has corrected the problem.

   If a three-wire grounding type power source is not available, consult a qualified electrician to determine another method of grounding the equipment.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
4. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
5. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
6. General purpose cables may be provided with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.
7. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
8. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
9. Input power to the ac voltage configuration of this product must be provided by a UL-listed or CSA-certified power source with a Class 2 or Limited Power Source (LPS) output. Input power to the dc voltage configurations of this product must be provided by a National Electric Code (NEC) or a Canadian Electric Code (CEC) Class 2 circuit.
10. This product contains a coin cell lithium battery that is only to be replaced at the factory. **Caution:** There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same type. Dispose of used batteries according to the battery manufacturer's instructions. **Attention:** Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

11. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
    - Never install telephone wiring during a lightning storm.
    - Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
    - Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
    - Use caution when installing or modifying telephone lines.
    - Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
    - Do not use the telephone to report a gas leak in the vicinity of the leak.

Notices

WARNING

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THE AUTHORITY TO OPERATE THIS EQUIPMENT IS CONDITIONED BY THE REQUIREMENTS THAT NO MODIFICATIONS WILL BE MADE TO THE EQUIPMENT UNLESS THE CHANGES OR MODIFICATIONS ARE EXPRESSLY APPROVED BY PARADYNE.

WARNING

TO USERS OF DIGITAL APPARATUS IN CANADA:

THIS CLASS A DIGITAL APPARATUS MEETS ALL REQUIREMENTS OF THE CANADIAN INTERFERENCE-CAUSING EQUIPMENT REGULATIONS.

CET APPAREIL NUMÉRIQUE DE LA CLASSE A RESPECTE TOUTES LES EXIGENCES DU RÉGLEMENT SUR LE MATÉRIEL BROUILLEUR DU CANADA.

Government Requirements and Equipment Return

Certain governments require that instructions pertaining to CSU and modem connection to the telephone network be included in the installation and operation manual. Specific instructions are listed in the following sections.

United States

NOTICE TO USERS OF THE UNITED STATES TELEPHONE NETWORK

1. This equipment complies with Part 68 of the FCC rules. On the equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. The label is located on the bottom of the 3150 CSU, and on the 3151 CSU's circuit card. If requested, this information must be provided to the telephone company.

2. There are two types of telephone lines associated with the standalone equipment. The T1 network connection should be made using a Universal Service Order Code (USOC) type RJ48C jack. The Service Order Code 6.0F should be specified to the telephone company when ordering the T1 line. In addition, the proper Facility Interface Code must be specified to the Telephone Company. The CSU can be configured to support any of the following framing format and line signaling techniques. The CSU's configuration must correspond to the T1 line's parameters. The 3150 CSU's internal modem connects to the Public Switched Telephone Network using a USOC Type RJ11C jack. The Facility Interface Code 02LS2 along with the RJ11C jack should be specified to the telephone company when ordering a dial line for the modem. The 3151 CSU connects to the T1 network using the multi-line USOC-type RJ48H jack and does not have a PSTN interface.

315x CSU Facility Interface Codes

Code	Description
04DU9-BN	1.544 Mbps superframe format (SF) without line power
04DU9-DN	1.544 Mbps SF and B8ZS without line power
04DU9-1KN	1.544 Mbps ANSI ESF without line power
04DU-1SN	1.544 Mbps ANSI ESF and B8ZS without line power

3. The ringer equivalence number (REN) is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum RENs for the calling area.

4. If the 315x CSU causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

5. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

6. If you experience trouble with this equipment, please contact your sales or service representative (as appropriate) for repair or warranty information. If the product needs to be returned to the company service center for repair, contact them directly for return instructions using one of the following methods:

   - **Via the Internet:** Visit the Paradyne World Wide Web site at http://www.paradyne.com
   - **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.

     — Within the U.S.A., call 1-800-870-2221

     — International, call 813-530-2340

   If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

7. The equipment's modem cannot be used on public coin service provided by the telephone company. Connection to Party Line Service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)

8. FCC compliant telephone line cords with modular plugs are provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant.

Canada

NOTICE TO USERS OF THE CANADIAN TELEPHONE NETWORK

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request to disconnect the equipment.

CAUTION

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

If your equipment is in need of repair, return it using the procedures described on page A in the front of this document.

Table of Contents

Preface

Objectives and Reader Assumptions iii
Related Documents iii
Reference Documents iii

1. Introduction

Overview 1-1
Features 1-1
Physical Description 1-3

2. Installation

Overview 2-1
Application Examples 2-1
SNMP or Telnet Connection Examples 2-3
Important Instructions 2-5
Optional Power Sources 2-5
Cabling Examples 2-8
Power-Up Self-Test 2-9

3. Operation

Overview 3-2
Using the Front Panel 3-2
Displaying Unit Identity 3-8
Setting Customer Identification 3-9
Selecting the DTE Drop/Insert or Data Port for LED Display 3-9
Displaying LED Conditions 3-10
Changing Configuration Options 3-11
Configuring the DSU/CSU for SNMP or Telnet Access 3-14
Configuring SNMP Traps 3-19
Configuring DS0 Channels 3-21
Providing Backup Capability 3-31
Selecting the Timing Source 3-32
Establishing Access Security on a Port 3-34
Setting a Password 3-34
Entering a Password to Gain Access 3-35
Acquiring/Releasing the User Interface 3-35
Enabling/Disabling the Front Panel 3-36
Using the Integral Modem in Standalone DSU/CSUs 3-37
Enabling the Communication Port for Carrier-Mounted DSU/CSUs 3-41
Deactivating the Alarm Relay for Carrier-Mounted DSU/CSUs 3-43
Resetting the DSU/CSU 3-43
Download Operations 3-43

4. Maintenance

Overview 4-1
Self-Test Health 4-2
Device Health and Status 4-3
Performance Reports 4-5
Alarms 4-9
SNMP Traps 4-10
Troubleshooting 4-11
Test Jacks 4-13
Test Commands 4-15
Remote Loopback Tests 4-15
Local Loopback Tests 4-17
Test Patterns 4-22
Lamp Test 4-25
Displaying DSU/CSU Test Status 4-26

Appendices

A. Front Panel Menu A-1
B. Technical Specifications B-1
C. Configuration Options C-1
D. Pin Assignments D-1
E. SNMP MIB Objects E-1
F. IP Network Addressing Scenarios F-1
G. Front Panel Emulation G-1
H. Async Terminal Operation H-1
I. Equipment List I-1

Glossary

Index

Preface

Objectives and Reader Assumptions

This operator's guide contains installation, operation, and maintenance information for the ACCULINK 3160, 3161, 3164, or 3165 Data Service Unit (DSU)/Channel Service Unit (CSU).

It is assumed that you are familiar with the operation of digital data communication equipment. You should also be familiar with Simple Network Management Protocol (SNMP) if you want your DSU/CSU to be managed by an SNMP manager.

Related Documents

3000-A2-GA31	*COMSPHERE 3000 Series Carrier Installation Manual*
3000-A2-GB41	*COMSPHERE –48 VDC Central Office Power Unit Installation Guide*
3100-A2-GK40	*ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide*
3162-A2-GB20	*ACCULINK 3162 Data Service Unit/Channel Service Unit User's Guide*

Reference Documents

- AT&T Technical Reference 54016
- AT&T Technical Reference 62411
- ANSI T1.403-1989
- Industry Canada CS-03
- CSA-22.2 No. 950
- Industry Canada (ICES)-003
- FCC Part 15
- FCC Part 68
- UL 1950
- *Management Information Base for Network Management of TCP/IP-Based Internets: MIBII*. RFC 1213, March 1991
- *Definitions of Managed Objects for the DS1 and E1 Interface Types*. RFC 1406, January 1993
- *Definitions of Managed Objects for RS-232-like Hardware Devices*. RFC 1317, April 1992
- *Extensions to the Generic-Interface MIB*. RFC 1229, May 1991

Introduction 1

Overview 1-1
Features 1-1
DTE Drop/Insert (DSX-1) Interface 1-2
Alarm Message Capability 1-2
Front Panel Emulation 1-2
Integral Modem 1-2
Async Terminal Interface Support 1-2
Telnet Access 1-2
SNMP Management Support 1-2
Physical Description 1-3
Standalone DSU/CSU Front Panel 1-3
Standalone DSU/CSU Rear Panel 1-5

Overview

The DSU/CSU acts as an interface between the T1 digital network and the customer premises equipment, converting signals received from the DTE (Data Terminal Equipment) to bipolar signals that can be transmitted over T1 lines. Typical applications include shared access to network-based services, Local Area Network (LAN)/Wide Area Network (WAN) interconnection, and fractional T1 network applications.

In addition to the T1 network interface and the DTE Drop/Insert (DSX-1) interface, the Model 3160 provides two synchronous data ports while the Model 3164 provides four synchronous data ports. The Model 3165 provides one synchronous data port, but does not provide the DTE Drop/Insert (DSX-1) interface.

The Model 3161 (carrier-mounted DSU/CSU) provides two ports in addition to the DTE Drop/Insert (DSX-1) interface and is designed to fit into the COMSPHERE 3000 Series Carrier.

For more information about the carrier-mounted DSU/CSU, refer to the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide* and the *COMSPHERE 3000 Series Carrier Installation Manual*.

Features

The DSU/CSU optimizes network performance with a wide range of features such as the following:

- Software configuration menu displayed via a liquid crystal display (LCD) to permit quick and easy operation, and elimination of complicated hardware strapping.
- Local or remote configuration and operation flexibility.
- Several loopback capabilities and test pattern generators.
- DTE Drop/Insert (DSX-1) capability.
- Alarm message display/print capability.
- Front panel emulation via Windows-based Front Panel Emulation software.
- Integral modem for standalone DSU/CSUs.
- Asynchronous (async) terminal interface support.
- Telnet access for remote async terminal operations.
- Network management provided through industry-standard Simple Network Management Protocol (SNMP).

DTE Drop/Insert (DSX-1) Interface

The DTE Drop/Insert interface allows DTEs/PBXs that support the DS1 signal format to share the T1 network with other high-speed equipment. This is available on 2-port and 4-port DSU/CSUs.

Alarm Message Capability

The DSU/CSU can be attached, either locally or remotely, to an ASCII terminal or printer to display or print alarm messages. Alarms can also be displayed on a PC that is using a terminal emulation package.

Front Panel Emulation

The DSU/CSU offers functionality through Front Panel Emulation software that is similar to that provided by the DSU/CSU front panel. The functionality of the front panel is available by clicking on the function keys with the mouse rather than by pressing keys from the actual front panel.

Integral Modem

The standalone DSU/CSUs contain an integral low-speed (2400 bps), V.22bis dial modem that enables communication with remote devices such as another 316x DSU/CSU, an ASCII terminal or printer, or a PC running the 3100 Series Front Panel Emulation software.

Async Terminal Interface Support

The DSU/CSU can be configured and managed from an asynchronous (async) terminal. The async terminal's full screen display uses a menu hierarchy similar to the DSU/CSU's front panel. You can perform device management and configuration operations as if you are using the DSU/CSU's front panel, but you do not have the limitation of the 2-line, 16-character LCD.

Telnet Access

Remote async terminal operations can be performed using Telnet access. Telnet is a Transmission Control Protocol/Internet Protocol (TCP/IP) service that supports a virtual terminal interface.

SNMP Management Support

SNMP is a network management protocol that is used to monitor network performance and status, and to report alarms (i.e., traps). To function, SNMP requires a manager consisting of a software program housed within a workstation or PC; an agent consisting of a software program housed within a device (e.g., the DSU/CSU); and a Management Information Base (MIB) consisting of a database of managed objects. The DSU/CSU can be managed by any industry-standard SNMP manager.

Two link layer protocols, Point-to-Point Protocol (PPP) and Serial Line Internet Protocol (SLIP), are supported for connection to an external SNMP manager or network device (e.g., a router).

The SNMP manager or network device can be directly connected to the communications (COM) port. An external LAN Adapter can be connected to either the COM port or the auxiliary (AUX) port to provide Ethernet connectivity. Also, the DSU/CSU can be daisy chained together by connecting the COM port of one device to the AUX port of the other, providing SNMP connectivity.

The SNMP management system can communicate to the DSU/CSU remotely through the Facility Data Link (FDL) or (for 2-port and 4-port DSU/CSUs) the synchronous data port's Embedded Data Link (EDL).

Physical Description

The 316x Series consists of a Model 3160 DSU/CSU (2-port), a Model 3164 DSU/DSU (4-port), a Model 3165 DSU/CSU (1-port), and a Model 3161 (carrier-mounted) DSU/CSU.

For more information about the carrier-mounted DSU/CSU, refer to the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide* and the *COMSPHERE 3000 Series Carrier Installation Manual*.

Standalone DSU/CSU Front Panel

The standalone DSU/CSU front panel contains,

- One 2-line, 16-alphanumeric-character-per-line liquid crystal display (LCD)
- One 7-button keypad (three Function and four directional keys)
- Twelve light-emitting diodes (LEDs)
- Six test jacks for the Model 3160/3164 DSU/CSU, and two test jacks for the Model 3165 DSU/CSU

The front panels are shown in Figures 1-1, 1-2, and 1-3.

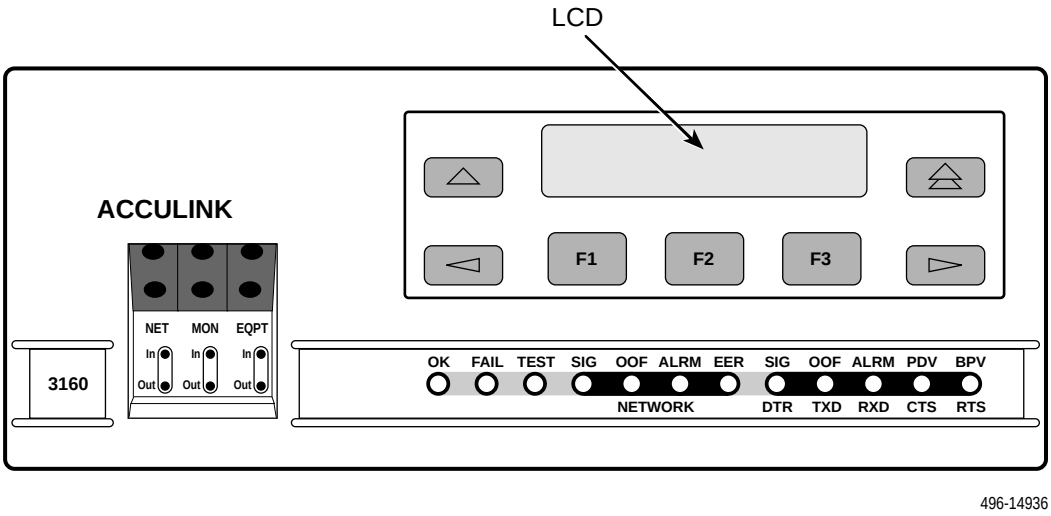


Figure 1-1. 3160 DSU/CSU Front Panel

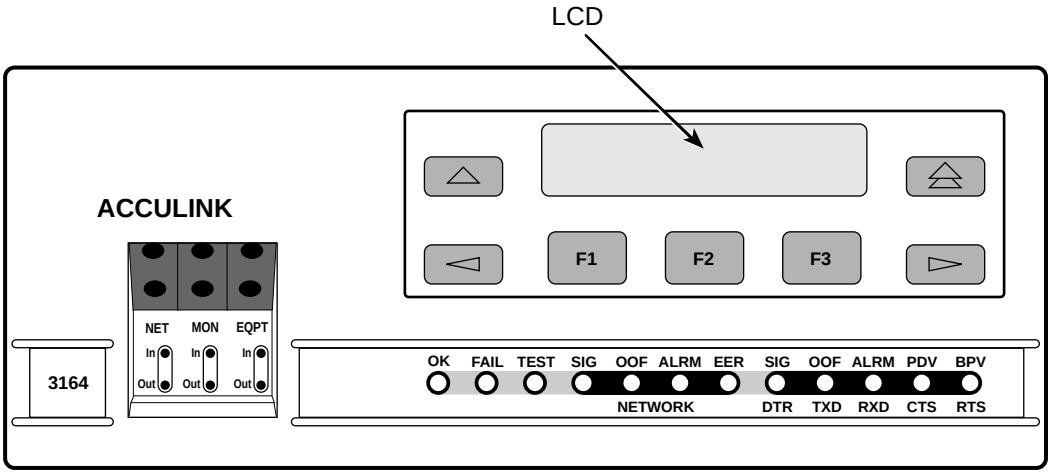


Figure 1-2. 3164 DSU/CSU Front Panel

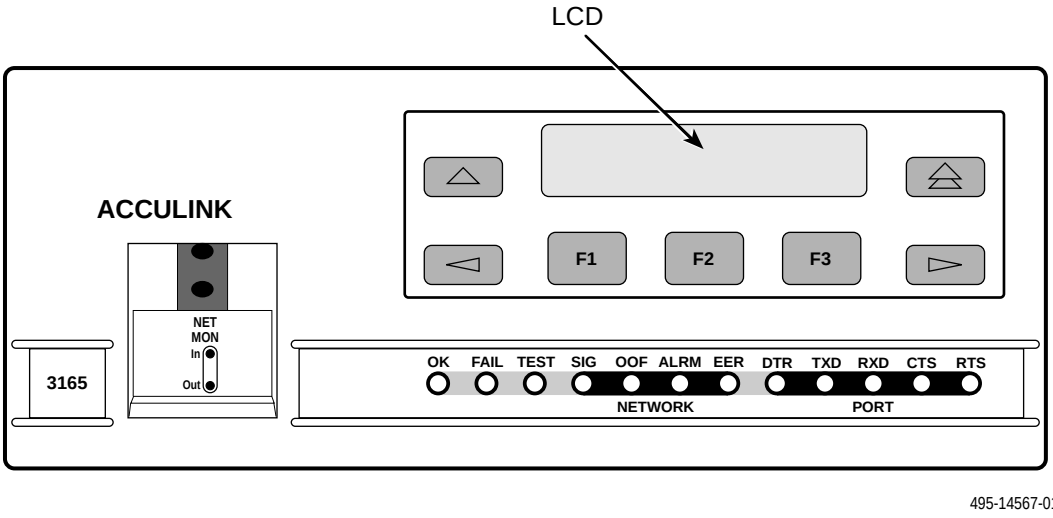


Figure 1-3. 3165 DSU/CSU Front Panel

Standalone DSU/CSU Rear Panel

The standalone DSU/CSU rear panel contains the connectors required for the operation of the DSU/CSU (Figures 1-4, 1-5, and 1-6). The connectors and their functions are listed in Table 1-1.

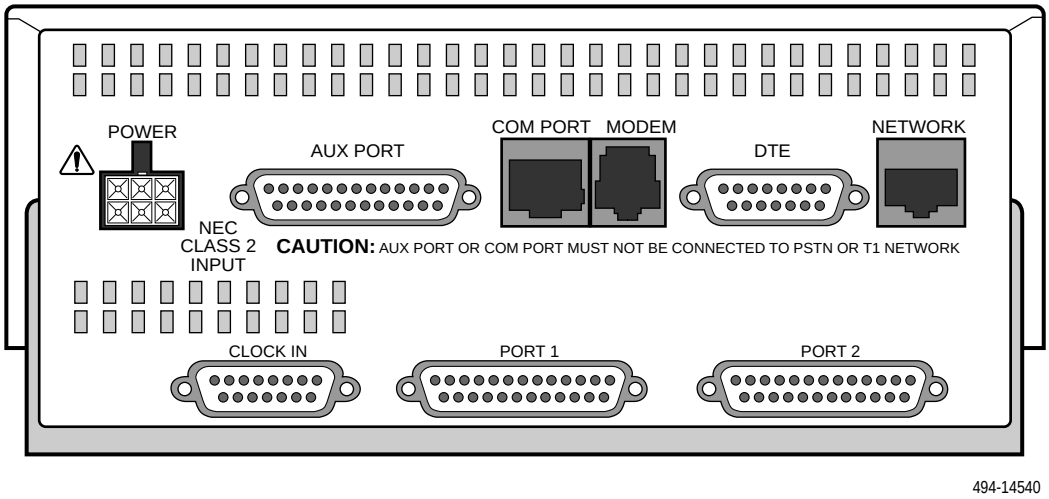


Figure 1-4. 3160 DSU/CSU Rear Panel

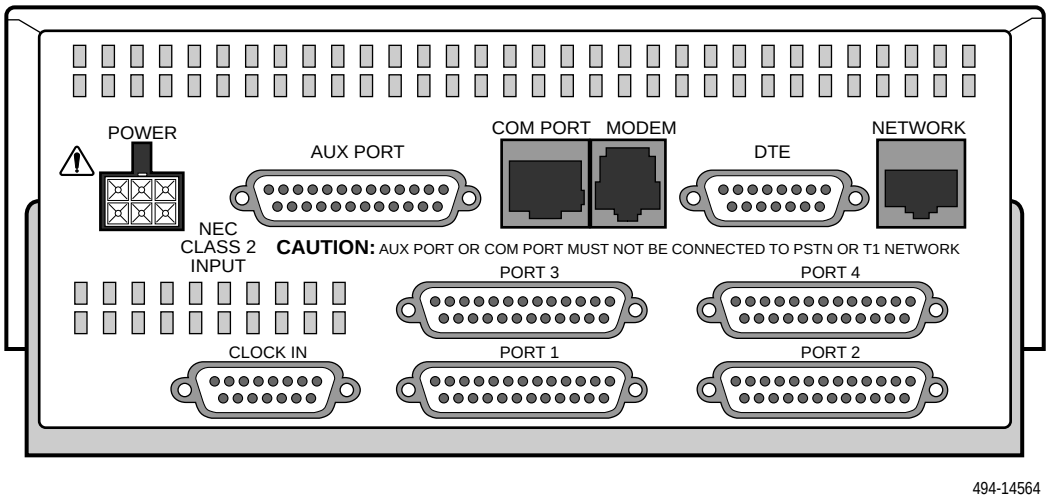


Figure 1-5. 3164 DSU/CSU Rear Panel

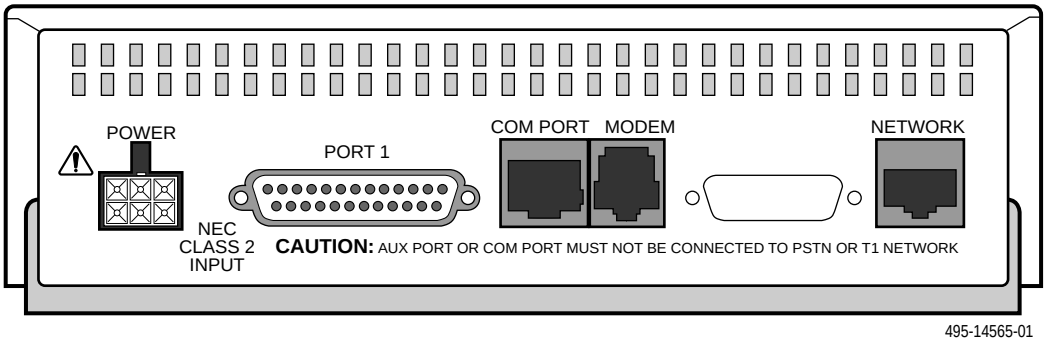


Figure 1-6. 3165 DSU/CSU Rear Panel

Table 1-1
Standalone DSU/CSU Rear Panel Connectors

Name	Function
POWER	Supplies power to the DSU/CSU by providing an attachment for the ac power module or the optional dc power cable (+24 or –48 Vdc).
AUX PORT	Supports SNMP LAN Adapter or daisy-chain connections.
COM PORT	Provides access to a locally connected PC, ASCII terminal or printer, SNMP management link, or async terminal interface.
MODEM	Provides a connection to the integral modem for access to a remotely connected PC, ASCII terminal or printer, SNMP management link, or async terminal interface.
NETWORK	Provides access to the T1 network.
DTE (Model 3160/3164)	Provides access to the DTE Drop/Insert (DSX-1) interface.
CLOCK IN (Models 3160/3164)	Used to attach an external clock to the DSU/CSU.
PORTs 1–4	Used to connect the customer's synchronous data DTE to the DSU/CSU.

Installation 2

Overview 2-1
Application Examples 2-1
SNMP or Telnet Connection Examples 2-3
Important Instructions 2-5
Optional Power Sources 2-5
Installing the +24 Vdc Power Supply 2-5
Installing the Single –48 Vdc Power Supply 2-6
Installing the Redundant –48 Vdc Power Supply 2-7
Cabling Examples 2-8
Power-Up Self-Test 2-9

Overview

This chapter contains information for installing your standalone DSU/CSU. It includes application examples, cabling, and power-up information.

NOTE

Installation instructions for the carrier-mounted DSU/CSU are located in the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide* and the *COMSPHERE 3000 Series Carrier Installation Manual*.

Application Examples

The DSU/CSU acts as an interface between the T1 digital network and the customer's equipment.

The DSU/CSU is connected to the customer's equipment through one of the synchronous data ports (PORTs 1– 4) or the DTE Drop/Insert (DSX-1) interface. It is connected to the T1 digital network through the network interface.

NOTE

The DTE Drop/Insert (DSX-1) interface is only available on 2-port and 4-port DSU/CSUs.

Some common applications for the DSU/CSU are:

- Point-to-Point LAN interconnection (Figure 2-1).
- Shared access to network-based services (Figure 2-2).
- Fractional T1 network applications (Figure 2-3).

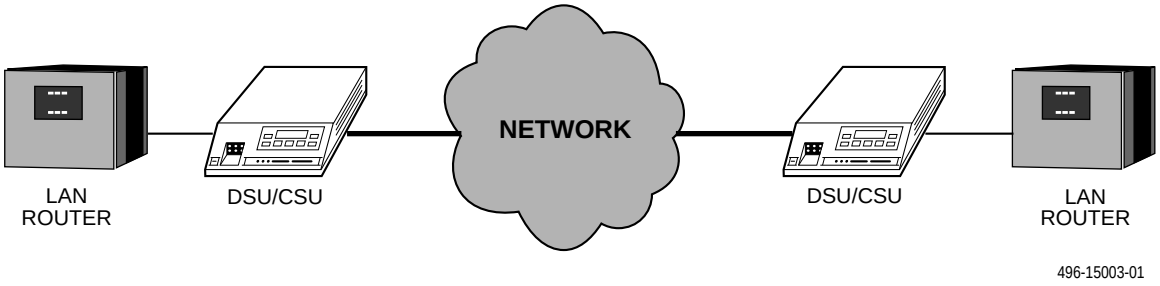


Figure 2-1. Point-to-Point Application Example

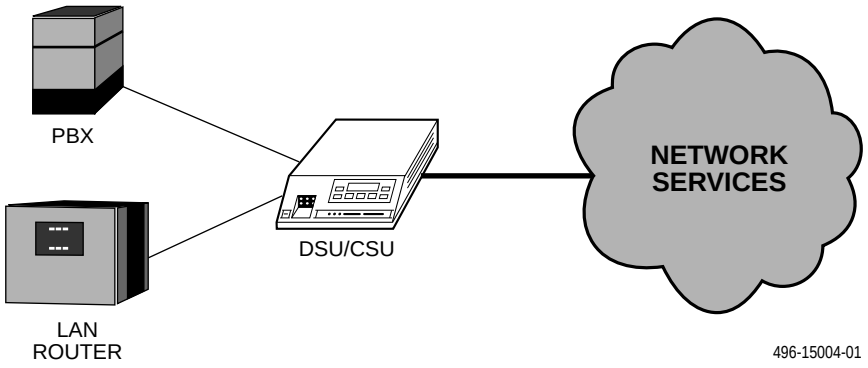


Figure 2-2. Shared Access Application Example

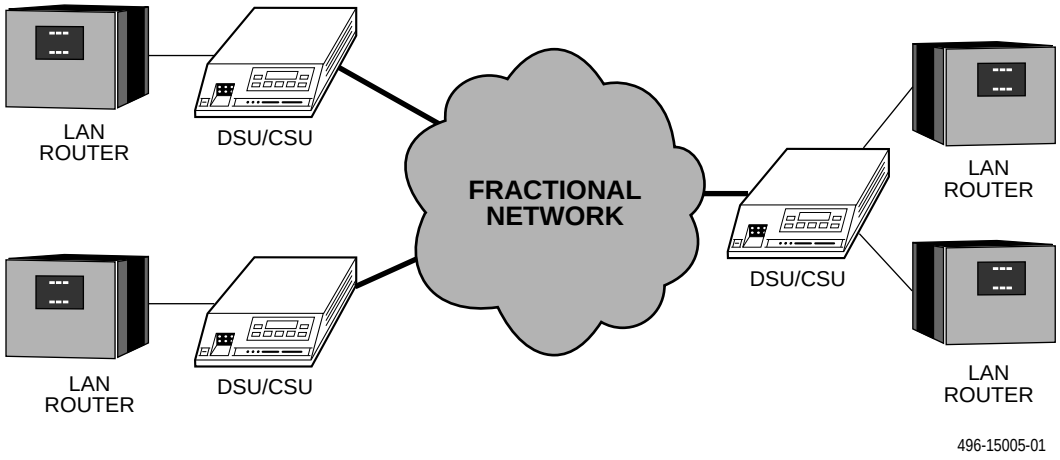


Figure 2-3. Fractional T1 Application Example

SNMP or Telnet Connection Examples

The DSU/CSU can be connected to an SNMP or Telnet system in a number of ways. Some examples include:

- Directly connecting the COM port to the SNMP or Telnet device (Figure 2-4).
- Connecting the COM port to a network device (e.g., a router) (Figure 2-5).
- Connecting the COM port or the AUX port to an external LAN Adapter for Ethernet connectivity (Figure 2-6).
- Daisy chaining the COM port of one device to the AUX port of the other (Figure 2-7).
- Remotely accessing the DSU/CSU through the Facility Data Link (FDL) or the synchronous data port's Embedded Data Link (EDL) (Figure 2-8).

NOTE

EDL is only available on 2-port and 4-port DSU/CSUs.

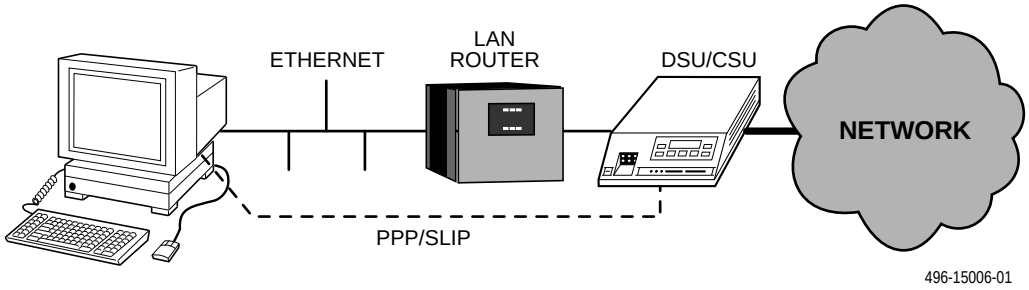


Figure 2-4. Direct Connection

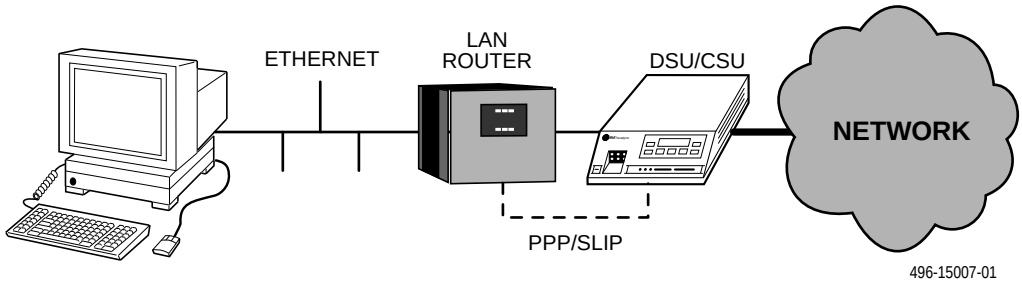


Figure 2-5. Connection through a Router

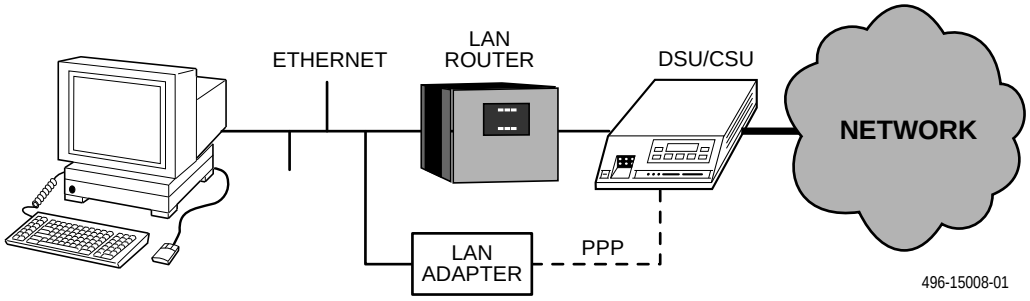


Figure 2-6. Connection through a LAN Adapter

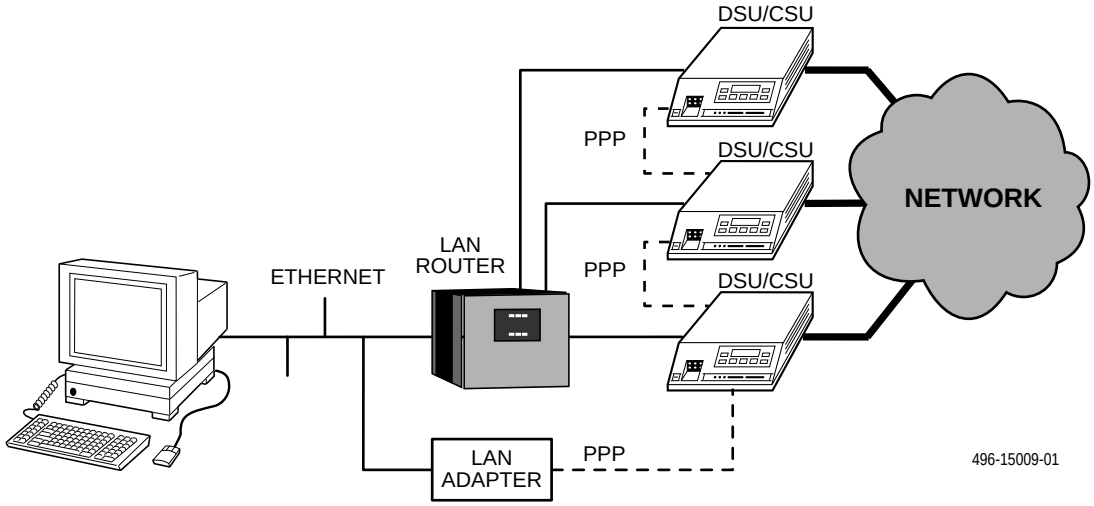


Figure 2-7. LAN Adapter and Daisy Chaining

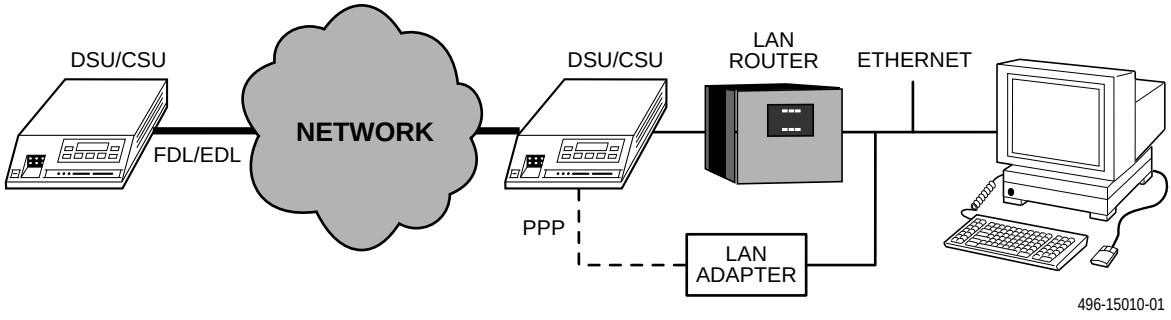


Figure 2-8. Remote Access through FDL/EDL

Important Instructions

Read and follow all warning notices and instructions marked on the DSU/CSU or included in this guide.

For a complete listing of the safety instructions, see the *Important Safety Instructions* section at the beginning of this guide.

HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

Optional Power Sources

The DSU/CSU is typically powered by the ac power module. Use the following procedures only if you want to use an optional dc power source.

Using the optional dc power cable, the DSU/CSU is capable of operating on either a +24 Vdc power source, –48 Vdc single source battery, or –48 Vdc redundant source batteries (for power backup). To use dc power, choose one of the following power supply types.

Installing the +24 Vdc Power Supply

To install the DSU/CSU using a +24 Vdc power supply, refer to Figure 2-9 and use the following procedure.

To install the +24 Vdc power supply,

1. Connect the green wire to a suitable earth ground.
2. Connect the white wire to the +24 Vdc return.
3. Connect the orange wire to the +24 Vdc source.
4. Cut the black, red, and blue wires off at the outer insulation.
5. Plug the power connector into the DSU/CSU.

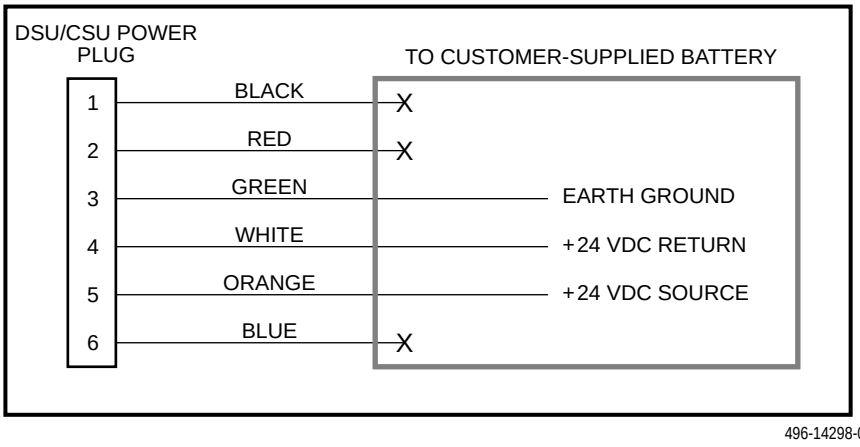


Figure 2-9. +24 Vdc Power Supply Pinouts

Installing the Single –48 Vdc Power Supply

To install the DSU/CSU using a single source –48 Vdc power supply, refer to Figure 2-10 and use the following procedure.

To install the –48 Vdc single source power supply,

1. Connect the black and red wires to the –48 Vdc return source.
2. Connect the green wire to a suitable earth ground.
3. Connect the orange and blue wires to the –48 Vdc input source.
4. Cut the white wire off at the outer insulation.
5. Plug the power connector into the DSU/CSU.

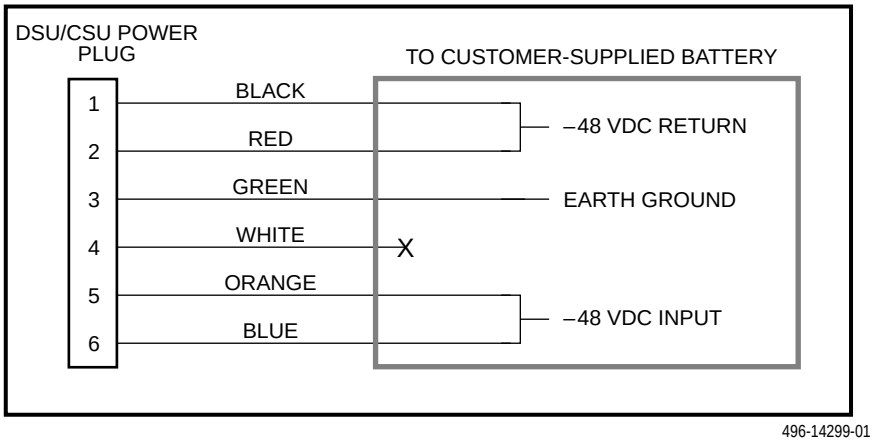


Figure 2-10. –48 Vdc Single Source Power Supply Pinouts

Installing the Redundant –48 Vdc Power Supply

To install the DSU/CSU using a redundant –48 Vdc power supply, refer to Figure 2-11 and use the following procedure.

To install the redundant –48 Vdc power supply,

1. Connect the black wire to the –48 Vdc return source B.
2. Connect the red wire to the –48 Vdc return source A.
3. Connect the green wire to a suitable earth ground.
4. Connect the orange wire to the –48 Vdc input source B.
5. Connect the blue wire to the –48 Vdc input source A.
6. Cut the white wire off at the outer insulation.
7. Plug the power connector into the DSU/CSU.

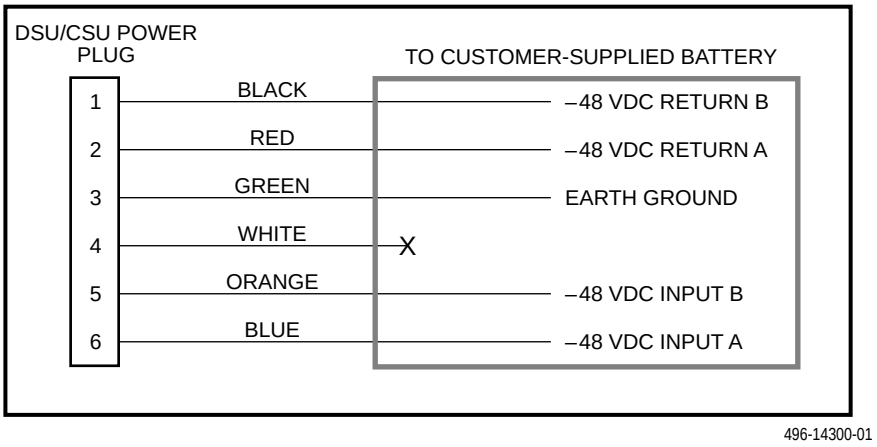


Figure 2-11. –48 Vdc Redundant Source Power Supply Pinouts

Cabling Examples

The DSU/CSU is supplied with an ac power module and a VF cable for the integral modem.

Optional cables are described in Appendix D, *Pin Assignments*.

Figure 2-12 illustrates some cabling examples.

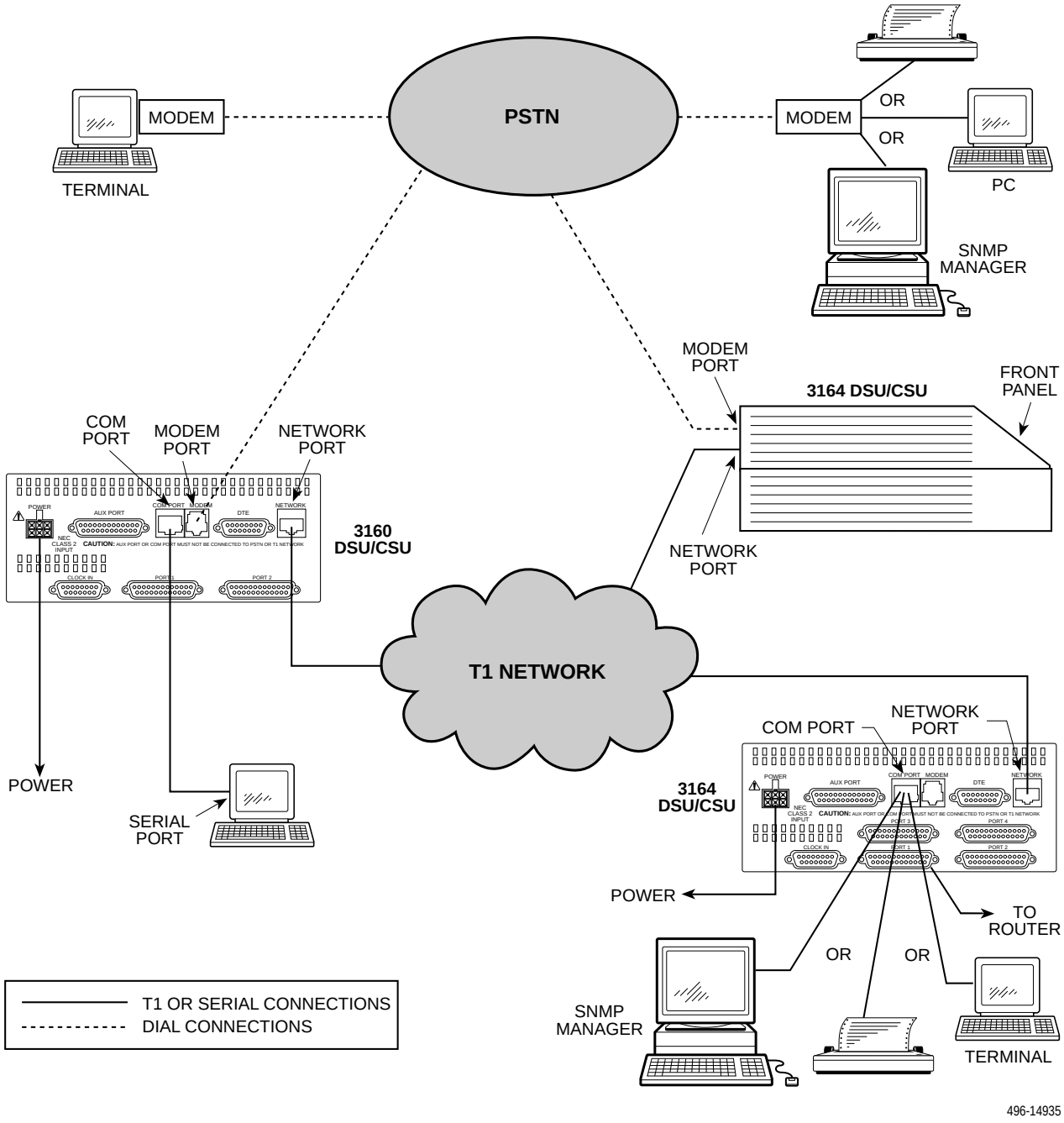


Figure 2-12. Cabling Examples

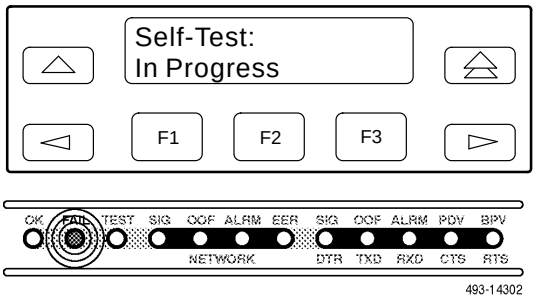
Power-Up Self-Test

After you connect the DSU/CSU to a power source, the unit performs the power-up self-test to ensure that it is in good working order. The DSU/CSU performs this test on itself upon power-up or after a device reset, unless it has been disabled by the Self-Test configuration option (see Appendix C, *Configuration Options*).

The self-test includes a basic processor test, a limited memory test, a code checksum test, and basic verification tests of the internal components. The front panel LCD displays the progress and pass/fail status of these power-up tests.

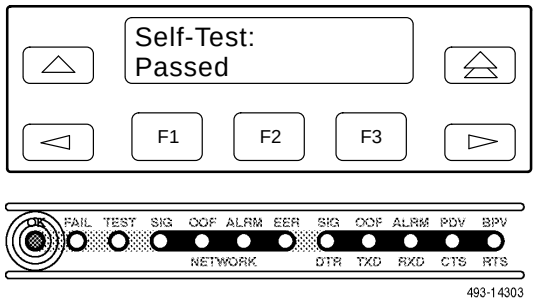
The power-up self-test consists of the following steps:

1. Once the DSU/CSU is plugged in, the In Progress screen appears and the Fail LED blinks ON and Off continuously.

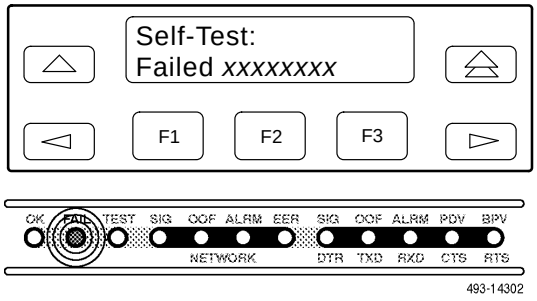


2. All the LEDs then start to flash simultaneously in the pattern twice ON, then Off. Then, the LCD begins to flash characters and numbers in the same pattern, alternating with the flashing LEDs.

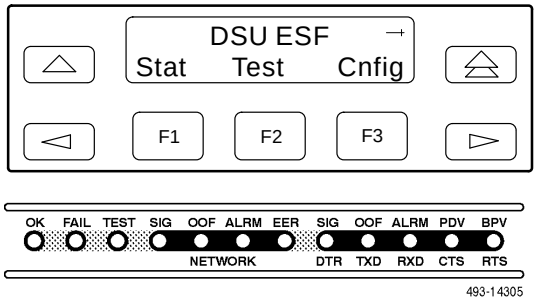
3. If the self-test is successful, the Passed screen appears for one second, the Fail LED turns Off and the OK LED lights.



If the self-test fails, the Failed screen appears for five seconds. The Fail LED lights, and an eight-digit failure code (*xxxxxxxx*) is displayed for use by service personnel to determine the cause of the self-test failure. The DSU/CSU continues to try to operate. If you are in doubt about the results of the self-test, use the Self-Test Health command to display the status of this test (see the *Self-Test Health* section in Chapter 4, *Maintenance*).



4. The top-level menu screen appears.



Operation 3

Overview 3-2
Using the Front Panel 3-2
LCD 3-3
Keypad. 3-3
Test Jacks. 3-4
LEDs 3-4
Displaying Unit Identity 3-8
Setting Customer Identification 3-9
Selecting the DTE Drop/Insert or Data Port for LED Display 3-9
Displaying LED Conditions 3-10
Changing Configuration Options 3-11
Displaying/Editing Configuration Options 3-12
Saving Edit Changes 3-13
Selecting/Copying to a Specific Port 3-13
Configuring the DSU/CSU for SNMP or Telnet Access 3-14
Selecting the Port 3-14
Setting the IP Address 3-15
Selecting the Link Layer Protocol 3-16
Specifying the Community Name(s) and Access Type(s) 3-17
Configuring SNMP Traps 3-19
Enabling SNMP Trap Messages 3-19
Selecting the Number of Trap Managers 3-19
Configuring a Destination for SNMP Traps 3-20
Configuring DS0 Channels 3-21
Displaying DS0 Channel Assignments 3-26
Allocating Data Ports 3-27
Block or ACAMI Assignment Method 3-28
Individual Channel Assignment Method 3-29
Allocating DS0 Channels from the DTE Drop/Insert Interface to the Network Interface 3-29
Clearing DS0 Channel Allocation 3-31
Providing Backup Capability 3-31
Selecting the Timing Source 3-32
Configuring for Network Timing 3-33
Configuring for External Timing 3-33
Establishing Access Security on a Port 3-34
Setting a Password 3-34
Entering a Password to Gain Access 3-35
Acquiring/Releasing the User Interface 3-35
Acquiring the Active User Interface 3-35
Releasing the Active User Interface 3-36
Enabling/Disabling the Front Panel 3-36
Using the Integral Modem in Standalone DSU/CSUs 3-37
Entering Numbers in the Phone Directories 3-37
Initiating a Call for Front Panel Pass-Through Operation 3-39
Initiating a Call for PC, ASCII Terminal/Printer, or SNMP Operation 3-39
Disconnecting the Modem Connection 3-40
Enabling the Communication Port for Carrier-Mounted DSU/CSUs 3-41
Deactivating the Alarm Relay for Carrier-Mounted DSU/CSUs 3-43
Resetting the DSU/CSU 3-43
Download Operations 3-43

Overview

This chapter contains information for operating your DSU/CSU. It includes a description of the front panel and sample procedures for configuring the DSU/CSU.

NOTE

Additional information for the carrier-mounted DSU/CSU is located in the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide* and the *COMSPHERE 3000 Series Carrier Installation Manual*.

Using the Front Panel

The standalone DSU/CSU front panel (Figure 3-1) consists of an LCD, a keypad, test jacks, and 12 LEDs. The carrier-mounted DSU/CSU faceplate contains test jacks and 12 LEDs, however, the LCD and keypad are located on the Shared Diagnostic Control Panel (SDCP) of the 3000 Series Carrier. For more information about the SDCP, refer to the *COMSPHERE 3000 Series Carrier Installation Manual*.

NOTE

You can display a graphical representation of the DSU/CSU front panel on an attached PC (see Appendix G, *Front Panel Emulation*).

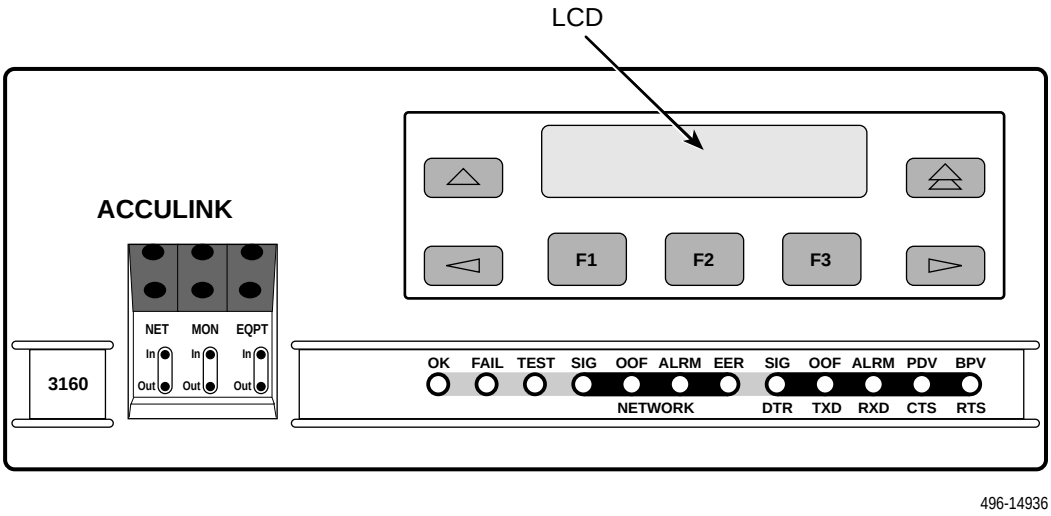


Figure 3-1. Standalone DSU/CSU Front Panel

LCD

The LCD (Figure 3-2) displays two types of data:

- Messages such as alarms, command/test completion, and action in progress
- Front panel menu tree information (see Appendix A, *Front Panel Menu*)

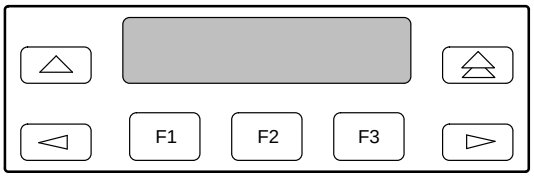


Figure 3-2. LCD

The LCD displays status messages as requested via the Device Health and Status branch of the front panel menu (see the *Device Health and Status* section in Chapter 4, *Maintenance*). In addition, the highest level status message appears on the front panel automatically if no front panel action has occurred at the DSU/CSU for the past five minutes.

The LCD also lists commands, configuration options, and test results. In most cases, the top line shows the command or option name and default value, while the second line displays options and responses. When a response is required, select from the options displayed directly above the Function keys (F1, F2, F3); make your choice by pressing the corresponding Function key.

Keypad

The 7-button keypad (Figure 3-3) enables you to navigate through the menu tree and select choices presented on the second line of the LCD.

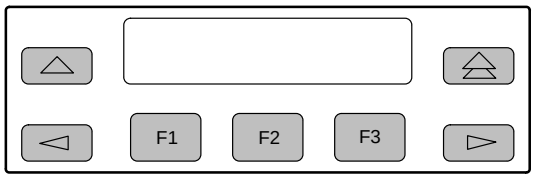
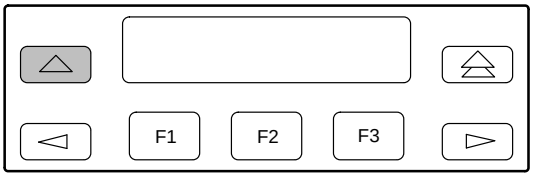
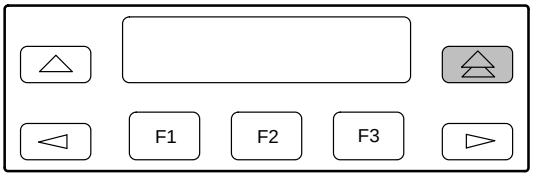


Figure 3-3. Keypad

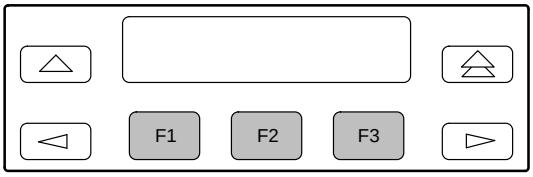
Use the △ key to move up the menu.



Use the ⏫ key to exit any part of the menu in which you may be operating. You immediately return to the top-level menu screen shown on the front panel menu (see Appendix A, *Front Panel Menu*).



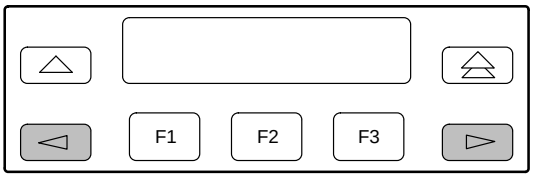
Use the Function (F1, F2, F3) keys to make selections from the choices presented on the second line of the LCD. When this line presents choices, it is generally divided into three sections, each displayed directly above one of the Function keys. When your choice appears above one of the Function keys, press that key to select that choice.



The scroll keys (◅ and ▻) serve one of two functions, depending on whether a menu screen or a data entry screen appears on the front panel.

For data entry screens, the ◅ key scrolls one character to the left while the ▻ key scrolls one character to the right.

For menu screens, the ◅ key scrolls to the previous menu choice while the ▻ key scrolls to the next menu choice.



If a choice is available to the left of the screen, the character ← appears on the top line. If a choice is available to the right of the screen, the → character appears on the top line. If choices are available to both the right and the left of the screen, two arrows appear (⇄). The arrows indicate that you must use the scroll keys to bring the additional options onto the screen.

Test Jacks

Test jacks are located on the DSU/CSU front panel (Figure 3-4). These are described in the *Test Jacks* section in Chapter 4, *Maintenance*. (The 3165 provides only the Network Monitor In and Network Monitor Out test jacks.)

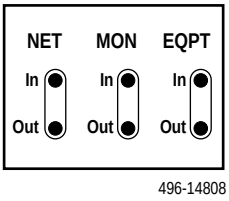


Figure 3-4. Test Jacks (Standalone DSU/CSU)

LEDs

There are twelve LEDs on the DSU/CSU front panel. The five LEDs on the right (Figure 3-5) are shared between the DTE Drop/Insert (DSX-1) interface and the data ports. Refer to the *Selecting the DTE Drop/Insert or Data Port for LED Display* section on page 3-9 to choose which port's status the LEDs display.

NOTE

The DTE Drop/Insert (DSX-1) interface is only available on 2-port and 4-port DSU/CSUs.

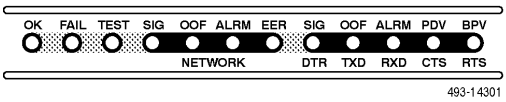


Figure 3-5. DSU/CSU LEDs

A green LED indicates normal operation. A yellow LED indicates a warning (for the DTE Drop/Insert interface) or activity (for the data ports). Conditions are sampled every tenth of a second.

The twelve front panel LEDs are grouped into four sections to indicate the status of the:

- System (Table 3-1)
- Network Interface (Table 3-2)
- DTE Drop/Insert (DSX-1) Interface (Table 3-3)
- Data Ports (Table 3-4)

Table 3-1
System LEDs

Name	Color	Meaning
OK	Green	Indicates the current operational state of the DSU/CSU. *ON:* The DSU/CSU is operational and has power. *OFF:* The DSU/CSU is performing a power-up self-test or a system failure has occurred. *BLINKING:* A software download is in progress. *FAST BLINK:* The carrier-mounted DSU/CSU is currently selected by the SDCP.
FAIL	Yellow	Indicates a system failure or a self-test. *ON:* A device error/fault is detected or a reset has just occurred. *OFF:* No system failures are detected. *BLINKING*: A self-test is in progress.
TEST	Yellow	A system test is in progress. *ON:* A loopback or pattern test has been initiated either locally, by the network, or externally. *OFF:* No tests are active.

Table 3-2
Network Interface LEDs

Name	Color	Meaning
SIG	Green	Monitors the signal being received from the network. *ON:* A recoverable signal is being received from the network. *OFF:* The signal cannot be recovered from the network (a Loss of Signal condition exists).
OOF	Yellow	Monitors Out Of Frame (OOF) conditions on the received network signal. *ON*: At least one OOF was detected on the signal during the sampling period. *OFF:* No OOFs were detected on the signal during the sampling period.
ALRM	Yellow	Indicates whether an alarm condition exists on the received network signal. *ON:* An alarm condition (LOS, LOF, EER, Yellow, AIS) exists on the received network signal. Use the Device Health and Status command to determine the alarm type. *OFF:* No alarm condition exists on the network interface signal.
EER	Yellow	Indicates the Excessive Error Rate (EER) has been exceeded on the network interface. **NOTE:** This LED is only valid when ESF framing is being used. *ON:* The EER has been exceeded on the network interface. *OFF:* The EER has not been exceeded on the network interface.

NOTE

The DTE Drop/Insert (DSX-1) interface is only available on 2-port and 4-port DSU/CSUs.

Table 3-3
DTE Drop/Insert (DSX-1) Interface LEDs

Name	Color	Meaning
SIG	Green	Monitors the signal being received from the DTE Drop/Insert (DSX-1) interface. *ON:* A recoverable signal is being received from the DTE Drop/Insert (DSX-1) interface. *OFF:* The signal cannot be recovered from the DTE Drop/Insert (DSX-1) interface (a Loss of Signal condition exists).
OOF	Yellow	Monitors Out Of Frame (OOF) conditions on the received DTE Drop/Insert (DSX-1) signal. *ON:* At least one OOF was detected on the signal during the sampling period. *OFF:* No OOFs were detected on the signal during the sampling period.
ALRM	Yellow	Indicates whether an alarm condition exists on the received DTE Drop/Insert (DSX-1) signal. *ON:* An alarm condition (LOS, LOF, EER, Yellow, AIS) exists on the received DTE Drop/Insert (DSX-1) signal. Use the Device Health and Status command to determine the alarm type. *OFF:* No alarm condition exists on the DTE Drop/Insert (DSX-1) interface signal.
PDV	Yellow	Monitors Pulse Density Violations (PDV) on the received DTE Drop/Insert (DSX-1) signal. *ON*: At least one PDV was detected (and corrected) on the received DTE Drop/Insert (DSX-1) signal during the sampling period. *OFF:* No PDVs were detected on the received DTE Drop/Insert (DSX-1) signal during the sampling period.
BPV	Yellow	Monitors Bipolar Violations (BPV) on the received DTE Drop/Insert (DSX-1) signal. *ON:* At least one BPV was detected (and corrected) on the received DTE Drop/Insert (DSX-1) signal during the sampling period. *OFF:* No BPVs were detected on the received DTE Drop/Insert (DSX-1) signal during the sampling period.

Table 3-4
Data Port LEDs

Name	Color	Meaning
DTR	Green	Monitors the state of interchange circuit CD (CCITT 108/1, /2) – Data Terminal Ready received from the synchronous data DTE. *ON:* DTR is being asserted by the synchronous data DTE. *OFF:* DTR is not being asserted.
TXD	Yellow	Monitors activity on interchange circuit BA (CCITT 103) – Transmitted Data. This is the data sent from the synchronous data DTE to the data port on the DSU/CSU. *ON:* Ones are being received from the synchronous data DTE. *OFF:* Zeros are being received from the synchronous data DTE. *CYCLING:* Both ones and zeros are being received from the synchronous data DTE.
RXD	Yellow	Monitors activity on interchange circuit BB (CCITT 104) – Received Data. This is data sent to the synchronous data DTE from the data port on the DSU/CSU. *ON:* Ones are being sent to the synchronous data DTE. *OFF:* Zeros are being sent to the synchronous data DTE. *CYCLING:* Both ones and zeros are being sent to the synchronous data DTE.
CTS	Yellow	Monitors the state of interchange circuit CB (CCITT 106) – Clear-to-Send sent to the synchronous data DTE. *ON:* CTS is being asserted by the DSU/CSU. *OFF:* CTS is not being asserted.
RTS	Yellow	Monitors the state of interchange circuit CA (CCITT 105) – Request-to-Send received from the synchronous data DTE. *ON:* RTS is being asserted by the synchronous data DTE. *OFF:* RTS is not being asserted.

NOTE

The following procedures are examples only. **Screen displays may vary depending on the model of the DSU/CSU.**

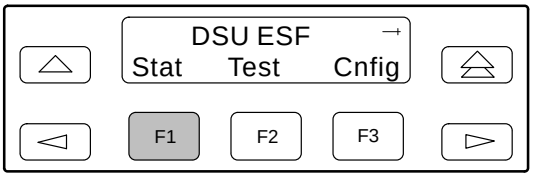
Displaying Unit Identity

The identity of the DSU/CSU (serial number, model number, software revision level, hardware revision level, and customer identification) is available through the Status branch of the front panel menu (see Appendix A, *Front Panel Menu*).

The customer identification is the only identity number you can change.

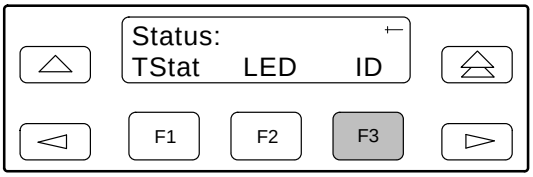
To display the DSU/CSU's identity (ID),

1. From the top-level menu screen, select Stat.

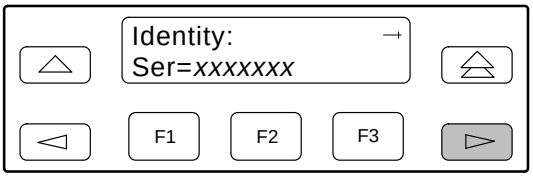


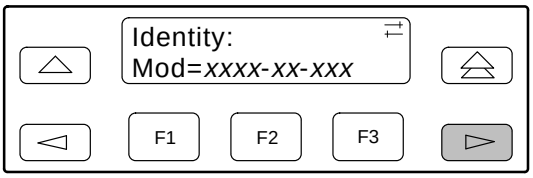
2. From the Status screen, press the ▻ key until the ID selection appears on the screen.

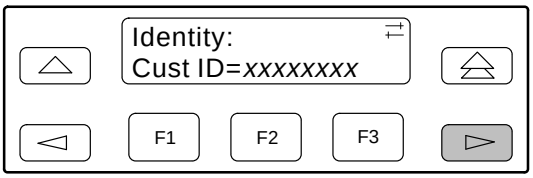
3. Select ID.

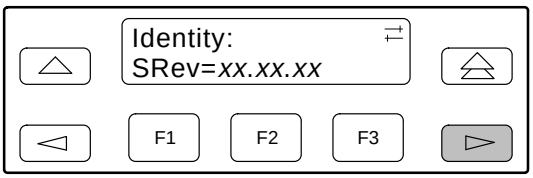


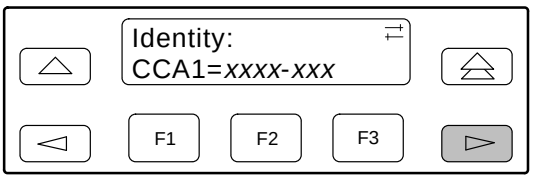
4. The following screens appear in the order listed each time you press the ▻ key.

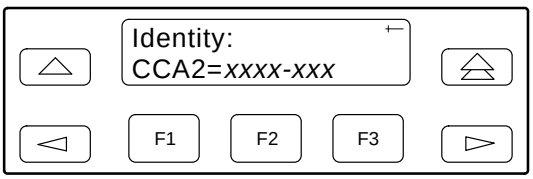










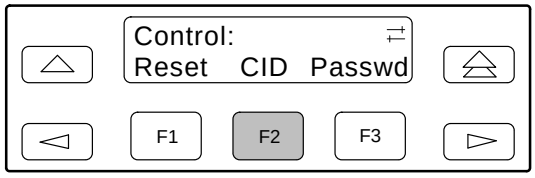


Setting Customer Identification

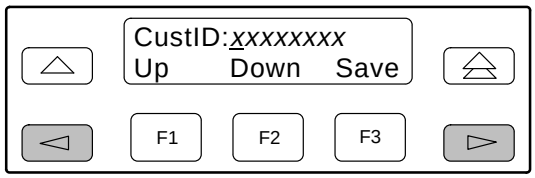
The customer identification is the only identity number you can change. It is used to uniquely identify the DSU/CSU.

To change the customer identification (CID),

1. From the top-level menu, press the ▷ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, press the ▷ key until the CID selection appears on the screen.
4. Select CID.



5. Use the ◁ and ▷ keys to position the cursor under the desired character. You must enter a character before the ▷ moves the cursor to the next space to the right.



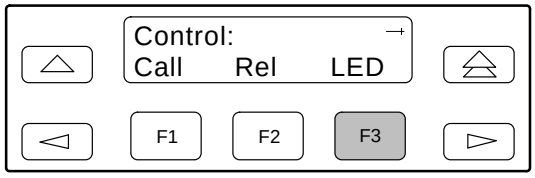
6. Enter the desired ID. Press F1 (Up) and F2 (Down) to scroll up and down through the valid characters/numbers for the customer ID. Valid characters are **0** through **9**, **#**, **-**, **.**, /, **A** to **Z**, and blank space. Press F3 (Save) to save the ID.

Selecting the DTE Drop/Insert or Data Port for LED Display

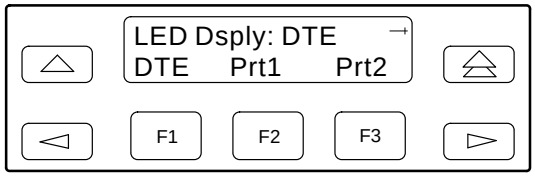
Use the LED command on the Control branch to select which port's (DTE Drop/Insert or data port) status appears on the five shared LEDs on the front panel.

To select a port for LED display,

1. From the top-level menu screen, press the ▷ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select LED.



The currently selected port name appears on the top line of the LCD. DTE indicates the DTE Drop/Insert (DSX-1) port.



4. From the LED Dsply screen, press the Function key that corresponds to the DTE Drop/Insert (DSX-1) or data port for which you want the LEDs to display. Use the scroll keys, if necessary.

   Select DTE to monitor the DTE Drop/Insert (DSX-1) port's SIG, OOF, ALRM, PDV, and BPV status signals on the shared LEDs.

   Select a particular data port to monitor the data port's DTR, TXD, RXD, CTS, and RTS control signals on the shared LEDs.

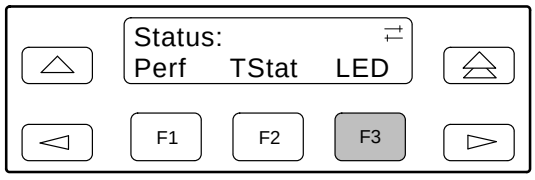
Displaying LED Conditions

The same conditions monitored by the front panel LEDs can also be monitored by the LED command. This command is most useful when the DSU/CSU is being accessed remotely (see Appendix G, *Front Panel Emulation*). When using Front Panel Emulation, no LEDs are shown on the PC's screen; you must use the Stat command procedure described below to get LED information.

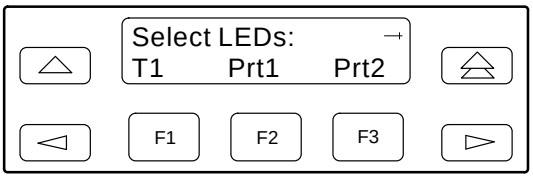
> **NOTE**
>
> The following procedure is an example only. **Screen displays may vary depending on the model of the DSU/CSU.**

To display LED conditions on the front panel screen,

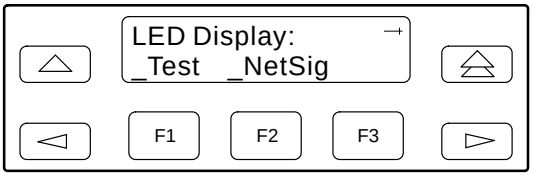
1. From the top-level menu screen, select Stat.
2. From the Status screen, press the ▻ key until the LED selection appears on the screen.
3. From the Status screen, select LED.



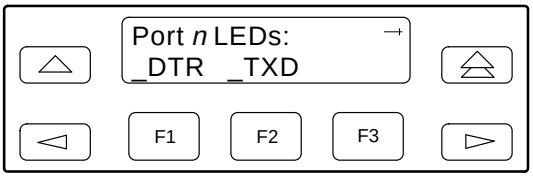
4. From the Select LEDs screen, press the Function key that corresponds to T1 interface or the data port for which you want to display LEDs. Use the scroll keys, if necessary.



If you chose T1, the LED Display screen lists the LED signals, two at a time, on the second line. A vertical bar at the left of the LED name indicates the condition is ON, while an underscore indicates the condition is Off.



If you chose a port, the Port *n* LEDs screen lists the LED signals, two at a time, on the second line. A vertical bar at the left of the LED name indicates the condition is ON, while an underscore indicates the condition is Off.



5. Use the ▻ and ◅ keys to scroll LED names onto the screen.

Changing Configuration Options

The DSU/CSU is an intelligent device that displays only valid options for the current configuration. Therefore, you are only presented with menu choices that are consistent with the current configuration and operational state of the DSU/CSU; invalid combinations of configuration options do not appear. For example, menus displayed for the Model 3160 (2 ports) and the Model 3164 (4 ports) differ due to the number of ports available. Also, if the DTE Drop/Insert (DSX-1) interface selection is disabled, many of the menu choices do not appear. Be aware that although all options are shown in this guide, what you see on your DSU/CSU varies with your configuration.

The DSU/CSU offers configuration options located in the following memory areas:

- **Active (Activ)**. This is the configuration option set currently active for the DSU/CSU. Before a configuration option set becomes active for the DSU/CSU, you must save the set to the Active area. When the DSU/CSU is shipped from the factory, the Active configuration option set is identical to the Factory set. This area can be written to and controls the current operation of the device.
- **Customer 1 (Cust1)**. This is the first of two sets of customer-defined configuration options. This area can be written to.
- **Customer 2 (Cust2)**. This is the second of two sets of customer-defined configuration options. This area can be written to.
- **Factory 1 (Fact1)**. This is a set of configuration options preset at the factory. This set is determined by what is considered to be the most common configuration used in the DSU/CSU market. Factory 1 options are read-only.
- **Factory 2 (Fact2)**. This is a set of configuration options preset at the factory. This set is determined by what is considered to be the second most common configuration used in the DSU/CSU market. Factory 2 options are read-only.

The configuration options are divided into functional groups. Appendix C contains a list of the configuration options and defaults. These groups are:

- DTE (DSX-1) Interface
- Port
- Network Interface
- Channel
- General
- User Interface
- Alarm
- General Management
- Management Trap

The DSU/CSU arrives with two preset factory default configuration settings. These settings are based on the following:

- **Factory 1** – ESF framing format with B8ZS line coding format for both the network and the DTE Drop/Insert (DSX-1) interfaces. Data ports are unassigned.
- **Factory 2** – D4 framing format with AMI line coding format for both the network and the DTE Drop/Insert (DSX-1) interfaces. Data ports are unassigned.

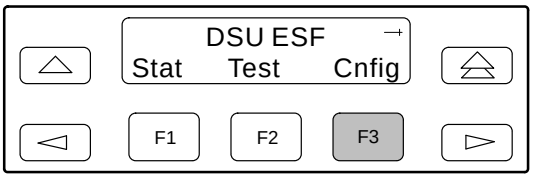
If neither of the factory default settings support your network's configuration, you can customize the configuration options to better suit your application.

Use the Configuration (Cnfig) branch of the front panel menu tree to display or change DSU/CSU configuration options (see Appendix C, *Configuration Options*).

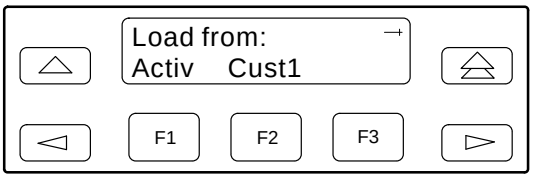
Displaying/Editing Configuration Options

To display/edit configuration options,

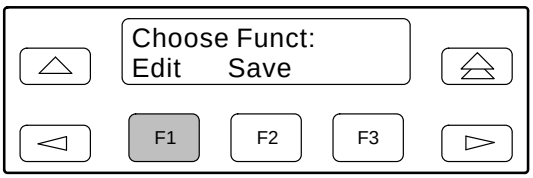
1. From the top-level menu screen, select Cnfig.



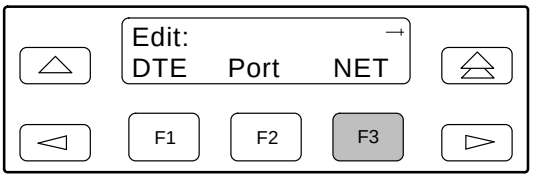
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.



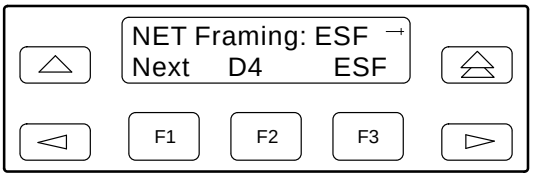
3. Select Edit.



4. From the Edit screen, select the functional group you want to edit by pressing the appropriate Function key. Use the scroll keys, if necessary. (The NET selection is shown as an example only.)



The configuration options for the selected functional group appear on the front panel one option at a time. The option name appears on Line 1 with the current value next to it. To reach other options, use the Next and Previous selections to scroll forward and backward through the group of options.



5. Press the appropriate Function key to choose another value. Use the scroll keys, if necessary.

6. Use the Save procedure to save your changes to the Active or Customer area.

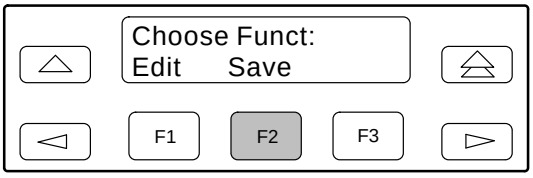
Saving Edit Changes

Save edit changes to the Active area when you want those changes to take effect immediately. Save edit changes to the Customer area when you want to overwrite the existing Customer configuration options and store these changes for future use.

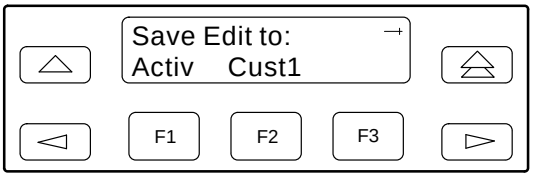
> **NOTE**
>
> If you attempt to exit the Edit function after making changes without performing a Save, the DSU/CSU prompts you with **Save Options?** Choose **Yes** or **No**.

To save edit changes,

1. From the Choose Funct screen (one level above the Edit screen, two levels below the top-level menu screen), select Save.



2. Choose whether you want to save to the Active, Customer 1, or Customer 2 area. Use the scroll keys, if necessary.



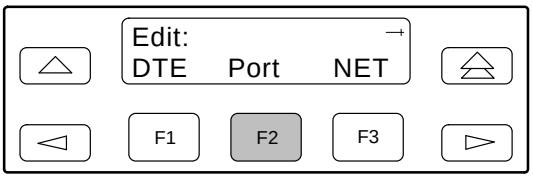
Selecting/Copying to a Specific Port

For the DSU/CSU, you have the capability of selecting a specific port to configure, and then (for 2-port and 4-port DSU/CSUs) copying the configuration options from that port to another port (or to all ports).

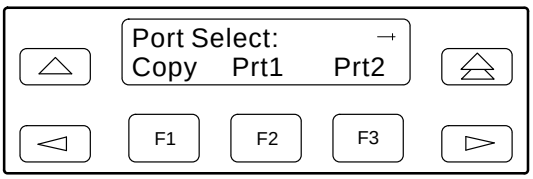
> **NOTE**
>
> The following procedure is an example only. **Screen displays may vary depending on the model and configuration of the DSU/CSU.**

To select a specific port to configure,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, select Port.

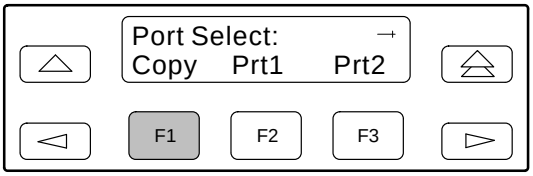


5. From the Port Select screen, press the Function key that corresponds to the port you want to configure. Use the ▻ key to scroll addition ports onto the screen, if necessary. Configure the port (see Appendix C, *Configuration Options*).

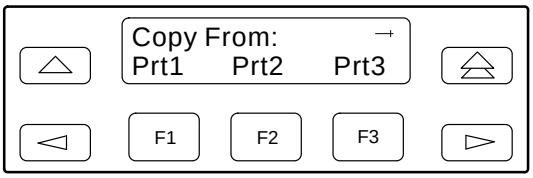


To copy the configuration options to one or all ports,

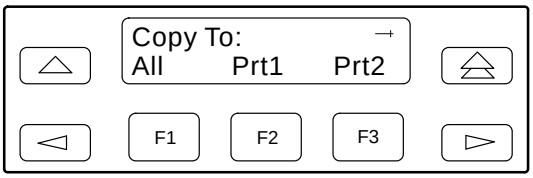
1. From the Port Select screen, select Copy.



2. Select the port *from* which you want to copy the configuration options using the corresponding Function key.



3. Select the port *to* which you want to copy the configuration options using the corresponding Function key. Or, press F1 (All) to choose to copy to all ports.



Configuring the DSU/CSU for SNMP or Telnet Access

To configure the DSU/CSU for SNMP or Telnet access,

- Enable the SNMP agent or Telnet server within the DSU/CSU (see Appendix C, *Configuration Options*).
- Select and configure the port that provides the link to the SNMP or Telnet system.
- Set the Internet Protocol (IP) address and subnet mask needed to access the DSU/CSU (see Appendix F, *IP Network Addressing Scenarios*).
- Select the link layer protocol (PPP or SLIP) for the port that provides the link to the SNMP or Telnet system.
- For SNMP links, specify the two community names (and their access levels) that are allowed to access the device's Management Information Base (MIB).
- For SNMP links, configure the device to send traps to the SNMP manager, if desired.
- Specify the Telnet password or SNMP validation options, if desired (see Appendix C, *Configuration Options*).

Selecting the Port

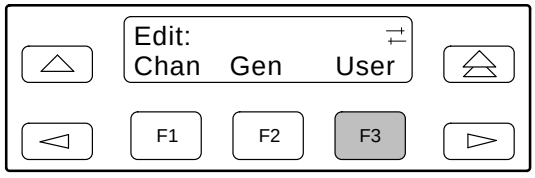
The SNMP manager, Telnet device, or network device (e.g., a router) can be directly connected to the communications (COM) port. An external LAN Adapter can be connected to either the COM port or the auxiliary (AUX) port to provide Ethernet or Token Ring connectivity. Also, the DSU/CSU can be daisy chained together by connecting the COM port of one device to the AUX port of the other, providing SNMP or Telnet connectivity. Use the MODEM port when accessing the DSU/CSU through a dial-up connection.

The COM port can support either synchronous or asynchronous PPP, or asynchronous SLIP at data rates of up to 38,400 bps. The AUX port can support data rates up to 38,400 bps. The MODEM port can support either synchronous or asynchronous PPP, or asynchronous SLIP at data rates of up to 2400 bps.

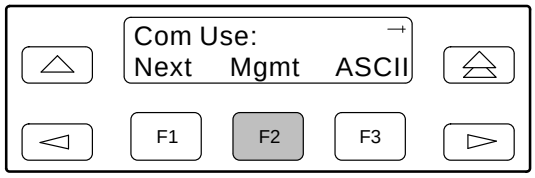
The example shown below assumes that the COM port is being used as the link to the SNMP or Telnet system.

To select the COM port as the SNMP or Telnet link,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the User selection appears on the screen.
5. Select User.



6. Press F1 (Next) until the Com Use configuration option appears.
7. Select Mgmt to configure the COM port as the SNMP or Telnet link.



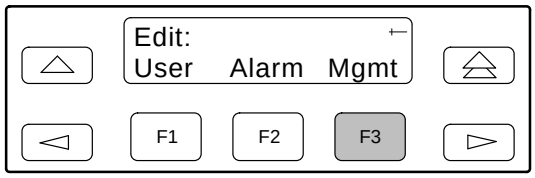
Setting the IP Address

The IP address is the address used by the SNMP or Telnet system to access the DSU/CSU (see Appendix F, *IP Network Addressing Scenarios*). For DSU/CSUs using PPP, the IP address can be negotiated if the network device (e.g., router or SNMP manager) supports such negotiation. The IP address is composed of four fields with three digits per field (*xxx.xxx.xxx.xxx*).

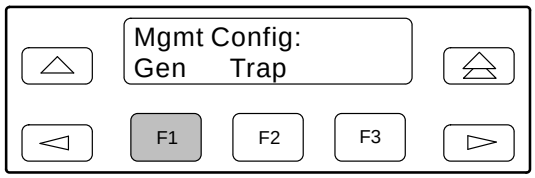
The IP address is set for the MODEM port, the COM port, or the AUX port (with LAN Adapter or daisy chain), depending on which one has been chosen as the SNMP or Telnet communication link. The example below assumes that an IP address of 010.155.111.222 is being set for the COM port. You can use the same principles to assign any value (between 000 and 255 for each digit field) to other ports.

To assign an IP address to the COM port,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Mgmt selection appears on the screen.
5. Select Mgmt.



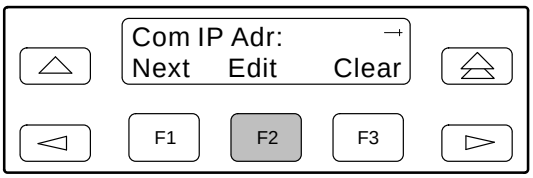
6. From the Mgmt Config screen, select Gen.



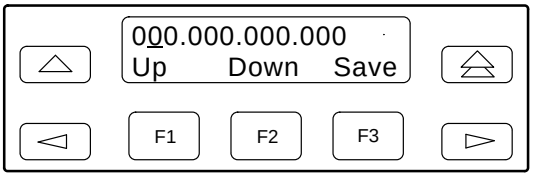
7. Press F1 (Next) until the Com IP Adr configuration option appears.

> **NOTE**
>
> Steps 8 and 9 describe the process for entering an IP address. This process applies to any IP address.

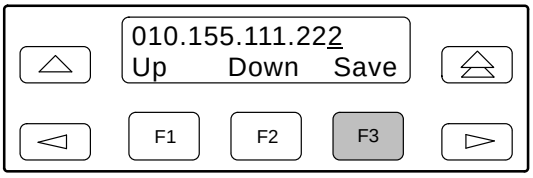
8. Press F2 (Edit) to edit the IP address. You have the option of using F3 (Clear) to reset the IP address to the factory default *000.000.000.000*.



9. Use the ◁ and ▷ keys to position the cursor under the digit you want to change. Press F1 (Up) to increment the digit or F2 (Down) to decrement the digit. In this example, you would press ▷ once to place the cursor under the middle digit in the first digit field, then press F1 (Up) once to change the 0 to a 1. Continue in this manner to change the other digits.



10. When you are through changing the IP address, you **must** press F3 (Save) to save the value. Otherwise, the original value will be retained.



Selecting the Link Layer Protocol

Two link layer protocols, Point-to-Point Protocol (PPP) and Serial Line Internet Protocol (SLIP), are supported for connection to an external SNMP manager, Telnet device, or network device (e.g., a router). PPP can be used for synchronous or asynchronous operation. SLIP can be used for asynchronous operation only.

> **NOTE**
>
> The carrier-mounted DSU/CSU does not support synchronous operation on the COM port.

The standalone DSU/CSU implementation of PPP supports the following:

- Full negotiation of PPP's Link Control Protocol (LCP).
- Active negotiation of LCP when the connection is established.
- Maximum Request Unit (MRU) sizes up to 1500 bytes, but the DSU/CSU will attempt to negotiate down to 500 bytes.
- The DSU/CSU provides a unique LCP magic number derived from the unit serial number and the elapsed time.
- Full negotiation of escape characters.

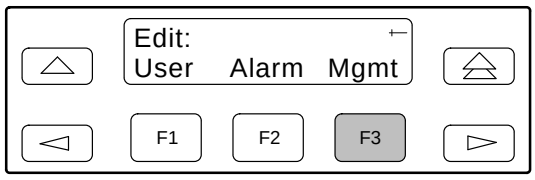
The DSU/CSU implementation of PPP does not support Link Quality Reports (LQR), compression, encryption, Password Authentication Protocol (PAP) or Challenge Handshake Authentication Protocol (CHAP).

The DSU/CSU implementation of SLIP supports a fixed MRU size of 1006 bytes.

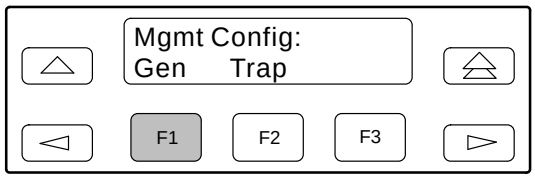
Before selecting the protocol, you must first select the port to be used as the communications link. Refer to the *Selecting the Port* section on page 3-14. This example assumes that the COM port is being used as the communications link.

To select the link layer protocol,

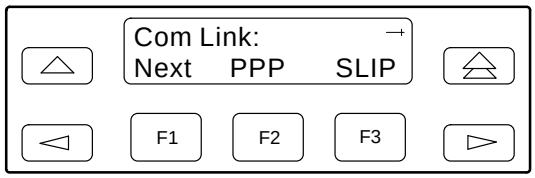
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Mgmt selection appears on the screen.
5. Select Mgmt.



6. From the Mgmt Config screen, select Gen.



7. Press F1 (Next) until the Com Link configuration option appears.
8. Press F2 (PPP) or F3 (SLIP).

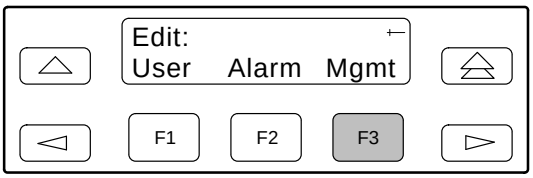


Specifying the Community Name(s) and Access Type(s)

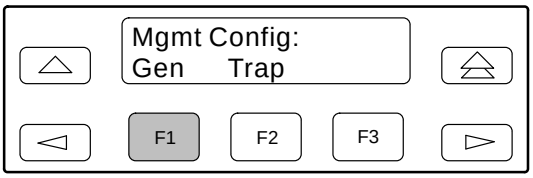
You have the capability of specifying up to two community names (community name 1 and community name 2) to be used by external SNMP managers when trying to access objects in the DSU/CSU's MIB. Once you specify the community name(s), you must then specify the type of access to the MIB that SNMP managers in the community are permitted to have.

To specify the community name 1 and its access type,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Mgmt selection appears on the screen.
5. Select Mgmt.

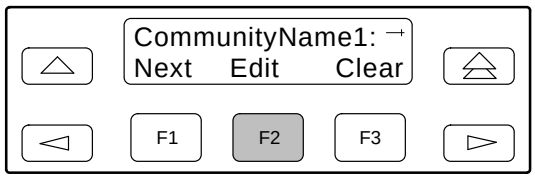


6. From the Mgmt Config screen, select Gen.



7. Press F1 (Next) until the CommunityName1 configuration option appears.

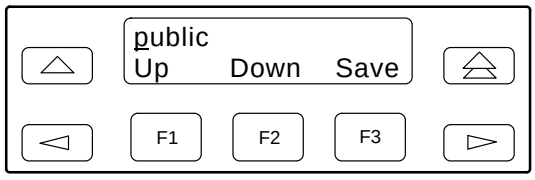
8. Press F2 (Edit) to edit the community name.



NOTE

Steps 9 and 10 describe the process for entering text strings for Mgmt configuration options. This process applies to entering any text strings into Mgmt configuration options.

9. Use the ◁ and ▷ keys to position the cursor under the character you want to change. Press F1 (Up) or F2 (Down) to scroll through the valid numbers/characters for the text string.

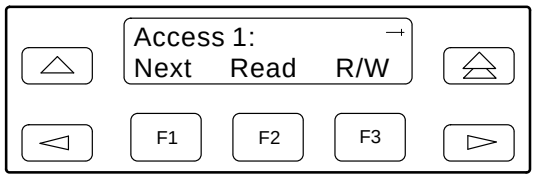


The F1 (Up) key scrolls through the ASCII character set in the following order: numbers (0–9), lowercase letters (a–z), uppercase letters (A–Z), space character, ASCII symbols (ascending order, based on ASCII code), and the End of Line symbol (←). The ← erases all characters to the right of the cursor.

10. When you are through changing the community name, you **must** press F3 (Save) to save the value. Otherwise, the original value will be retained.

11. Press F1 (Next) until the Access 1 configuration option appears.

12. Press F2 (Read) or F3 (R/W).



The Read selection allows read-only access (SNMP “Get”) to the accessible objects in the MIB when community name 1 is used. The R/W selection allows Read/Write access (SNMP “Get” and “Set”) to the objects in the MIB. Write access is allowed for all objects specified as read/write in the MIB. Read access is allowed for all objects specified as read-only or read/write.

Configuring SNMP Traps

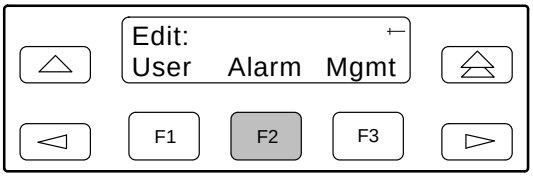
A trap is an unsolicited message that is sent from the DSU/CSU to an SNMP manager when the DSU/CSU detects certain pre-specified conditions. These traps enable the SNMP manager to monitor the state of the network.

The SNMP Trap configuration option must be enabled for trap messages to be sent over the communications link. You must specify the number of SNMP managers that are to receive traps from this DSU/CSU, an IP address for each SNMP manager specified, and the type of traps to be sent from this DSU/CSU. For more information, refer to Appendix C, *Configuration Options*, and the *SNMP Traps* section in Chapter 4, *Maintenance*.

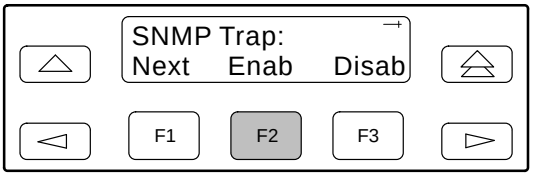
Enabling SNMP Trap Messages

To enable SNMP trap messages from this DSU/CSU,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Alarm selection appears on the screen.
5. Select Alarm.



6. Press F1 (Next) until the SNMP Trap configuration option appears.
7. Press F2 (Enab) to enable trap messages over the SNMP management link.

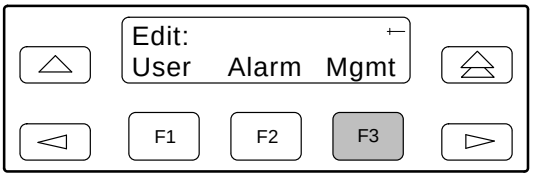


Selecting the Number of Trap Managers

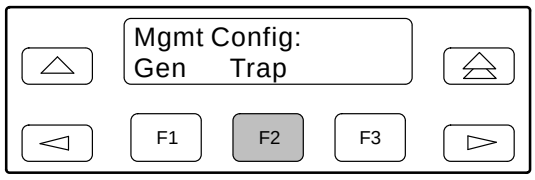
If you intend to issue traps to an SNMP manager(s) from this device, you must specify the number of SNMP managers that are to receive the traps.

To specify the number of SNMP managers to receive traps from this device,

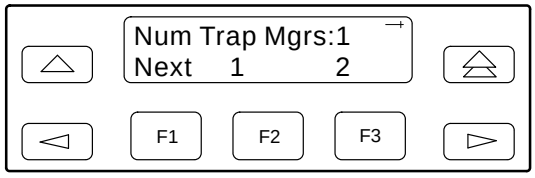
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Mgmt selection appears on the screen.
5. Select Mgmt.



6. From the Mgmt Config screen, select Trap.



7. Select the number of SNMP managers to receive traps (from 1 through 6) by using the appropriate Function key. Use the scroll keys, if necessary.



Configuring a Destination for SNMP Traps

A destination must be configured for each SNMP trap manager specified. This configuration option is displayed for the number of trap managers specified by the Number of Trap Managers configuration option.

To configure an IP address for the SNMP trap manager,

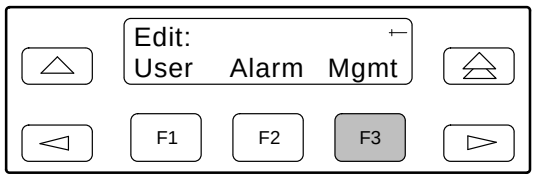
1. From the top-level menu screen, select Cnfig.

2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.

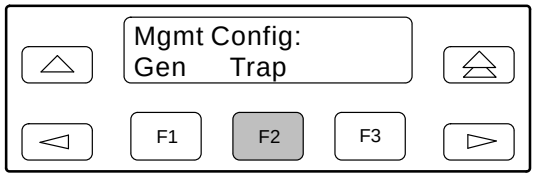
3. Select Edit.

4. From the Edit screen, press the ▻ key until the Mgmt selection appears on the screen.

5. Select Mgmt.



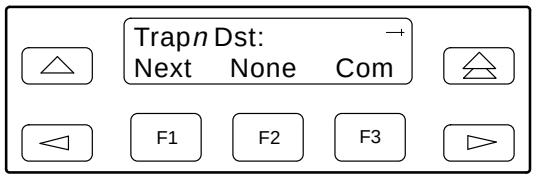
6. From the Mgmt Config screen, select Trap.



7. Press F1 (Next) until the Trap*n* IP Address configuration option appears.

8. Press F2 (Edit) to edit the IP address. You have the option of using F3 (Clear) to reset the IP address to the factory default *000.000.000.000.* Refer to the *Setting the IP Address* section on page 3-15 for more information on setting an IP address.

9. Press F1 (Next) until the Trap*n* Destination configuration appears, and select the destination for the SNMP trap by using the appropriate Function key. Use the scroll keys, if necessary.



Configuring DS0 Channels

The DSU/CSU provides channel configuration options that allow you to do the following:

- Display the DS0 assignments for the network, DTE Drop/Insert (DSX-1), and data port interfaces.
- Allocate DS0 channels on the DTE Drop/Insert (DSX-1) interface to the network interface.
- Allocate DS0 channels on the network or DTE Drop/Insert (DSX-1) interface to particular data ports.
- Clear (deallocate) all DS0 channels from the network, DTE Drop/Insert (DSX-1), or data port interface.
- Map data from one port to another.

To allocate DS0 channels, begin by defining the logical channel configuration for the network interface, and then the DTE Drop/Insert (DSX-1) interface, and then any ports, if desired. See Figure 3-6 for an example of a conceptual diagram of a channel configuration.

Blank configuration worksheets are provided at the back of Appendix C, *Configuration Options*. To complete the configuration worksheets for DS0 channel allocation:

1. Complete the Network Interface and the DTE Drop/Insert (DSX-1) Interface tables (unless the DTE Drop/Insert interface is disabled) as shown in the example in Figure 3-7.

2. Complete the Robbed Bit Signaling (RBS) information worksheet as shown in the example in Figure 3-8.

3. Using the worksheets shown in Figures 3-9 and 3-10, circle the configuration options needed to implement the logical channel configuration.

Once you have completed the worksheets, enter this information using the procedures in the *Allocating Data Ports* section on page 3-27.

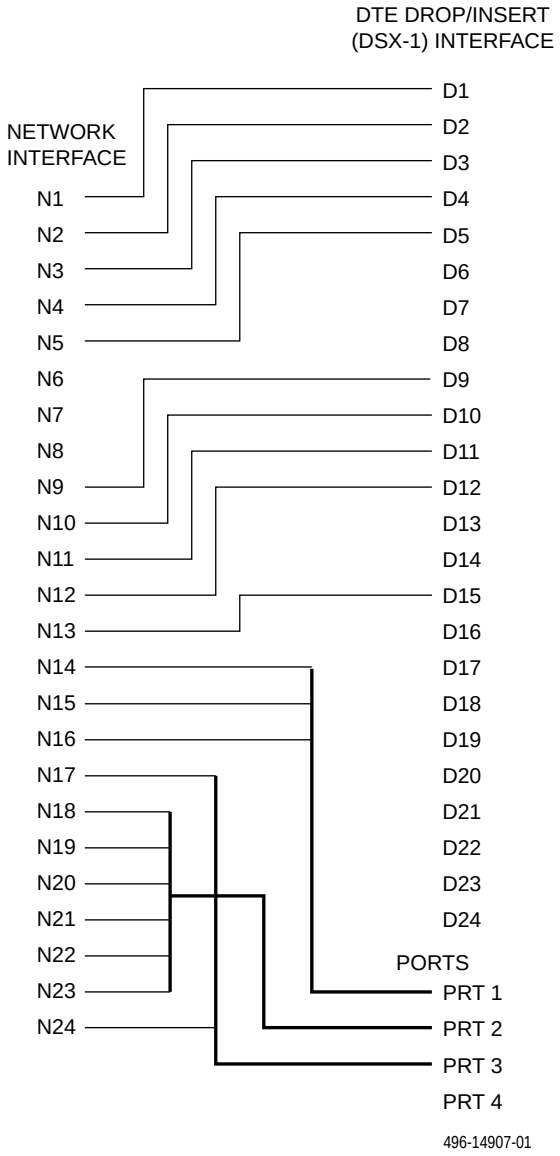


Figure 3-6. Example of Channel Allocation

Network Interface

Network Channel	Allocation
N1	*D1*
N2	*D2*
N3	*D3*
N4	*D4*
N5	*D5*
N6	
N7	
N8	
N9	*D9*
N10	*D10*
N11	*D11*
N12	*D12*
N13	*D15*
N14	*Prt1*
N15	*Prt1*
N16	*Prt1*
N17	*Prt3*
N18	*Prt2*
N19	*Prt2*
N20	*Prt2*
N21	*Prt2*
N22	*Prt2*
N23	*Prt2*
N24	*Prt3*

Allocations

D1 – D24 indicates allocation to DTE Drop/Insert (DSX-1) channels.

Prt1 – Prt4 indicates allocation to synchronous data ports.

DTE Drop/Insert (DSX-1) Interface

DTE (DSX-1) Channel	Allocation
D1	*N1*
D2	*N2*
D3	*N3*
D4	*N4*
D5	*N5*
D6	
D7	
D8	
D9	*N9*
D10	*N10*
D11	*N11*
D12	*N12*
D13	
D14	
D15	*N13*
D16	
D17	
D18	
D19	
D20	
D21	
D22	
D23	
D24	

Allocations

N1 – N24 indicates allocation to network channels.

Figure 3-7. Example of Interface Worksheet

DTE Chan Config	Assign: (N1 – 24)	Voice (RBS or Data)
D1	*N1*	*RBS*
D2	*N2*	*RBS*
D3	*N3*	*RBS*
D4	*N4*	*RBS*
D5	*N5*	*Data*
D6		
D7		
D8		
D9	*N9*	*RBS*
D10	*N10*	*RBS*
D11	*N11*	*Data*
D12	*N12*	*Data*
D13		
D14		
D15	*N13*	*Data*
D16		
D17		
D18		
D19		
D20		
D21		
D22		
D23		
D24		

Figure 3-8. Example of RBS Information Worksheet

Port Chan Conf	Options		Value
Port 1	Assign To		NET, DTE, Prt2, Prt3, Prt4
	Assign By		Block, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)
Port 2	Assign To		NET, DTE, Prt1, Prt3, Prt4
	Assign By		Block, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)

Figure 3-9. Port Channel Configuration Worksheet (Ports 1 and 2)

Port Chan Conf	Options		Value
Port 3	Assign To		NET, DTE, Prt1, Prt2, Prt4
	Assign By		Block, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)
Port 4	Assign To		NET, DTE, Prt1, Prt2, Prt3
	Assign By		Block, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)

Figure 3-10. Port Channel Configuration Worksheet (Ports 3 and 4)

NOTE

The following procedures are examples only. **Screen displays may vary depending on the model and configuration of the DSU/CSU.**

Displaying DS0 Channel Assignments

Use the Display command (in the Channel Configuration branch) to view how the DS0 channels are currently allocated.

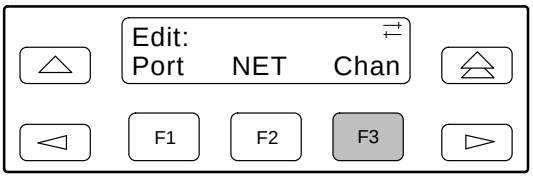
Line 1 of the display shows the 24 channels of the selected interface. Pressing the ◁ or ▷ key scrolls the channels onto the screen in groups of three. Line 2 displays what is allocated to the DS0 channel listed in Line 1. Symbols used in the display are shown in Table 3-5.

Table 3-5
Display Channel Symbols

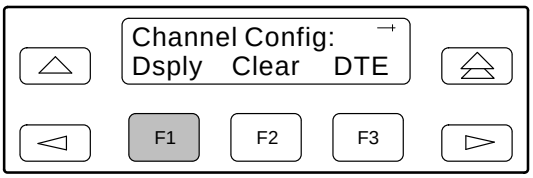
Symbol	Meaning
–	The DS0 channel is not allocated.
Prt*n*	The DS0 channel is allocated to Port *n*, where *n* is 1, 2, 3, or 4.
N*n*	The DS0 channel is allocated to the network interface DS0 channel *n*, where *n* can be any number from 1 through 24.
D*n*	The DS0 channel is allocated to the DTE Drop/Insert (DSX-1) interface DS0 channel *n*, where *n* can be any number from 1 through 24.

To display the DS0 channel allocation,

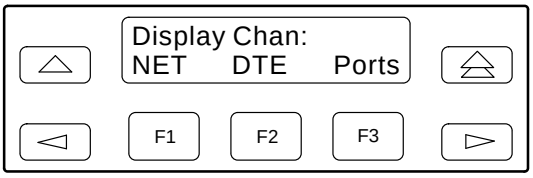
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▷ key until the Chan selection appears on the screen.
5. Select Chan.



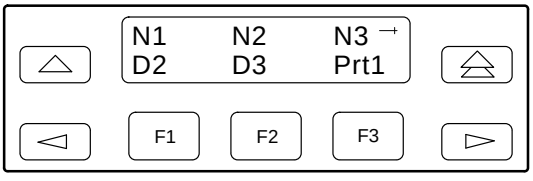
6. From the Channel Config screen, select Dsply.



7. From the Display Chan screen, select NET to display the channels allocated to the network interface. Or, select DTE to display the channels allocated to the DTE Drop/Insert (DSX-1) interface.

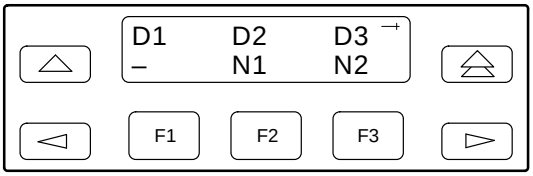


8. If you selected NET the channels allocated to the network interface are displayed. Line 1 displays the 24 channels for the network interface, while Line 2 displays what is allocated to the DS0 channel shown in Line 1. Pressing the ◁ or ▷ key scrolls the channels onto the screen in groups of three.



If you selected DTE, the channels allocated to the DTE Drop/Insert (DSX-1) interface are displayed.

Line 1 displays the 24 channels for the DTE Drop/Insert (DSX-1) interface, while Line 2 displays what is allocated to the DS0 channel shown in Line 1.



Allocating Data Ports

By using the configuration options, assign a specific port to DS0 channels on either the network interface or the DTE Drop/Insert (DSX-1) interface. The following methods are available to assign DS0 channels to the port:

Block – Allows a block of contiguous channels to be assigned by specifying a data port rate and an initial DS0 channel (the first DS0 channel in a block of DS0 channels). The number of channels assigned is determined by the port rate. Only those initial DS0 channel numbers that provide enough bandwidth (based on the port's data rate) are displayed on the screen. These channels are automatically assigned to the destination T1 interface (Network or DTE Drop/Insert) when the initial DS0 channel is selected.

ACAMI (Alternate Channel Alternate Block Inversion) – Allows a block of contiguous channels to be assigned by specifying a data port rate and an initial DS0 channel (the first DS0 channel in a block of DS0 channels). However, with ACAMI, the number of channels assigned is twice the number needed for the port rate. This is because with ACAMI, every alternate DS0 channel (starting with the *n*+1 DS0 channel), does not carry data from the port, but instead always transmits and receives all ones.

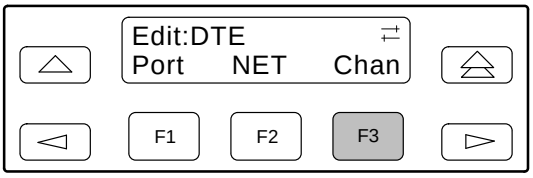
Chan (Channel) – Individually selects the DS0 channels to allocate to the data port. The data port rate is automatically determined based on the number of channels selected.

Once a port is selected, you have access to the configuration options to complete the port allocation procedure. These configuration options enable you to,

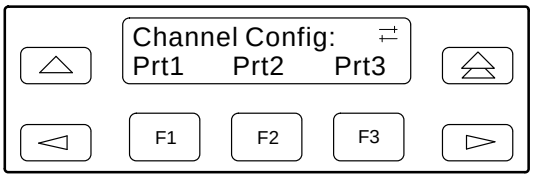
- Assign the selected port to the desired interface.
- Select the desired method for channel allocation.
- Select the port rate and starting channel (if the allocation method is block or ACAMI).
- Select the specific channels (if the allocation method is by individual channel).

To select the data port,

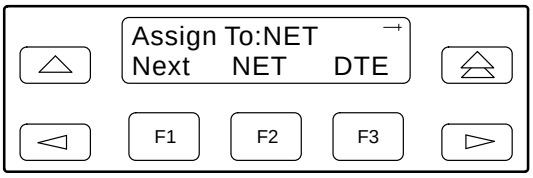
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Chan selection appears on the screen.
5. Select Chan.



6. From the Channel Config screen, press the ▻ key to scroll the ports onto the screen.
7. Select the desired port by pressing its corresponding Function key.



8. The configuration option for the data port channel allocation destination appears on the screen. Select NET to assign this port to the network interface, select DTE to assign this port to the DTE Drop/Insert (DSX-1) interface, or press the ▻ key and the appropriate Function key to assign this port to another port.



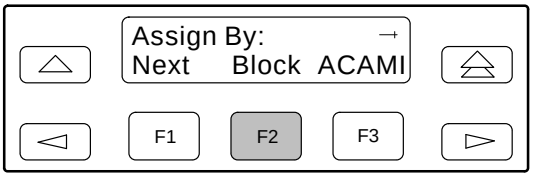
9. Press F1 (Next) to display the appropriate configuration options on the screen. Use one of the following examples, depending on whether you are assigning by block, ACAMI, or individual channel.

Block or ACAMI Assignment Method

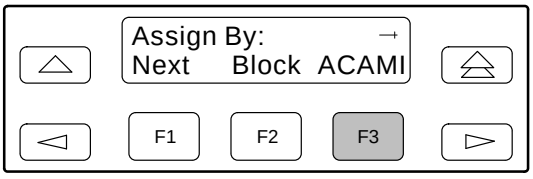
The Assign By configuration option screen appears after you select a port.

To assign by the block or ACAMI method,

1. Press F2 for Block or F3 for ACAMI.

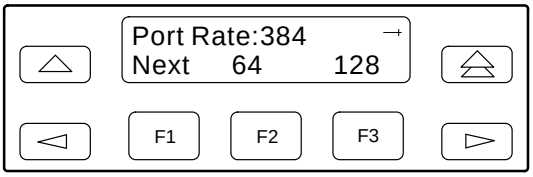


or



2. Press F1 (Next) to display the next configuration option (Port Rate).

3. Use the ◅ or ▻ key to scroll the desired port rate onto the screen. Rates scroll in groups of three. Available selections depend on the current base rate selected for the port. Press the corresponding Function key to select the port rate. Then, select Next to display the Start At configuration option on the screen.

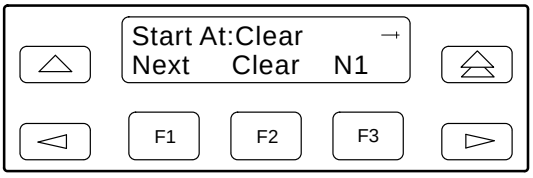


NOTE

For port-to-port mapping, the procedure is complete after the port rate is selected.

4. The Start At screen displays the configuration option used to select the starting DS0 channel. If the destination selected is the network interface, then the network channels appear on the screen. If the destination selected is the DTE Drop/Insert (DSX-1) interface, then these channels appear on the screen.

   The following screen shows an example for the network interface. Use the ◅ or ▻ key to scroll the desired channel onto the screen. Use the Function keys to select the starting channel. Only those DS0 channel numbers that provide enough bandwidth (based on the configured data rate) to be used as a starting channel number are displayed. Channel allocation for this port can only be cleared by selecting Clear.

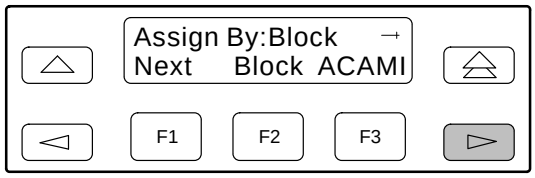


Individual Channel Assignment Method

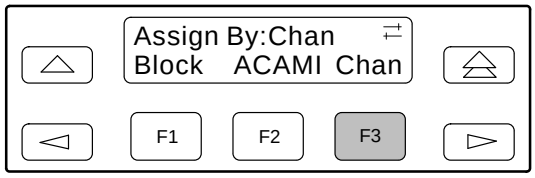
The Assign By configuration option screen appears after you select a port.

To assign by the individual channel method,

1. Press the ▷ key once to bring the Chan selection onto the screen.

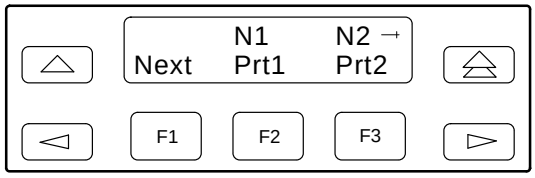


2. Press F3 (Chan).



3. Press F1 (Next) to display the next configuration option (channel allocation).

4. Line 1 displays the 24 channels for the network interface or the DTE Drop/Insert (DSX-1) interface, depending on which destination was chosen. This example assumes that the network is the destination. Line 2 displays what is allocated to the DS0 channel shown in Line 1. Pressing the ◁ or ▷ key scrolls the channels onto the screen in groups of three. Select the channel by pressing the Function key under the desired number. Port*n* appears. The port is assigned to that channel. To deallocate a port, press the Function key under that port number. Pressing the Function key under channels assigned to other ports has no effect.



Allocating DS0 Channels from the DTE Drop/Insert Interface to the Network Interface

By using the configuration options, you can allocate DS0 channels from the DTE Drop/Insert (DSX-1) interface to the network interface and specify which DS0 channels carry Robbed Bit Signaling (RBS) information for voice channels.

To allocate DS0 channels from the DTE Drop/Insert (DSX-1) interface to the network interface,

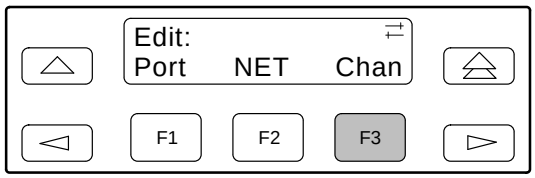
1. From the top-level menu screen, select Cnfig.

2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.

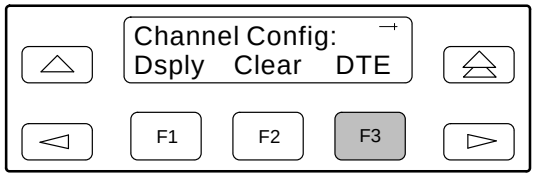
3. Select Edit.

4. From the Edit screen, press the ▷ key until the Chan selection appears on the screen.

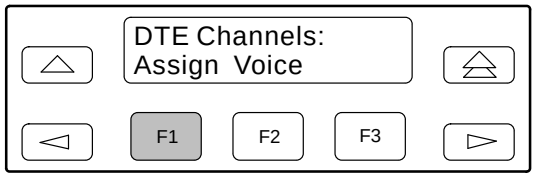
5. Select Chan.



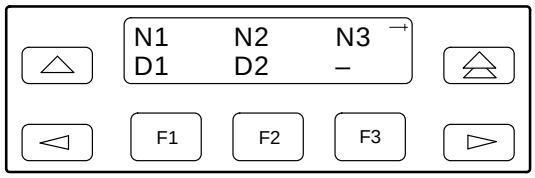
6. From the Channel Config screen, select DTE.



7. From the DTE Channels screen, press F1 to select Assign.

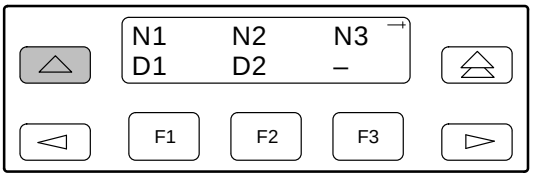


8. Press the Function key below the network channel desired. Each time that you press the Function key, the DTE channel number will scroll up one number. If the network channel is currently unassigned (‘‘–” is displayed on Line 2), the DTE channel number initially displays the same number as the corresponding network channel number. However, if the network channel is currently assigned, the DTE channel number is shown as D*n*. Pressing the Function key for D24 wraps the display back to D1. Only those channels that are not already assigned will appear on the LCD when scrolling. The network channels assigned to ports (Prt1...Prt4) are unavailable for assignment.

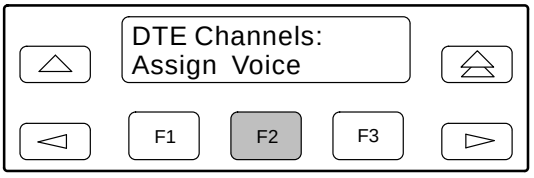


To specify DTE Drop/Insert (DSX-1) channels used to carry voice information,

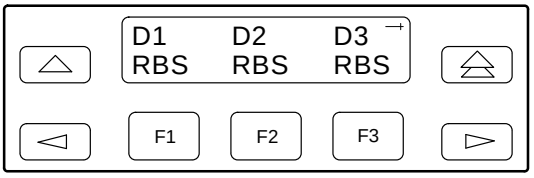
1. Press △ from the channel allocation screen to return to the DTE Channels screen.



2. From the DTE Channels screen, press F2 to select Voice.



3. Line 1 displays the 24 DS0 channels for the DTE Drop/Insert (DSX-1) interface. Pressing the ◁ or ▷ key scrolls the channels onto the screen in groups of three. Line 2 displays whether the DS0 channel in Line 1 is a data channel (Data) or a voice (RBS) channel. Each time that you press the Function key located below the desired channel, the display in Line 2 toggles between Data and RBS.

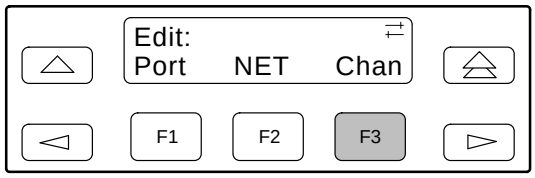


Clearing DS0 Channel Allocation

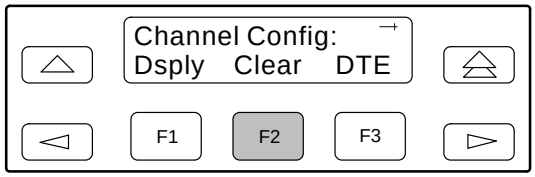
You can clear (deallocate) all the DS0 channels currently allocated to either the network interface, the DTE Drop/Insert (DSX-1) interface, or the synchronous data ports.

To clear DS0 channel allocation,

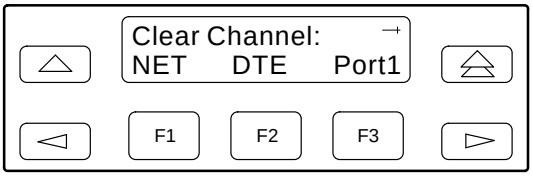
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▷ key until the Chan selection appears on the screen.
5. Select Chan.



6. From the Channel Config screen, select Clear.



7. From the Clear Channel screen, select NET to clear all DS0 channels assigned to the network interface. Or, select DTE to clear all DS0 channels assigned to the DTE Drop/Insert (DSX-1) interface. Or, select a port to clear all assignments for that data port.



Providing Backup Capability

If the T1 network fails, the DSU/CSU provides the ability to reconfigure the unit and restore (at least partially) priority data circuits through an external backup device.

You can store backup configuration options in the Customer 2 set of customer-defined configuration options. The Enterprise MIB variable devConfigAreaCopy allows the entire contents of one configuration area to be copied into another configuration area via SNMP.

By cross-connecting two synchronous data ports to each other, one port can provide a backup path for the other. As soon as the ports are configured to be mapped to each other, Data Set Ready (DSR) for the ports is turned on. The external backup device can be configured to initiate dialing when it detects the off-to-on transition of DSR.

Selecting the Timing Source

The DSU/CSU provides the ability to select a master clock (timing) source that is used to synchronize all of the T1 and data port interfaces on the DSU/CSU. The clock for each interface is at the appropriate rate for that interface (e.g., 1.544 Mbps for the T1 interfaces, the configured port rate for the data ports), and it is independent of the master clock rate. This means that the master clock rate and the DSU/CSU interface rates may be different.

The clock source configuration options enable you to select either the network interface, a synchronous data port, the internal clock, the DTE Drop/Insert (DSX-1) interface, or an external clock. If external clocking is selected, you must use the clock rate configuration option to specify the clock rate. Figure 3-11 shows some common clocking configurations. Two sample procedures for configuring timing are given in the following sections, *Configuring for Network Timing* and *Configuring for External Timing*. For more information on configuration options, refer to Appendix C.

NOTE

The external clock source is only available for 2-port and 4-port DSU/CSUs. For carrier-mounted DSU/CSUs, the external clock provides timing for up to eight slots in the carrier. Each Auxiliary Backplane must have its own external clock input.

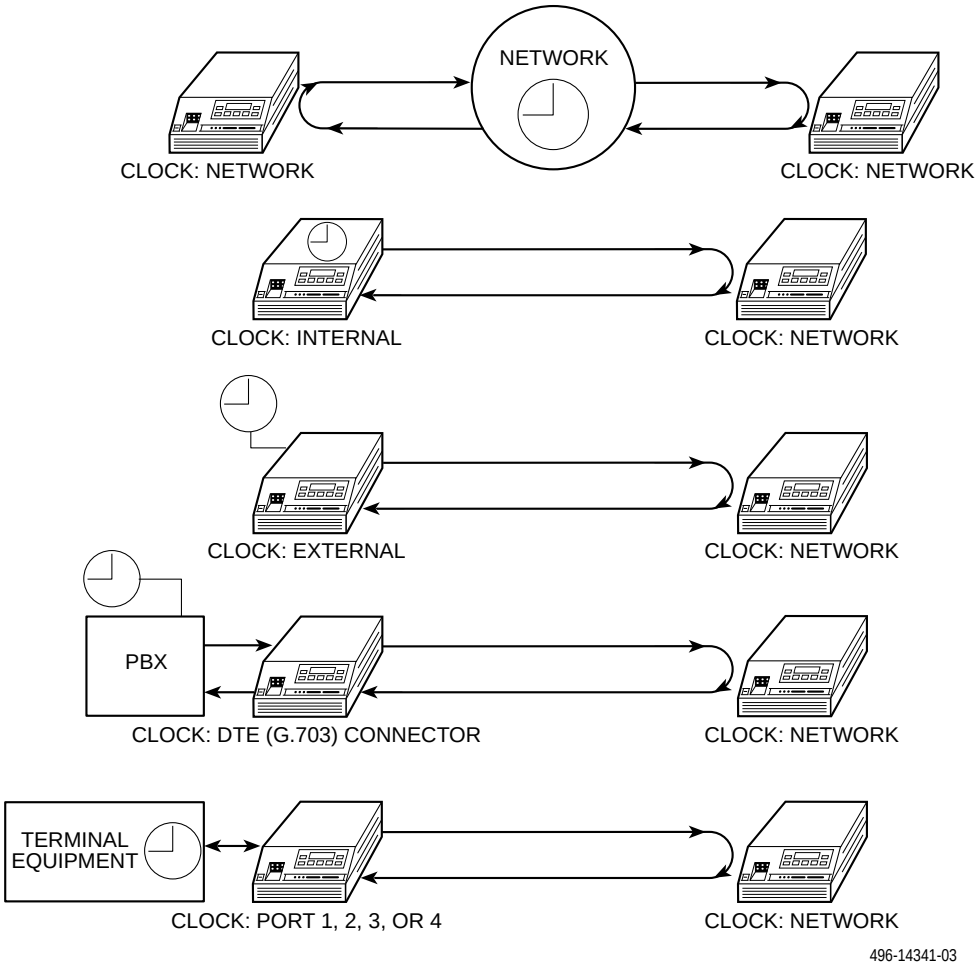
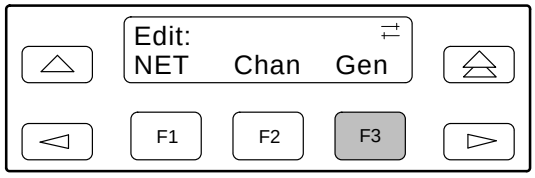


Figure 3-11. Common Clocking Configurations

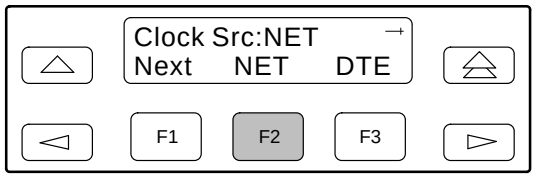
Configuring for Network Timing

To configure for network timing,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Gen selection appears on the screen.
5. Select Gen.



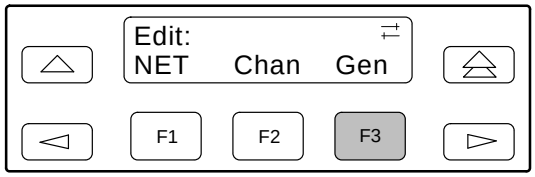
6. Press F1 (Next) to display the next configuration option (Clock Src).
7. Select the master clock source. For network, press F2 (note that network is also the default).



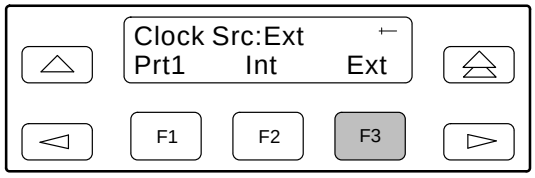
Configuring for External Timing

To configure 2-port and 4-port DSU/CSUs for external timing,

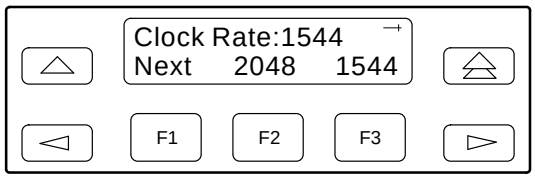
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the Gen selection appears on the screen.
5. Select Gen.



6. Press F1 (Next) to display the next configuration option (Clock Src).
7. Select the master clock source. For external, press the ▻ key until the Ext selection appears on the screen.
8. Select Ext (external timing).



9. Select the appropriate external clock rate by pressing the corresponding Function key. This step is mandatory if you have chosen external clocking.

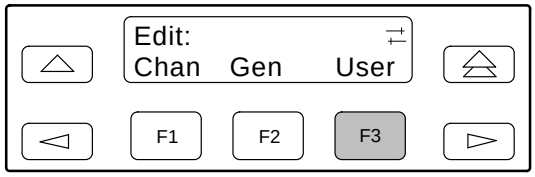


Establishing Access Security on a Port

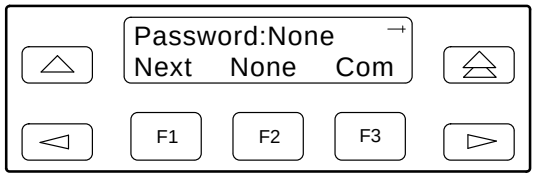
Although the password feature is available, it is not required as a factory default. If used, it ensures access security before device control is passed to a device connected to a port. The password configuration option can be individually set for the COM or MODEM port, or both if security is needed on both port types. The default is **None.** The password itself is set separately (refer to the following section, *Setting a Password*).

To establish access security on a port,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the User selection appears on the screen.
5. Select User.



6. Press F1 (Next) until the Password configuration option appears.
7. Select port(s) to receive access security (None, Com, Modem, or Both). Use the scroll keys, if necessary.

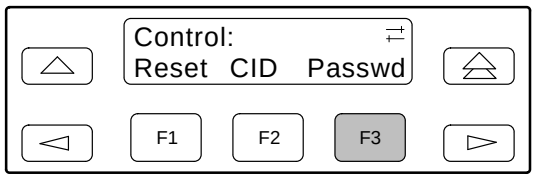


Setting a Password

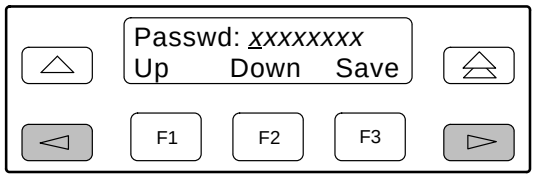
In addition to establishing access security on a port (refer to the previous section, *Establishing Access Security on a Port*) the password itself is set. Unless you specify otherwise, the password is null.

To set a password,

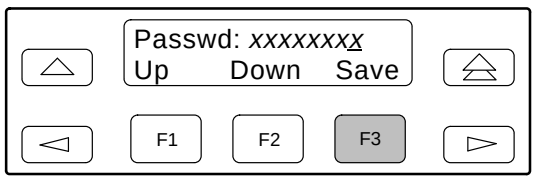
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, press the ▻ key until the Passwd selection appears on the screen.
4. Select Passwd.



5. Use the ◅ and ▻ keys to position the cursor under the desired character. You must enter a character before the ▻ moves the cursor to the next space to the right.



6. Enter the desired password. Press F1 (Up) and F2 (Down) to scroll up and down through the valid characters/numbers for the password. Valid password characters are **0–9, a–z, A–Z, #, –, .,** and **/.** Press F3 (Save) to save the password.

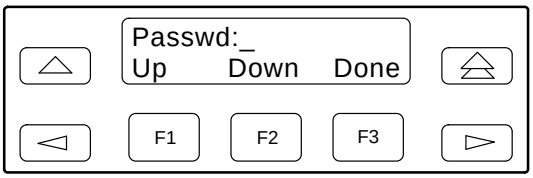


Entering a Password to Gain Access

You are prompted to enter a password (up to 8 characters) when you are accessing a port whose Password configuration option is set (refer to the previous section, *Setting a Password*).

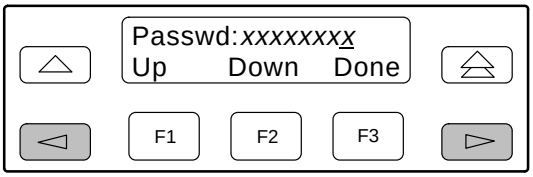
Valid password characters are **0–9, a–z, A–Z, #, -, .,** and **/.** The existing password is not shown on the screen. An underscore in the first position shows where to enter the first character. If the password is set to all null characters (default value), press F3 (Done) when the password screen first appears.

The following screen appears when you access a DSU/CSU that has a password enabled.



To enter a password,

1. Use the ◁ and ▷ keys to position the cursor under the desired character. You must enter a character before the ▷ key moves the cursor to the next space to the right. The ◁ key is not destructive.



2. Enter the required password. Press F1 (Up) and F2 (Down) to scroll up and down through the valid characters/numbers for the password. You have five minutes to enter the correct password before the DSU/CSU ends the session.

3. Press F3 (Done) to indicate you are done entering the password. If you enter an invalid password, the message **Invalid Password** appears.

Acquiring/Releasing the User Interface

You can access the user interface from either the front panel, the COM port, the MODEM port (for standalone DSU/CSUs), or the SDCP (for carrier-mounted DSU/CSUs). The DSU/CSU allows only one user interface to be active at a time. The front panel is the default user interface at power-up or after a reset. It is also the default during a software download or when a failure occurs at either the local or remote PC interface.

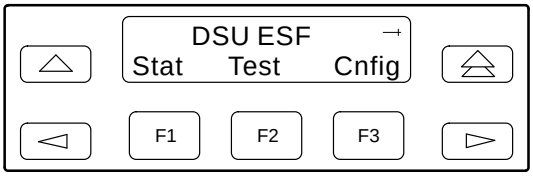
You can switch an inactive user interface to active if,

- The current active user interface has had no activity (no key was pressed) for at least five minutes.
- The active user interface has been released with the Release command.
- The active interface connection is broken. This includes the call disconnect for a modem interface or the termination of the front panel emulation program on a locally-attached PC (if the PC supports DTR) or the termination of the async terminal interface on a remote or locally-attached terminal.

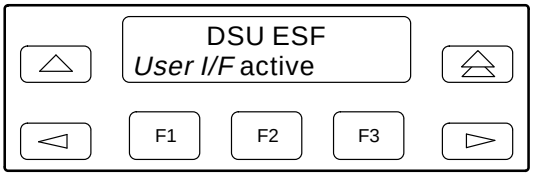
Acquiring the Active User Interface

To acquire the active user interface, press any key. If you are using the PC interface, use the mouse to click on the desired Function key.

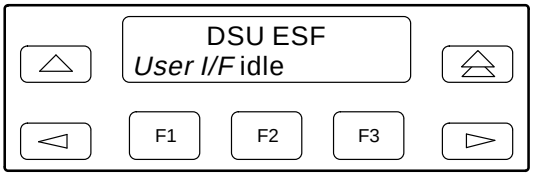
The top-level menu screen appears on the active user interface, regardless of what screen was displayed at the previous active user interface.



The inactive interface displays the following message when a Function key is pressed or a connection is made on the inactive user interface and control cannot be switched because the currently active interface is in use. On the screen, either Ft. Panel (front panel), Com Port, Modem, or SDCP is displayed in the user interface (*User I/F*) field.



The inactive interface displays the following message after control has been released from the previously active interface and another interface has not become active.

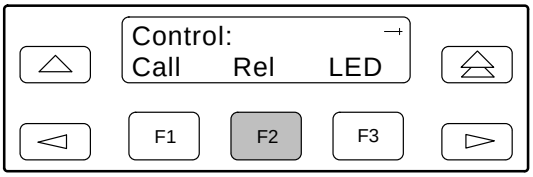


Releasing the Active User Interface

To release the current active user interface, either allow five minutes to elapse without pressing any key or use the Release command.

To use the Release command,

1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Rel (Release).



The active user interface is released. The message **Released** appears. No user interface is active until input is received from a user interface.

Enabling/Disabling the Front Panel

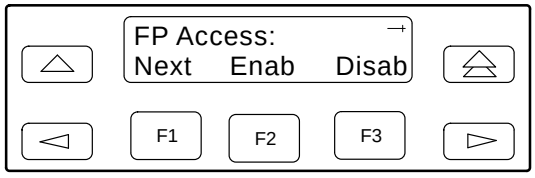
You can enable or disable the display of information on the front panel. This feature is useful for ensuring that other users do not inadvertently change the device's configuration options while you are using an external device (e.g., a PC or async terminal). The factory default is **Enable**.

NOTE

If you disable the front panel, be sure not to alter the configuration options for using an external device (e.g., a PC or async terminal). If this happens, you lose the ability to communicate with the device. You will need to contact your service representative.

To enable or disable the front panel:

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the User selection appears on the screen.
5. Select User.
6. Press F1 (Next) until the FP Access configuration option appears.
7. Press F2 to enable the front panel or F3 to disable the front panel.



Using the Integral Modem in Standalone DSU/CSUs

The standalone DSU/CSU's integral modem enables your DSU/CSU to communicate with remote devices to display alarm messages or to function as the user interface. **The carrier-mounted DSU/CSU does not have an integral modem.**

The Call command, available from the Control branch of the menu tree, provides the following functions to initiate and terminate modem connections:

- **Pass** – Initiates a call through the integral modem to access a far-end DSU/CSU's front panel from your DSU/CSU's front panel (or PC attached to the COM port).
- **Dial** – Initiates a call through the integral modem to a printer, ASCII terminal, or PC. Sets up a semipermanent connection to route alarm messages to the specified destination.
- **Disconnect** – Disconnects an active modem connection.
- **Change Directory** – Allows entry of phone numbers into the internal phone directories.

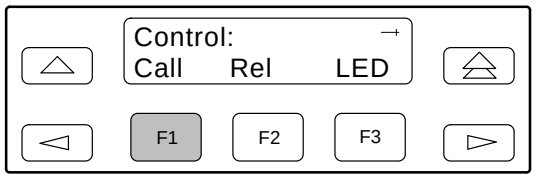
For additional information, refer to the *User Interface Configuration Options* section in Appendix C.

Entering Numbers in the Phone Directories

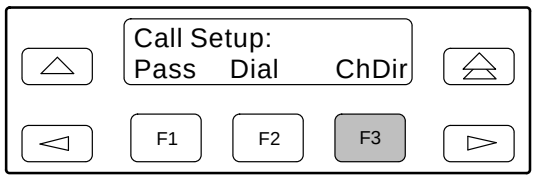
The DSU/CSU has five general directories (1 through 5) and one alarm directory (A). Use the general directories to store phone numbers for remote devices such as standalone DSU/CSUs and ASCII printers. Use the alarm directory to store the phone number of the primary ASCII terminal or printer you use to display or print alarms. This function is not available for carrier-mounted DSU/CSUs because the integral modem is not available for carrier-mounted DSU/CSUs.

To enter or change numbers in the phone directories,

1. From the top-level menu screen, press the ▷ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.

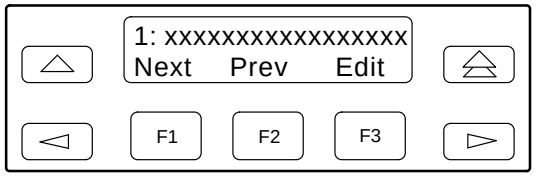


4. From the Call Setup screen, select ChDir.

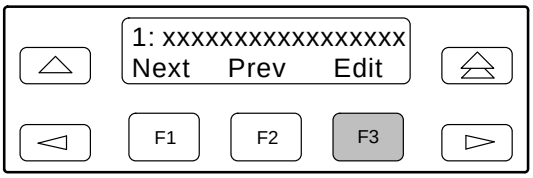


The Directory 1 displays first, along with its phone number if one has been entered.

5. Press F1 (Next) to display the next directory (2, in this case). Press F2 (Previous) to display the previous directory (A, in this case). Directories appear in order, 1 through 5 and then A.



6. Press F3 (Edit) to change the displayed directory's phone number (phone numbers can be up to 40 characters). If you select Edit, the Edit screen appears.



7. Use the ◁ and ▷ keys to position the cursor under the digit(s) you want to change. Press F1 to scroll up to a higher digit. Press F2 to scroll down to a lower digit. The ▷ key inserts blanks (default characters) while the ◁ key invokes the End Of Number (EON) character which terminates the dial string and erases any characters to the right when you use the Save function.

   See Table 3-6 for the set of valid characters and rules that apply to entering phone numbers.

   Example: P9W8135551212

8. Press F3 (Save) to store your changes in nonvolatile memory. If you press ⏫ or △ before saving the phone number you just changed, the previous phone number remains in effect.

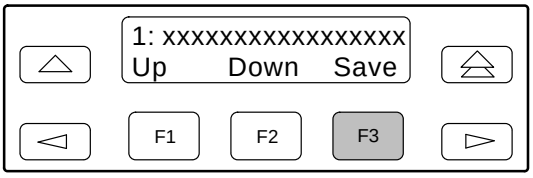


Table 3-6
Valid Phone Number Characters

Valid Characters	Meaning	Restrictions
0 to 9	DTMF or pulse digits	—
* #	DTMF digits	—
P	Selects Pulse dialing	Pulse or Tone must be specified, otherwise Tone is the default. This must be the first character in the string, unless the first character is B. Then, it must immediately follow the B.
T	Selects Tone (DTMF) dialing	Tone or Pulse must be specified, otherwise Tone is the default. This must be the first character in the string, unless the first character is B. Then, it must immediately follow the B.
W	Wait for dial tone	—
B	Blind dialing (you need not wait for a dial tone before entering the dialing sequence)	To be valid, this must be the first character in the string.
,	Creates a 2-second pause in the dialing sequence	—
<space> ( ) -	Extra characters for readability. The space is the default character.	—
<-	End Of Number (EON) character, terminates the dial string and erases all characters to the right after F3 (Save) is pressed	—

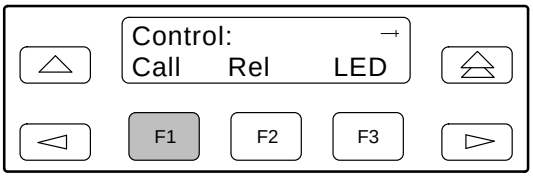
Initiating a Call for Front Panel Pass-Through Operation

Front panel pass-through initiates a call through the integral modem to access a far-end DSU/CSU's front panel from your DSU/CSU's front panel (or PC attached to the COM port).

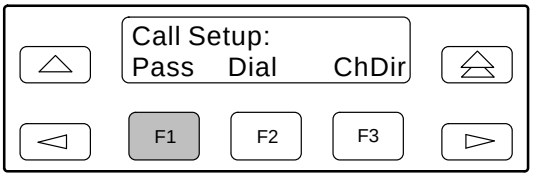
> **NOTE**
>
> Pass is only available when the FP Pass configuration option has been enabled (see Appendix C, *Configuration Options*), the active physical interface is either the front panel or the PC, and the integral modem is not already in use.

To initiate front panel pass-through at the near-end DSU/CSU,

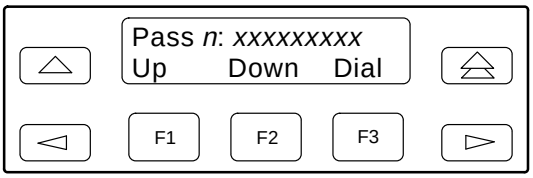
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.



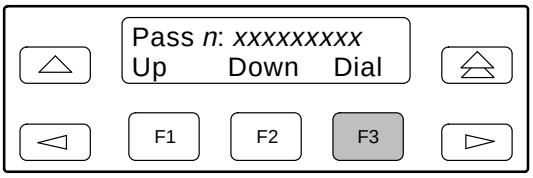
4. From the Call Setup screen, select Pass.



5. From the Pass Directory screen, press F1 (Up) to display the next higher numbered directory or press F2 (Down) to select the next lower numbered directory.



6. When the number of the desired directory appears on the screen, press F3 (Dial) to place the call.

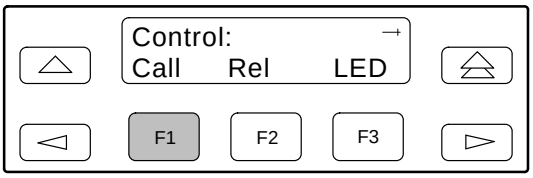


Initiating a Call for PC, ASCII Terminal/Printer, or SNMP Operation

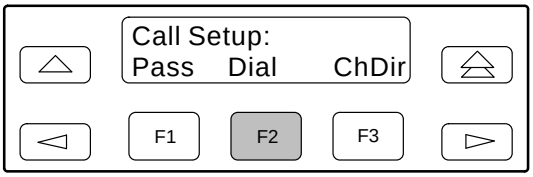
Use the Dial command to set up a semipermanent connection to route alarm messages to the specified destination. The Dial command initiates a call through the integral modem to a printer, ASCII terminal, or PC.

To initiate a call at the local DSU/CSU,

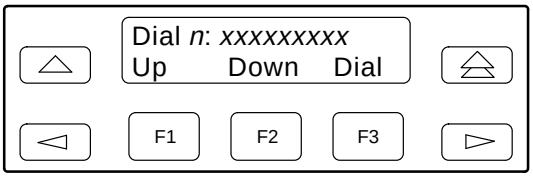
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.



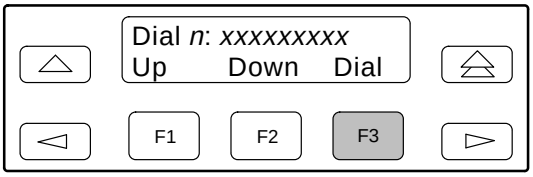
4. From the Call Setup screen, select Dial. This selection is not available if the DSU/CSU's integral modem is already in use.



5. From the Dial Directory screen, press F1 (Up) to display the next higher numbered directory or press F2 (Down) to select the next lower numbered directory.



6. When the number of the desired directory appears on the screen, press F3 (Dial) to place the call.



Disconnecting the Modem Connection

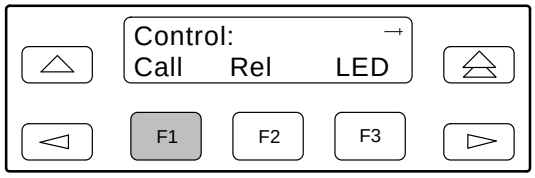
The Disconnect command enables you to force a disconnect of an active modem connection from the front panel of the DSU/CSU. This command is only available when the DSU/CSU modem is connected.

Disconnect methods include:

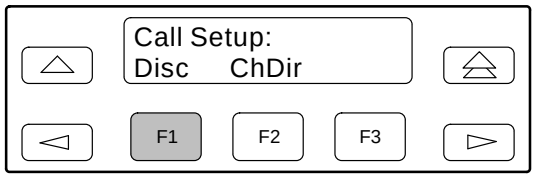
- Using the Disconnect command via the front panel menu (for **all** dial connections, or when a pass-through connection is established to another 316x DSU/CSU).
- Pressing and holding the ⏫ and ⏶ front panel keys simultaneously (when a pass-through connection is established to a remote device other than a 316x DSU/CSU).

To disconnect an established modem connection using the Disconnect command,

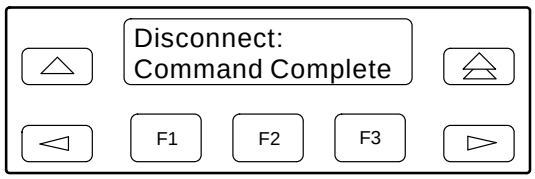
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.



4. From the Call Setup screen, select Disc.

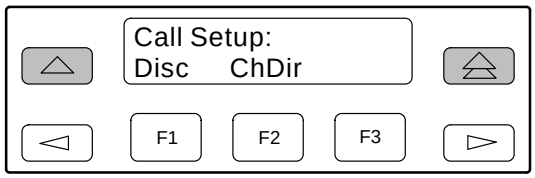


The modem call is disconnected and the Command Complete screen appears.



To disconnect a modem connection using two front panel keys,

1. Press the ⏫ and ⏶ keys simultaneously and hold for two seconds.



The modem call is disconnected and the Command Complete screen appears.

Enabling the Communication Port for Carrier-Mounted DSU/CSUs

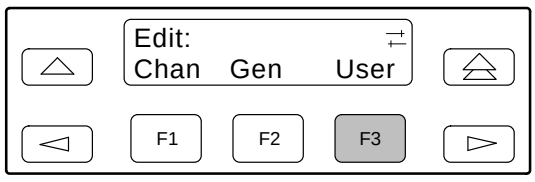
Communication between the carrier-mounted DSU/CSUs and an external PC, ASCII device, SNMP manager, or async terminal interface (attached either locally or through an external modem) occurs through a shared communication (COM) port. (For COM port cabling information, refer to the *COMSPHERE 3000 Series Carrier Installation Manual*.) Unlike standalone DSU/CSUs, the carrier-mounted DSU/CSUs do not have a dedicated COM port for external access. Once the COM port is enabled, other COM port configuration options can be selected. These options are used to configure Port 2 on the Auxiliary Backplane as a COM port for the carrier.

NOTE

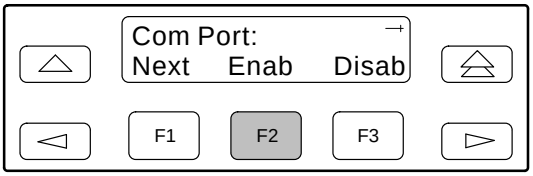
If a Model 3161 DSU/CSU has the COM port enabled, Port 2 cannot be used as a data port.

To enable the COM port on the carrier-mounted DSU/CSU,

1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▻ key until the User selection appears on the screen.
5. Select User.



6. Press F1 (Next) until the Com Port configuration option appears.
7. Select Enab to enable the COM port for the carrier-mounted DSU/CSU.



The carrier COM port provides the following functionality:

- If configured for ASCII, only one ASCII device may be used for the carrier. (If two COM ports are configured for ASCII, neither will work.)
- If configured for Mgmt, each device in the carrier can support an Mgmt COM port; however, each Mgmt COM port must be connected to a different subnet. To facilitate IP data routing, the device with the closest link to the SNMP manager or Telnet client should be configured as the IP Bus Master.
- If configured for either ASCII or Mgmt, the carrier COM port may be configured to control an external device (e.g., modem, x.25 PAD) through the use of AT or user-specified commands.

The set of valid characters for control of the carrier external COM port device is as follows:

- The numbers: 0–9
- The lowercase letters: a–z
- The uppercase letters: A–Z
- The space (“ ”) character
- The ASCII symbols (in ascending order, based on the ASCII code)
- The End Of Line (EOL) symbol: ←
- The caret (“^”) control character is used to select non-printable ASCII characters. The caret “^” must be followed by one character which together form the control sequence. Table 3-7 defines all of the available control sequences.

Table 3-7
Control Sequences

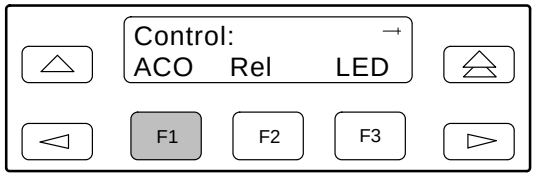
Sequence	ASCII	HEX
^A or ^a	SOH	0x01
^B or ^b	STX	0x02
^C or ^c	ETX	0x03
^D or ^d	EOT	0x04
^E or ^e	ENQ	0x05
^F or ^f	ACK	0x06
^G or ^g	BEL	0x07
^H or ^h	BS	0x08
^I or ^i	HT	0x09
^J or ^j	LF or NL	0x0A
^K or ^k	VT	0x0B
^L or ^l	FF or NP	0x0C
^M or ^m	CR	0x0D
^N or ^n	SO	0x0E
^O or ^o	SI	0x0F
^P or ^p	DLE	0x10
^Q or ^q	DC1	0x11
^R or ^r	DC2	0x12
^S or ^s	DC3	0x13
^T or ^t	DC4	0x14
^U or ^u	NAK	0x15
^V or ^v	SYN	0x16
^W or ^w	ETB	0x17
^X or ^x	CAN	0x18
^Y or ^y	EM	0x19
^Z or ^z	SUB	0x1A
^{	ESC	0x1B
^\	FS	0x1C
^}	GS	0x1D
^^	RS	0x1E
^_	US	0x1F

Deactivating the Alarm Relay for Carrier-Mounted DSU/CSUs

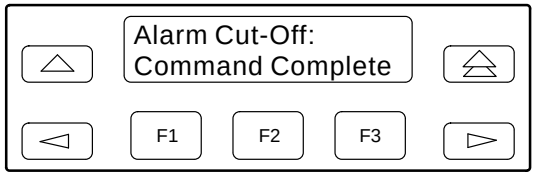
The Alarm Cut-off command forces a deactivation of the alarm relay on the 3000 Series Carrier during an alarm condition. Since this function only affects the 3000 Series Carrier, it is only available for carrier-mounted DSU/CSUs. The alarm relay function must first be enabled by the Alarm Relay configuration option (refer to Appendix C, *Configuration Options*).

To deactivate the alarm relay,

1. From the top-level menu screen, press the ▷ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select ACO.



4. The Command Complete screen appears.

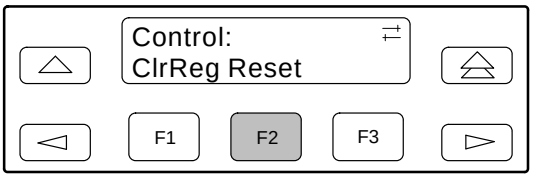


Resetting the DSU/CSU

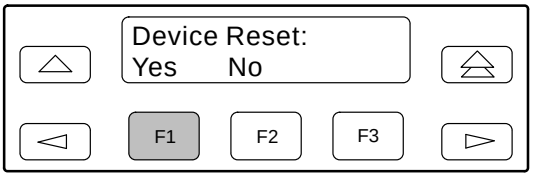
Use the Reset command to perform a power-on reset of the DSU/CSU.

To reset the DSU/CSU,

1. From the top-level menu screen, press the ▷ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, press the ▷ key until the Reset selection appears on the screen.
4. Select Reset.



5. From the Device Reset screen, press F1 to initiate a reset of the DSU/CSU (the power-up sequence screen appears). Press F2 instead to return to the Control screen without initiating a reset.



Download Operations

NOTE

The Download command is for use by service personnel only. Loss of primary data could result from improper use.

User Interface Access Security for Standalone DSU/CSUs

NOTE

This page of the manual is self-supporting and can be removed to prevent unwanted knowledge of the security access levels and their selection.

The user interface access security option allows you to limit access to the DSU/CSU to display-only and non-intrusive functions. **The user access security function is not available for carrier-mounted DSU/CSUs.**

Level 1 (Lvl1) access security allows access to all functions available through the menu tree. This is the default setting.

Level 2 (Lvl2) access security restricts access to only those functions that cannot affect the operation of the DSU/CSU in any way. At this level,

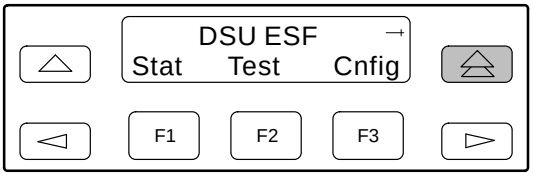
- None of the functions in the Test or Ctrl branches are available.
- All functions on the Stat branch are available.
- All functions on the Cnfg branch are available for display, but they cannot be used to save to a configuration area.

You can only reach the screen that controls security access using the front panel.

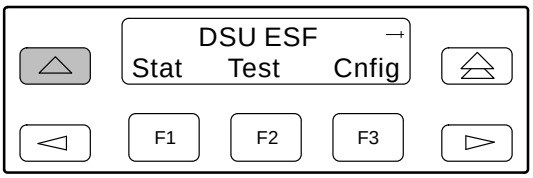
Changing User Interface Access Security

To change user interface access security,

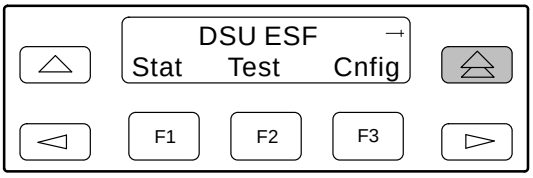
1. Press the ⏫ key two times from the top-level screen.



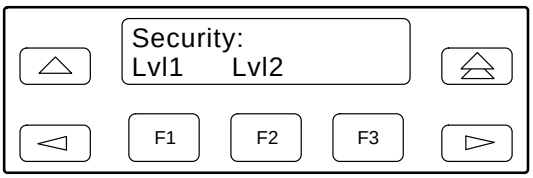
2. Press the ⏶ key three times.



3. Press the ⏫ key once.



The Security screen appears.



4. Press F1 to select Lvl1, or press F2 to select Lvl2. After you make a selection, the top-level screen appears.

   If you do not make a selection within 5 minutes, the Automatic Device Health/Status screen appears.

Maintenance 4

Overview 4-1
Self-Test Health 4-2
Device Health and Status 4-3
Performance Reports 4-5
Alarms 4-9
SNMP Traps 4-10
Troubleshooting 4-11
Test Jacks 4-13
Test Commands 4-15
Remote Loopback Tests 4-15
  Sending a Line Loopback Up or Down 4-15
  Sending a V.54/ANSI FT1 Activation/Deactivation 4-16
Local Loopback Tests 4-17
  Starting a Line Loopback 4-18
  Starting a Payload Loopback 4-18
  Starting a DTE Loopback 4-19
  Starting a Repeater Loopback 4-19
  Starting a Data Channel Loopback 4-20
  Starting a Data Terminal Loopback 4-20
  Aborting Loopbacks 4-21
Test Patterns 4-22
  Sending Test Patterns 4-22
  Monitoring Test Patterns 4-23
  Aborting Test Patterns 4-24
Lamp Test 4-25
  Starting a Lamp Test 4-25
  Aborting a Lamp Test 4-25
Displaying DSU/CSU Test Status 4-26

Overview

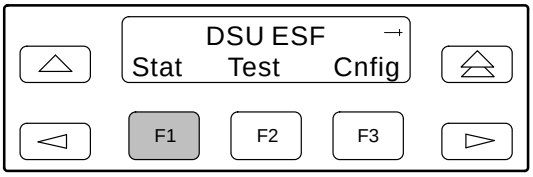
The DSU/CSU can detect and report faults, and perform diagnostic tests. These features ensure that your DSU/CSU is giving you optimum performance in your network.

Self-Test Health

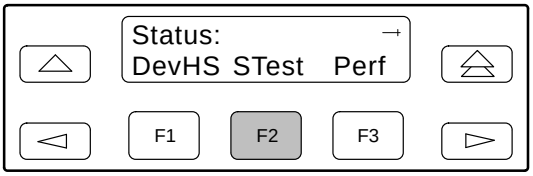
Use the Self-Test Health command to display the results of the power-up self-test. Possible messages are listed in Table 4-1. See Chapter 2, *Installation,* for more information about power-up self-test.

To display power-up self-test results,

1. From the top-level menu screen, select Stat.



2. From the Status screen, select STest.



3. View the results of the last power-up self-test. If no problems were found during power-up, the following message appears.

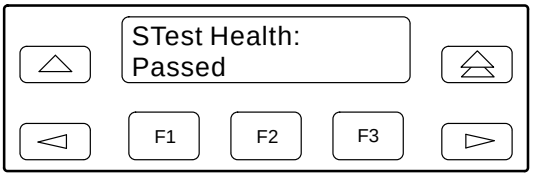


Table 4-1
Self-Test Health Messages

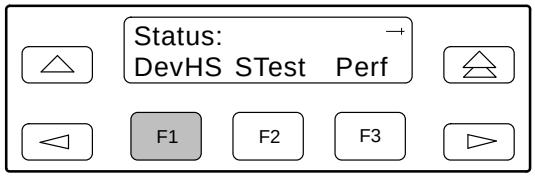
Message	Description
Passed	No problems were found during power-up.
CPU fail	The central processing unit failed internal testing.
Device fail	One or more of the unit's integrated circuit chips failed to pass internal device level testing.
B8ZS/LOS fail	The unit failed to encode data properly or to detect Loss Of Signal.
Alarm fail	The unit failed to transmit AIS or to detect an Yellow alarm.
Memory fail	The unit failed program checksum verification.
LCD fail	The front panel liquid crystal display (LCD) failed.
NET T1 fail	The unit failed to internally loop data on the network T1 circuit.
DTE T1 fail	The unit failed to internally loop data on the DTE T1 (DSX-1) circuit.
DSU fail	The unit failed to internally loop data on the DSU.
DSU Port*n* fail	Port's integrated circuitry failed to pass device internal testing.
Modem fail	Unit failed to internally loop data through the modem circuit.
Unknown Exp Dev	The unit is not able to recognize the expansion device connected to the main circuit card.
Failure *xxxxxxxx*	An 8-digit hexadecimal failure code is provided for service personnel.

Device Health and Status

Use the Device Health and Status branch to view the current health and status messages for the DSU/CSU. Table 4-2 lists these messages in priority order.

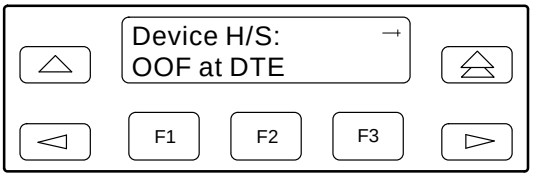
To display device health and status,

1. From the top-level menu screen, select Stat.
2. From the Status screen, select DevHS.



Alarm/status messages appear on Line 2 of the LCD in priority order (highest to lowest). The DSU/CSU is polled for current status every ten seconds. If the status has changed from the last poll, the Health and Status screen is updated and the highest priority message is displayed.

3. Use the scroll keys, if necessary, to scroll additional device health and status messages onto the LCD.



The Auto Device Health and Status screen appears when there is no activity (no keys pressed) on the active physical interface for five minutes. Only the highest priority message appears on Line 2 of the LCD.

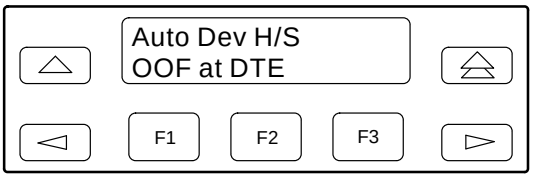


Table 4-2
(1 of 2)
Health and Status Messages

Message	Description
LOS at Net	A Loss Of Signal condition (175 consecutive zeros) has been detected on the network interface. The condition is cleared when the density of ones to zeros received is 12.5%.
LOS at DTE	A Loss Of Signal condition (175 consecutive zeros) has been detected on the DTE Drop/Insert (DSX-1) interface. The condition is cleared when the density of ones to zeros received is 12.5%.
OOF at Net	An Out Of Frame condition (2 out of 4 frame synchronization bits in error) has been detected on the network interface. The condition is cleared when a reframe occurs.
OOF at DTE	An Out Of Frame condition has been detected on the DTE Drop/Insert (DSX-1) interface. The condition is cleared when a reframe occurs.
AIS at Net	An Alarm Indication Signal (unframed all ones signal) is being received by the network interface.
AIS at DTE	An Alarm Indication Signal is being received by the DTE Drop/Insert (DSX-1) interface.
EER at Net	An Excessive Error Rate condition has been detected on the network interface (the bit error rate has exceeded the configured threshold for ESF framing). The condition is cleared when the error rate falls below the threshold value.
Yellow at Net	A Yellow Alarm signal is being received by the network interface.
Yellow at DTE	A Yellow Alarm signal is being received by the DTE Drop/Insert (DSX-1) interface.

Table 4-2
(2 of 2)
Health and Status Messages

Message	Description
OOF at Prt*n*	An Out Of Frame condition has been detected on data port Prt*n* (where *n* is the port number). This condition only occurs if the synchronous data port's Embedded Data Link (EDL) is enabled (only available for 2-port and 4-port DSU/CSUs).
EER at Prt*n*	The error rate of the received signal has exceeded the configured threshold for data port Prt*n* (where *n* is the port number). This condition only occurs if the synchronous data port's Embedded Data Link (EDL) is enabled (only available for 2-port and 4-port DSU/CSUs). The condition is cleared when the error rate falls below the synchronous data port's configured threshold value.
PORT IP Down	The IP management link is in a down state for *PORT* (where *PORT* is COM, MODEM, or AUX). This condition occurs if the *PORT* is configured for Mgmt, and communication between the management system and the DSU/CSU is not currently possible for this port. For the AUX port, this condition is detected only when a device reset or power-up occurs.
Selftest failed	A failure was detected during the power-on self-test. Select STest (in the Stat branch) to display more information about the failure.
DevFail *xxxxxxxx*	An internal error has been detected by the operating software. An 8-digit code appears for use by service personnel. The condition is cleared by resetting the device.
Download failed	A download attempt was interrupted and failed to complete. The condition is cleared by resetting the device.
Test in progress	A test is currently active. Select Tstat (in the Stat branch) to display more test information.
Modem Connected	The integral modem is currently connected. This message is only displayed for standalone DSU/CSUs.
Master Clk fail	The master clock has failed. Timing for the DSU/CSU is provided by the internal clock.
DSU Operational	This message only appears if there are no valid alarm or status messages.

Performance Reports

When the network interface is configured for ESF operation, network performance is continuously monitored and maintained in two sets of aggregate registers: Carrier Network Interface Registers (Telco) and User Network Interface Registers (User). The User registers contain an extra status register (Status Event). Registers shown on the front panel LCD are listed in Table 4-3. These registers are status registers that collect performance data for the previous 24-hour period. Performance data is updated in 15-minute intervals. After 15 minutes, the current interval is rolled over into a set of accumulator registers that represent the previous 96 15-minute intervals for the register. An interval total of how many of the 96 registers contain valid data is also kept, as well as a 24-hour total for each accumulator register.

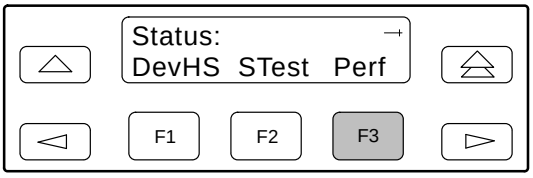
For 2-port and 4-port DSU/CSUs, port performance is continuously monitored and maintained in memory registers when the port is configured to use EDL. The DSU/CSU maintains two sets of port registers for each synchronous data port: far-end port registers and near-end port registers. These registers are status registers that collect performance data for the previous 8-hour period. Port data is updated in 15-minute intervals. After 15 minutes, the current interval is rolled over into a set of accumulator registers that represent the previous 32 15-minute intervals for the register. An interval total of how many of the 32 registers contain valid data is also kept, as well as a 8-hour total for each accumulator register.

NOTE

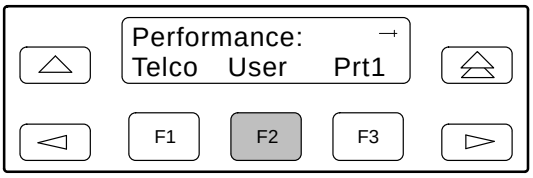
The following procedure is an example only. **Screen displays may vary depending on the model and configuration of the DSU/CSU.** The procedures for displaying Telco and port registers are similar to this example.

To display User Network Interface (User) performance,

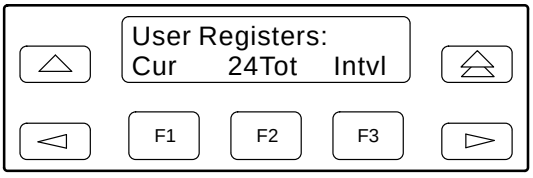
1. From the top-level menu screen, select Stat.
2. From the Status screen, select Perf.



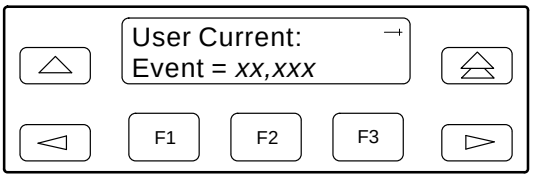
3. Select User registers.



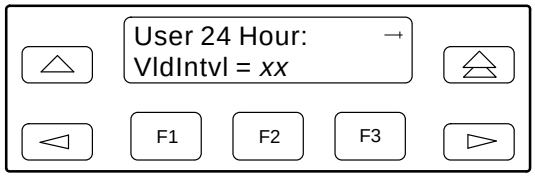
4. From the User Registers screen, press F1 to view current registers (go to Step 5), press F2 to view 24-Hour Totals (go to Step 6), or press F3 to view 15-Minute Interval Registers (go to Step 7).



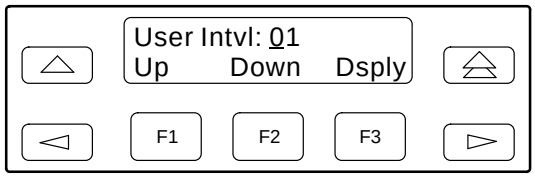
5. When you press F1 from the User Registers screen, the User registers for the current 15-minute interval appear.



6. When you press F2 from the User Registers screen, the User registers for the 24-hour total interval appear.

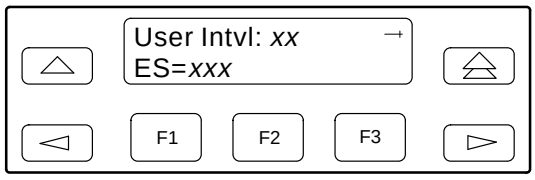


7. When you press F3 from the User Registers screen, the interval screen appears. Use this screen to choose the specific 15-minute interval.



8. Use the ◁ and ▷ keys to position the cursor under the first or second digit in the interval number displayed, then use the F1 (Up) and F2 (Down) keys to increment/ decrement the number.

9. When you have selected the number of the interval you want to display, press F3 (Dsply) to display the registers for the interval selected. Use the scroll keys to view additional register information.



You can reset the performance registers via the ClrReg command in the Control branch of the front panel menu.

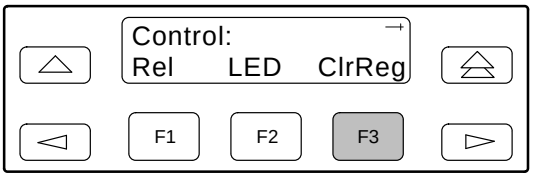
To clear the performance registers,

1. From the top-level menu screen, press the ▷ key until the Ctrl selection appears on the screen.

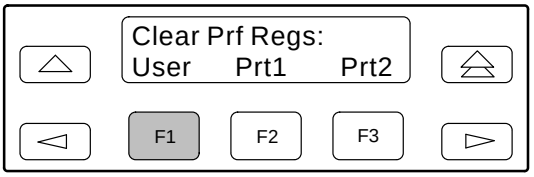
2. Select Ctrl.

3. From the Control screen, press the ▷ key until the ClrReg selection appears on the screen.

4. Select ClrReg.



5. From the Clear Prf Regs screen, press F1 to clear the User registers.



If you selected User, the User performance registers are cleared, all accumulators are reset to zero, and all status registers are cleared. The current interval timer, the number of valid intervals count, and the total 24-hour counts are reset to zero. The **Command Complete** message then appears.

Table 4-3
(1 of 2)
Performance Registers

Register	Interval Description	Totals Description
Event	ESF error events counter. An error event is an ESF frame with either a Cyclic Redundancy Check (CRC) error or an Out Of Frame (OOF) event. The maximum count is 65,535. This register is only reset as a result of a reset command from the network. This register is valid for the current interval only.	N/A
CurTimer	Current interval timer. This register records the number of seconds in the current 15-minute interval. The maximum is 900 seconds. This register is valid for the current interval only.	N/A
VldIntvl	N/A	Valid interval total. Records the number of valid 15-minute intervals in the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance. This register is not valid for the current interval.
ES	The number of errored seconds for the current interval. An errored second is any second with one or more ESF error events. The maximum is 900 seconds.	The total number of errored seconds for the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance.
UAS	The number of unavailable seconds for the current interval. An unavailable second is any one second interval when service is unavailable. (Detection occurs with 10 consecutive unavailable seconds.) The maximum is 900 seconds.	The total number of unavailable seconds for the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance.
SES	The number of severely errored seconds for the current interval. A severely errored second is any second with 320 or more CRC errors, or any second with one or more OOF events. The maximum is 900 seconds.	The total number of severely errored seconds for the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance.
BES	The number of bursty errored seconds for the current interval. A bursty errored second is any second with more than one, but less than 320, CRC errors. The maximum is 900 seconds.	The total number of bursty errored seconds for the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance.
LOFC	The loss of frame count for the current interval. This is a count of the number of times that an LOF is declared. The maximum count is 255.	The total loss of frame count for the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance.
CSS (Not valid for Port registers.)	The number of controlled slip seconds for the current interval.	The total number of controlled slip seconds for the previous *x* hours, where *x* is 24 hours for aggregate performance and 8 hours for port performance.

Table 4-3
(2 of 2)
Performance Registers

Register	Interval Description	Totals Description
StEvnt (Only valid for User registers.)	The status events register records whether one or more of the following events have occurred at least once during the interval. The event is identified by a letter as follows: Y – A Yellow Alarm signal has been received on the network interface. L – Loss Of Signal has occurred on the DTE Drop/Insert (DSX-1) interface. E – The Excessive Error Rate threshold has been exceeded. F – A Frame Synchronization Bit Error has been detected. V – A Bipolar Violation has been detected. If none of these events occurred during the interval, StEvnt=none will be displayed.	N/A
Complete (Only valid for far-end port registers.)	Bad line conditions or loopback tests may prevent far-end port statistics from reaching the DSU/CSU. This field indicates whether the 15-minute interval contains 900 seconds of statistics. If one or more seconds of far-end statistics are missing, this field will display Complete=No, otherwise it will display Complete=Yes. This field is only displayed when Far is selected from the Prt*n* screen.	N/A

Alarms

The DSU/CSU can be attached, either locally or remotely, to an ASCII terminal or printer to display or print alarm messages. Alarms can also be displayed on a PC that is using a terminal emulation package.

For standalone DSU/CSUs, you can route these alarms to the MODEM port, the COM port, or both. For carrier-mounted DSU/CSUs, you can route them to the COM port or dial them out using an external device.

Each alarm message contains a customer identification to indicate which remote DSU/CSU is reporting an alarm. For information about customer identification, refer to the *Displaying Unit Identity* section in Chapter 3, *Operation*.

Possible alarm messages are as follows:

- **Continuous Loss Of Signal detected at the *x* Interface** (where *x* is either Network or DTE).
- **Alarm Cleared. Loss Of Signal condition at the *x* Interface** (where *x* is either Network or DTE).
- **Continuous Out Of Frame condition detected at the *x* Interface** (where *x* is either Network or DTE).
- **Alarm Cleared. Out Of Frame condition at the *x* Interface** (where *x* is either Network or DTE).
- **Alarm Indication Signal received at the *x* Interface** (where *x* is either Network or DTE).
- **Alarm Cleared. Alarm Indication Signal at the *x* Interface** (where *x* is either Network or DTE).
- **An Excessive Error Rate has been detected at the Network Interface**.
- **Alarm Cleared. An Excessive Error Rate at the Network Interface**.
- **Yellow Alarm signal received at the *x* Interface** (where *x* is either Network or DTE).
- **Alarm Cleared. Yellow Alarm signal at the *x* Interface** (where *x* is either Network or DTE).
- **Continuous Out Of Frame condition detected at synchronous data port *n*** (where *n* is the port number).
- **Alarm Cleared. Out Of Frame condition at synchronous data port *n*** (where *n* is the port number).
- **An Excessive Error Rate has been detected at synchronous data port *n*** (where *n* is the port number).
- **Alarm Cleared. An Excessive Error Rate at synchronous data port *n*** (where *n* is the port number).

If two alarm conditions are detected at once, the higher priority alarm is reported. However, if an even higher priority alarm is detected before the first alarm is cleared, the later alarm is not reported. (The alarms listed above are in priority order with the highest priority listed first.)

Alarms remain active until the alarm condition is cleared. Also, an alarm clear message is only sent when there are no other alarms active.

For information about alarm configuration options, refer to the *Alarm Configuration Options* section in Appendix C, *Configuration Options*.

For troubleshooting information, refer to the *Troubleshooting* section on page 4-11.

SNMP Traps

SNMP traps are unsolicited messages that are sent from the DSU/CSU to an SNMP manager when the DSU/CSU detects certain pre-specified conditions. These traps enable the SNMP manager to monitor the state of the network.

The SNMP Trap configuration option must be enabled for trap messages to be sent over the communications link. You must specify the number of SNMP managers that are to receive traps from this DSU/CSU, an IP address for each SNMP manager specified, and the type of traps to be sent from this DSU/CSU. For more information, refer to Appendix C, *Configuration Options*, and the *Configuring SNMP Traps* section in Chapter 3, *Operation*.

Trap types consist of the following:

- **General traps** – include warmStart and authenticationFailure. The DSU/CSU sends a warmStart trap after it has been reset to indicate that it has just reinitialized itself. The DSU/CSU sends an authenticationFailure trap when it has received an SNMP protocol message that has not been properly authenticated. These traps are set by the Gen Trap configuration option.
- **Enterprise Specific traps** – signify that the DSU/CSU has recognized an enterprise-specific event. See Table 4-4 for enterprise-specific traps. These traps are set by the Entp Trap configuration option.
- **Link Traps** – identify the condition of the communications interface, either linkDown (one of the communications interfaces has failed) or linkUp (one of the communications interfaces has just come up). These traps are set by the Link Trap configuration option. The communications interfaces for which these traps can be generated are specified by the Trap I/F configuration option. Table 4-5 defines traps for each interface.

Table 4-4
Enterprise-Specific Trap Definitions

Trap Value	Event
enterpriseClockFail(1)	The currently configured master clock source has failed.
enterpriseSelfTestFail(2)	A DSU/CSU hardware failure is detected at self-test. This trap is generated after DSU/CSU initialization.
enterpriseDeviceFail(3)	An internal DSU/CSU failure is detected by the operating software.
enterpriseTestStart(5)	A test is initiated.
enterpriseConfigChange(6)	A configuration option is changed.
enterpriseTestClear(105)	A test is concluded.

Table 4-5
SNMP Trap per Interface

Interface	Trap Meaning
T1 Network	**Up** = No alarm or test conditions. **Down** = Alarm or test conditions.
DTE Drop/Insert (DSX-1)	**Up** = No alarm or test conditions, and the interface is enabled. **Down** = Alarm or test conditions, or the interface is disabled.
Synchronous Data Ports	**Up** = No test conditions, the port is assigned to a network interface, and both CTS and DSR are ON. **Down** = Test conditions, the port is unassigned, or either CTS or DSR is off.

Troubleshooting

The DSU/CSU is designed to provide you with trouble-free service. However, Table 4-6 gives you some direction if a problem occurs.

For problems other than those listed in the table, please contact your service representative.

Table 4-6
(1 of 2)
Troubleshooting

Symptom	Possible Cause	Solutions
No power	1. The power module is not securely attached. 2. The wall receptacle has no power.	1. Check the power module attachment. 2. Check the wall receptacle power by plugging in some equipment that is known to be working.
Power-Up Self-Test fails	The DSU/CSU has detected an internal hardware failure.	Contact your service representative.
Message **LOS at NET** appears	1. Network cable problem. 2. No signal is being transmitted at the far-end. 3. Facility problem.	1. Check that the network cable is securely attached at both ends. 2. Check the far-end status. 3. Contact your facility provider.
Message **LOS at DTE** appears	1. DTE Drop/Insert (DSX-1) cable problem. 2. No signal being transmitted from the DTE.	1. Check that the DTE Drop/Insert (DSX-1) cable is securely attached at both ends. 2. Check the DTE status.
Message **OOF at Net** appears	1. Incompatible framing format between the network and the DSU/CSU. 2. Network cabling problem. 3. Facility problem.	1. Check that the framing format for the network interface is correct. 2. Check that the network cable is securely attached at both ends. 3. Contact your facility provider.
Message **OOF at DTE** appears	1. Incompatible framing format between the Drop/Insert port on the customer premises equipment and the DSU/CSU. 2. DTE Drop/Insert (DSX-1) cabling problem.	1. Check that the framing format for the DTE Drop/Insert (DSX-1) interface is correct. 2. Check that the DTE Drop/Insert (DSX-1) cable is securely attached at both ends.
Message **Yellow at Net** appears	1. Network cable problem. 2. Far-end device has lost framing sync on the line. 3. Facility problem.	1. Check that your network cable is securely attached at both ends. 2. Check the status of the far-end device. 3. Contact your facility provider.
Message **Yellow at DTE** appears	DTE has detected an LOS or LOF condition.	1. Check the status of the DTE. 2. Check that the DTE Drop/Insert (DSX-1) cable is securely attached at both ends.
Message **AIS at Net** appears	1. Upstream device is transmitting an AIS. 2. The network is transmitting an AIS.	1. Check the status of the upstream device(s). 2. Contact your facility provider.

Table 4-6
(2 of 2)
Troubleshooting

Symptom	Possible Cause	Solutions
Message **AIS at DTE** appears	DTE is sending an AIS.	Check the DTE.
Message **EER at Net** appears	Facility problem.	Contact your facility provider.
BPV LED is ON	1. Incompatible line coding format between the DTE and the DSU/CSU. 2. DTE Drop/Insert (DSX-1) cable problem.	1. Check that the line coding format for the DTE Drop/Insert (DSX-1) interface is correct. 2. Check that the DTE cable is securely attached at both ends.
A failure message appears followed by an 8-digit code (*x x x x x x x x*)	Internal DSU/CSU problem.	Record the 8-digit code, then contact your service representative.
Mgmt link is down	1. The manager configuration is mismatched with the DSU/CSU configuration. 2. The manager's link layer protocol is not running.	1. Check that the configurations are matched. 2. Start the link layer protocol.
No SNMP communication via the AUX port	1. Cable problem. 2. The link layer protocol is not running.	1. Check that the cable is securely attached at both ends. 2. Change the Aux Use configuration option to None, and then back to SNMP or Daisy (as appropriate).
Invalid Number	The modem cannot dial because the phone number is invalid or there is no number in the selected directory.	Check that the selected phone number is correct.
No Dial Tone	The modem cannot dial because there is no dial tone.	Check that the modem is connected properly.
Busy Signal	The modem is receiving a busy signal.	Redial the phone number later.
No Answer Tone	The remote end does not answer within 45 seconds.	Redial the phone number later.
Modem In Use	The modem is in use.	Redial the phone number later.

Test Jacks

For 2-port and 4-port DSU/CSUs, six test jacks are located on the front panel (Figure 4-1). The Mon (Monitor) branch of the menu tree allows you to select either EQPT (Equipment) or NET (Network).

> **NOTE**
>
> The single-port DSU/CSU provides only Network Monitor In and Network Monitor Out test jacks. There is no Mon (Monitor) selection in the menu tree.

The 2-port and 4-port DSU/CSU test jack functions are shown in Figure 4-2 and described in Table 4-7.

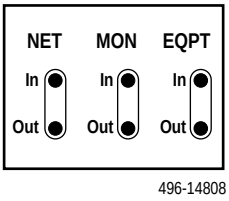
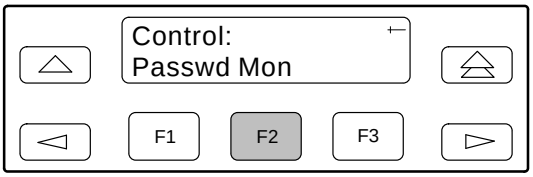


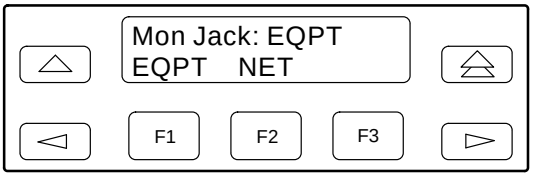
Figure 4-1. Test Jacks (Standalone DSU/CSU)

To change the Mon (Monitor) selection in 2-port and 4-port DSU/CSUs,

1. From the top-level menu, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, press the ▻ key until the Mon selection appears on the screen.
4. Select Mon.



5. From the Mon Jack screen, press F1 to select EQPT (the default), or press F2 to select NET.



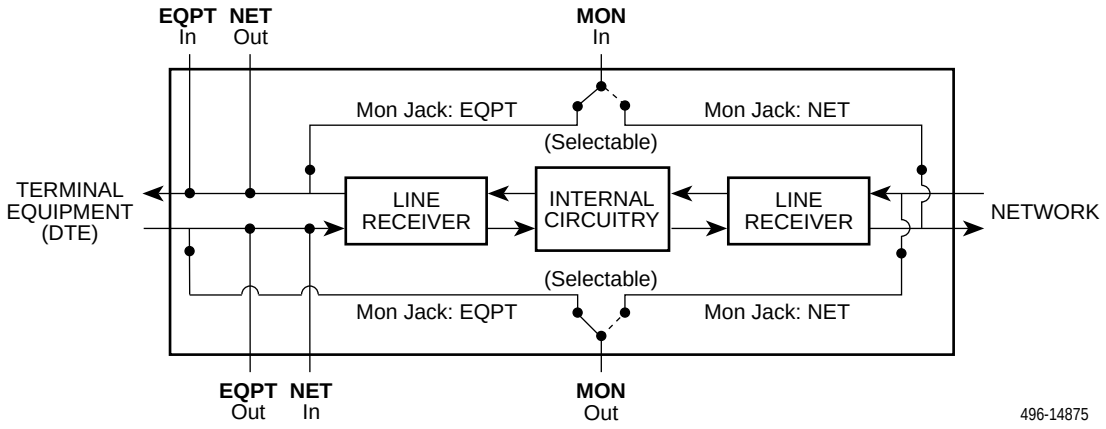


Figure 4-2. Test Jack Block Diagram

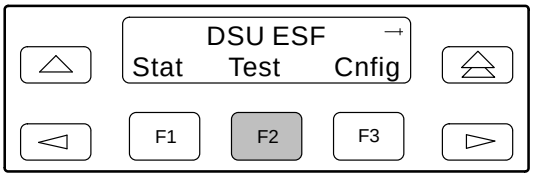
Table 4-7
Test Jack Functions

Test Jack Name	Function
NET In (Network In)	A break-in test jack that allows a signal to be inserted toward the network by external test equipment.
NET Out (Network Out)	A break-in test jack that interrupts the signal coming from the network and allows it to be terminated by the external test equipment.
EQPT In (Equipment In)	A break-in test jack that allows a signal to be inserted toward the terminal equipment (DTE) by external test equipment.
EQPT Out (Equipment Out)	A break-in test jack that interrupts the signal coming from the terminal equipment (DTE) and allows it to be terminated by the external test equipment.
MON In (Monitor In)	A monitor jack that is controlled by the Mon (Monitor) branch of the menu tree. If it is set to EQPT (the default), this jack monitors the signal going into the terminal equipment (DTE). If it is set to NET, this jack monitors the signal going into the network.
MON Out (Monitor Out)	A monitor jack that is controlled by the Mon (Monitor) branch of the menu tree. If it is set to EQPT (the default), this jack monitors the signal coming from the terminal equipment (DTE). If it is set to NET, this jack monitors the signal coming from the network.

Test Commands

The test commands enable you to run loopbacks and test patterns on the DSU/CSU, and to test the front panel LEDs. These tests can help you isolate areas of trouble if you are having problems with your DSU/CSU.

To access all Test commands from the Test branch, press F2 to select Test from the top-level menu screen.



Remote Loopback Tests

The Remote Loopback tests enable you to troubleshoot your circuit by sending the following to a far-end device:

For Networks

- Line loopback up activation sequence for 10 seconds (LLBUP)
- Line loopback down activation sequence for 10 seconds (LLBDN)

For Channels

- V.54 activation sequence to initiate a V.54 Loop 2 (54UP)
- V.54 deactivation sequence to terminate a V.54 Loop (54DN)
- ANSI T1.403 (Annex B) activation sequence to initiate a DCLB on the remote device (FT1UP)
- ANSI T1.403 (Annex B) deactivation sequence to terminate a DCLB on the remote device (FT1DN)

You cannot perform remote loopbacks if any of the local loopbacks are active. If you attempt to do so, the error message **Invld Test Combo** (Invalid Test Combination) appears.

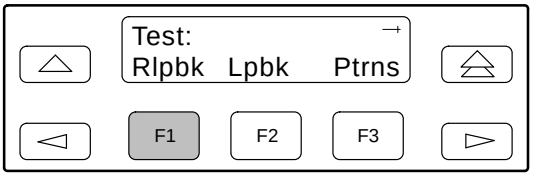
NOTE

The following procedures are examples only. **Screen displays may vary depending on the model and configuration of the DSU/CSU.**

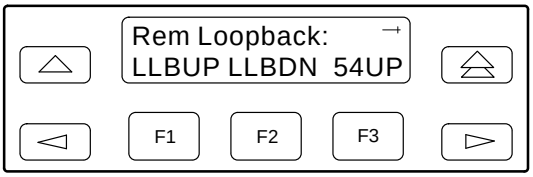
Sending a Line Loopback Up or Down

To send a Line Loopback Up or Down sequence on the network to a far-end DSU/CSU,

1. From the top-level menu screen, select Test.
2. From the Test screen, select Rlpbk.



3. From the Rem Loopback screen, press F1 to select LLBUP (Line Loopback Up), or press F2 to select LLBDN (Line Loopback Down).



The Line Loopback sequence is sent up or downstream to the far-end DSU/CSU for 10 seconds. During this time, **Sending** appears on Line 2 of the LCD, followed by **Command Complete** when 10 seconds have elapsed.

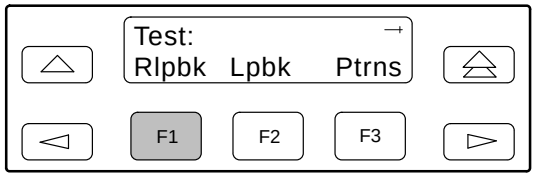
You can press any function key to restore the Rem Loopback screen without affecting transmission of the loopback code.

Sending a V.54/ANSI FT1 Activation/Deactivation

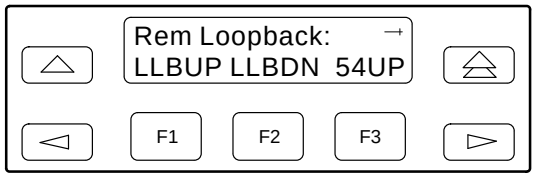
To send a V.54 or ANSI FT1 Activation or Deactivation loopback sequence to the far-end DSU/CSU,

1. From the top-level menu screen, select Test.

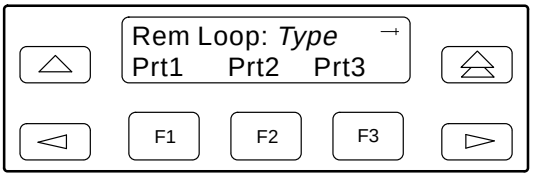
2. From the Test screen, select Rlpbk.



3. From the Rem Loopback screen, press the function key that corresponds to the specific loopback test you want to perform. Use the scroll keys, if necessary.



The Rem Loop screen appears.



The 54UP, 54DN, FT1UP, and FT1DN commands send the requested sequence out the network interface on the DS0 channels allocated to the port you select here.

4. From the Rem Loop screen, press the desired function key to select the specific port. Use the scroll keys, if necessary.

   After you select a port, the sequence is sent to the far-end DSU/CSU. During this time, **Sending** appears on Line 2 of the LCD, followed by **Command Complete** when the sequence is complete.

   During the **Sending** message, you can press the △ and ⏢ keys without affecting transmission of the loopback sequence.

Local Loopback Tests

The Local Loopback tests enable you to conduct circuit testing and fault isolation for the digital line. The supported local loopback tests are:

- Line Loopback (LLB)
- Payload Loopback (PLB)
- DTE Loopback (DLB)
- Repeater Loopback (RLB)
- Data Channel Loopback (DCLB)
- Data Terminal Loopback (DTLB)

> **NOTE**
>
> DLB does not appear when the DTE Drop/Insert (DSX-1) interface is disabled.

The Line Loopback command can be activated and deactivated in response to commands received over the network interface. The Network Interface configuration option NET LLB controls whether the DSU/CSU responds to the commands transmitted on the network interface to initiate LLBs (see Appendix C, *Configuration Options*).

The data port configuration option NET DCLB controls whether the DSU/CSU responds to inband V.54 commands to initiate DCLB for that port (see Appendix C, *Configuration Options*).

Local loopback tests can be aborted (Abort Command) at any time.

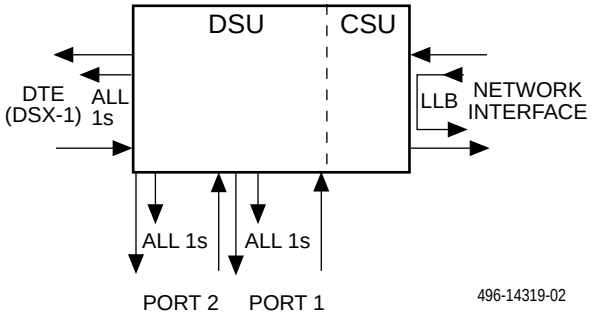
No more than two local loopbacks can be active at any one time. An additional restriction prohibits certain loopbacks from running at the same time. Valid loopback combinations listed in Table 4-8 are identified by YES.

Table 4-8
Valid Loopback Combinations

	LLB	PLB	DLB	RLB	DCLB	DTLB
LLB	N/A	NO	YES	YES	NO	YES
PLB	NO	N/A	YES	NO	NO	YES
DLB	YES	YES	N/A	NO	YES	YES
RLB	YES	NO	NO	N/A	NO	YES
DCLB	NO	NO	YES	NO	YES (on separate ports)	YES (on separate ports)
DTLB	YES	YES	YES	YES	YES (on separate ports)	YES (on separate ports)

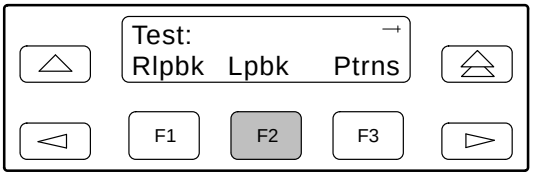
Starting a Line Loopback

The Line Loopback command (LLB) loops the received signal on the network interface back to the network without change.

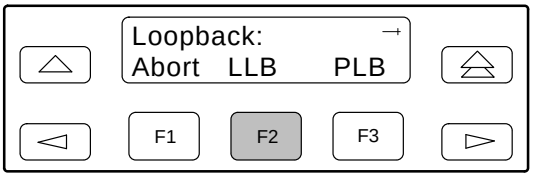


To perform a Line loopback,

1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



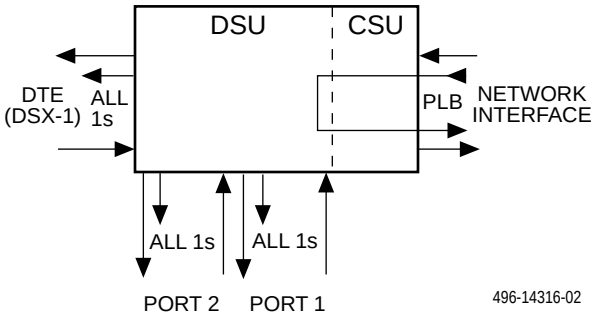
3. From the Loopback screen, select LLB.



Test Started appears on Line 2. If a line loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-8 for valid loopback test combinations).

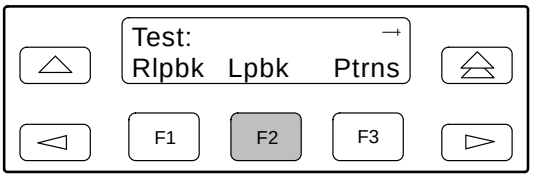
Starting a Payload Loopback

The Payload Loopback command (PLB) loops the received signal on the network interface back to the network. The signal is looped back as close to the DTE Drop/Insert (DSX-1) port as possible (after it has passed through the framing circuitry of the DSU/CSU). Framing CRCs and BPVs are corrected.

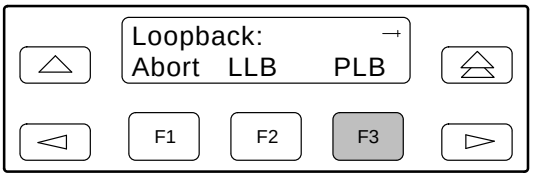


To perform a Payload loopback,

1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



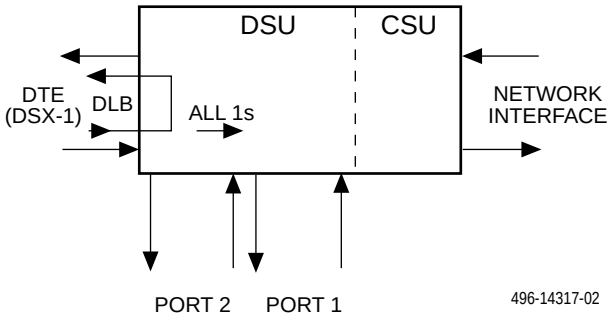
3. From the Loopback screen, select PLB.



Test Started appears on Line 2. If a Payload loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-8 for valid loopback test combinations).

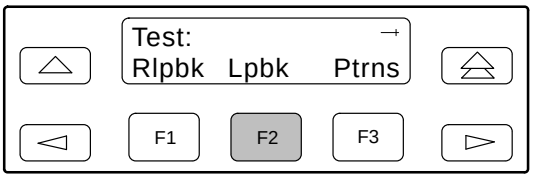
Starting a DTE Loopback

The DTE Loopback command (DLB) loops the received signal on the DTE Drop/Insert (DSX-1) port back to the DTE without change.

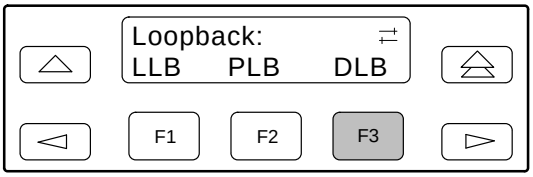


To perform a DTE loopback,

1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



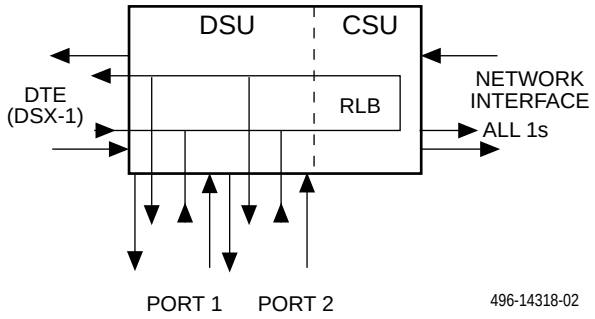
3. From the Loopback screen, press the ▻ key until the DLB selection appears on the screen.
4. Select DLB.



Test Started appears on Line 2. If a DTE loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-8 for valid loopback test combinations).

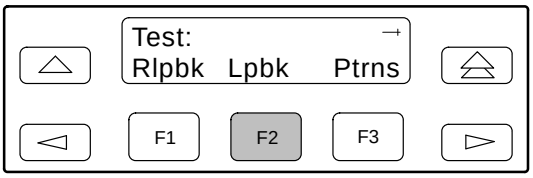
Starting a Repeater Loopback

The Repeater Loopback command (RLB) loops the signal being sent to the network back to the DTE Drop/Insert (DSX-1) and data ports. The signal is looped back as close to the network interface as possible (after it has passed through the framing circuitry of the DSU/CSU). Framing CRCs and BPVs are corrected.

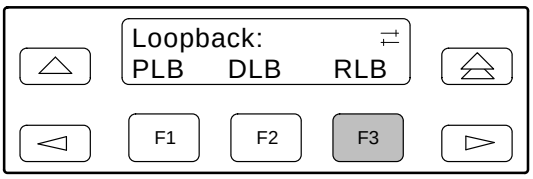


To perform a Repeater loopback,

1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



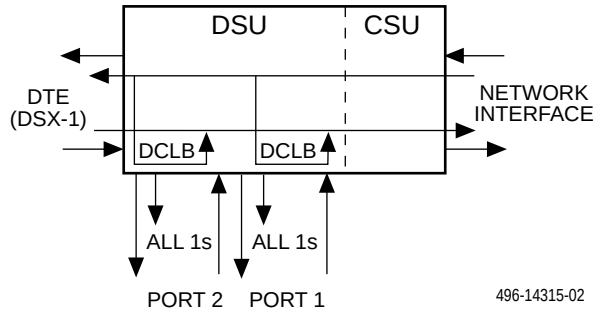
3. From the Loopback screen, press the ▻ key until the RLB selection appears on the screen.
4. Select RLB.



Test Started appears on Line 2. If a Repeater loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-8 for valid loopback test combinations).

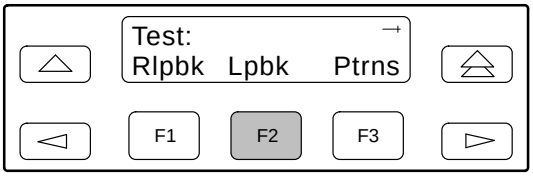
Starting a Data Channel Loopback

The Data Channel Loopback command (DCLB) loops the data received from the network interface, for all DS0 channels allocated to the selected port, back to the network. The loopback occurs after the data passes through the port circuitry but before it is sent out the data port.

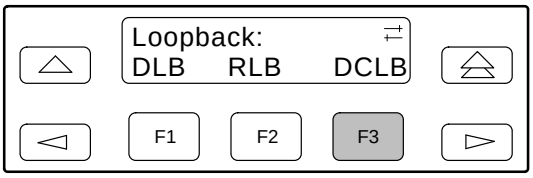


To perform a Data Channel loopback,

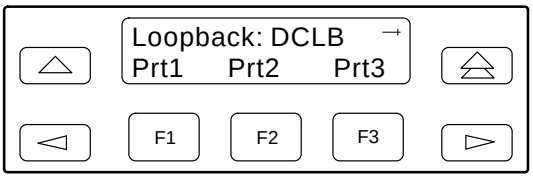
1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



3. From the Loopback screen, press the ▷ key until the DCLB selection appears on the screen.
4. Select DCLB.



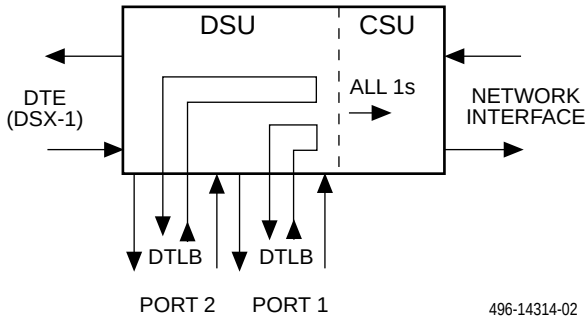
5. From the DCLB screen, press the Function key for the port for which you want to perform the data channel loopback. Use the scroll keys, if necessary.



Test Started appears on Line 2. If a Data Channel loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-8 for valid loopback test combinations).

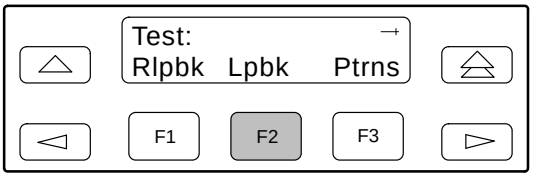
Starting a Data Terminal Loopback

The Data Terminal Loopback command (DTLB) loops the data received from the selected port, for all DS0 channels allocated to the port, back out of the port. This loopback occurs after the data passes through the port circuitry but before it reaches the T1 framer.



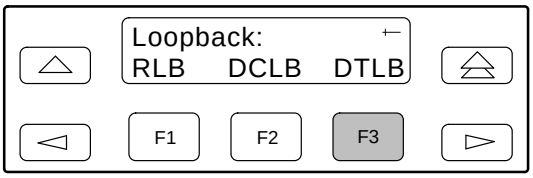
To perform a Data Terminal loopback,

1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.

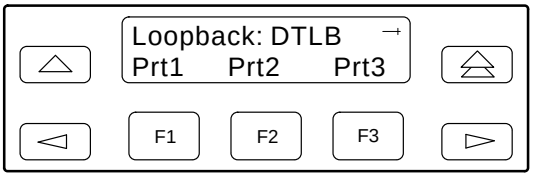


3. From the Loopback screen, press the ▷ key until the DTLB selection appears on the screen.

4. Select DTLB.



5. From the DTLB screen, press the Function key for the port for which you want to perform the data terminal loopback. Use the scroll keys, if necessary.



Test Started appears on Line 2. If a Data Terminal loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-8 for valid loopback test combinations).

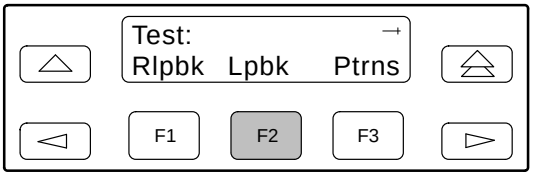
Aborting Loopbacks

The Abort Loopback command stops all loopback tests or any selected loopback test currently active on the DSU/CSU.

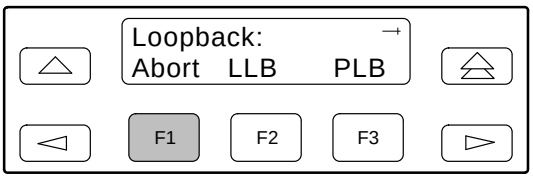
To abort one or more loopback tests,

1. From the top-level menu screen, select Test.

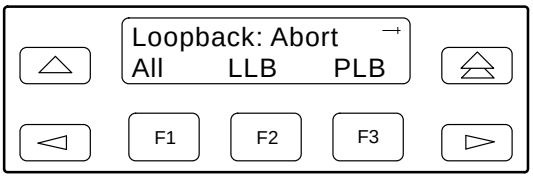
2. From the Test screen, select Lpbk.



3. From the Loopback screen, select Abort.

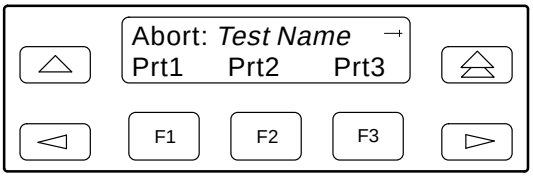


4. From the Loopback Abort screen, press the desired Function key to abort All or one specific loopback test. Use the scroll keys, if necessary.



If you select ALL, LLB, PLB, DLB, or RLB, skip Step 5.

5. From the Abort screen, press the Function key that corresponds to the port for which you want to abort the test. Use the scroll keys, if necessary.



When abort is complete, the message **Command Complete** appears on the Abort screen.

NOTE

If you mistakenly choose to abort a loopback test that is not currently running, a **Command Complete** message will still display and the loopback that is currently active will still be running. Use the TStat branch to view the test status to determine if the abort was successful.

Test Patterns

Use the Test Pattern commands to send, monitor, and abort test patterns. Available test patterns are:

- **QRSS** – A quasi-random signal source approximating live data that can be monitored for logic errors (on the network and the data ports).
- **1-in-8** – A test pattern consisting of a one (1) followed by seven zeros (on the network only).
- **511** – A pseudo-random bit sequence (PRBS) that is 511 bits long (on the data ports only). This is a PRBS 2^9–1 test.

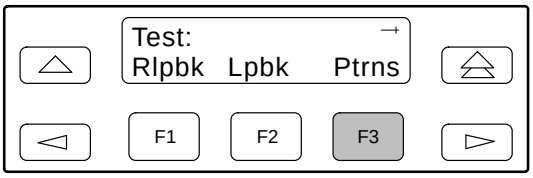
Sending Test Patterns

Use the Send command to start transmission of a test pattern.

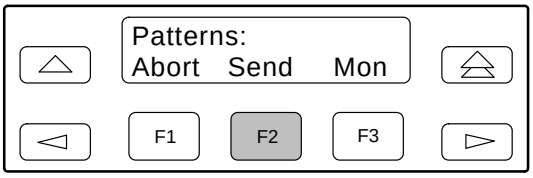
Only one test pattern can be active at a time on one port. Table 4-9 lists the valid send test pattern combinations. Valid combinations are identified by YES.

To send a test pattern,

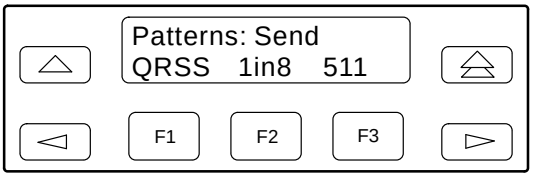
1. From the top-level menu screen, select Test.
2. From the Test screen, select Ptrns.



3. From the Patterns screen, select Send.

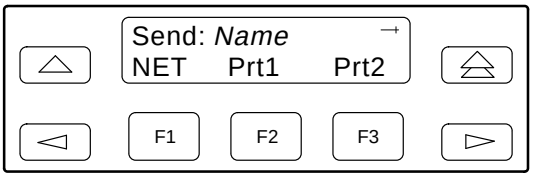


4. From the Patterns Send screen, press F1 to send a QRSS pattern, F2 to send a 1-in-8 pattern, F3 to send a 511 pattern.

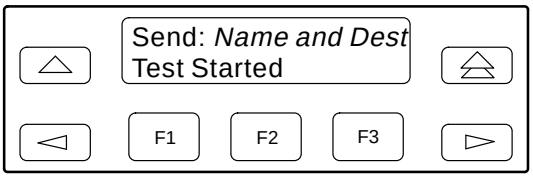


If you send a 1-in-8 pattern, skip Step 5.

5. From the Send screen, press the Function key that corresponds to network or the port for which you want to send a test pattern. Use the scroll keys, if necessary. (NET does not appear for the 511 pattern.)



The Test Started screen appears.



If the DSU/CSU is already sending the test pattern you selected, the message **Already active** appears. If you selected an incompatible test pattern combination, the message **Invld Test Combo** appears. See Table 4-9 for valid combinations.

Table 4-9
Valid Send Test Pattern Combinations

	QRSS (Network)	QRSS (Port)	1-in-8 (Network)	511 (Port)
QRSS (Network)	N/A	NO	NO	NO
QRSS (Port)	NO	YES (on separate ports)	N/A	YES (on separate ports)
1 in 8 (Network)	NO	NO	N/A	NO
511 (Port)	NO	N/A	N/A	YES (on separate ports)

Monitoring Test Patterns

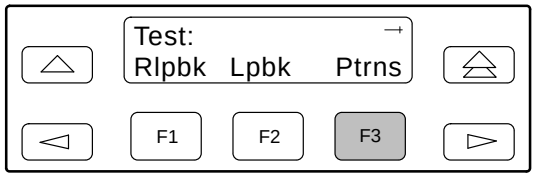
Use the Monitor command to monitor a QRSS test pattern over all the channels on the network interface, or to monitor QRSS or 511 test patterns on the channels allocated to an individual port.

This command provides the number of errors detected in the test pattern (5 digits, maximum 99999).

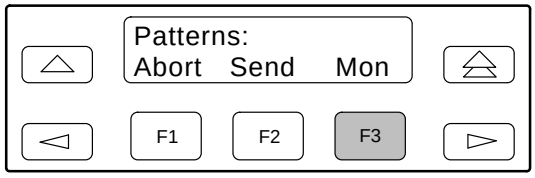
To monitor a QRSS or 511 test pattern,

1. From the top-level menu screen, select Test.

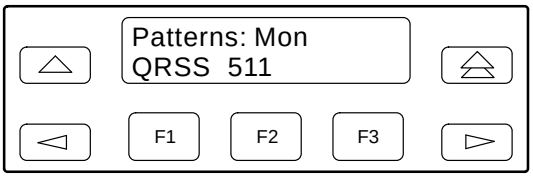
2. From the Test screen, select Ptrns.



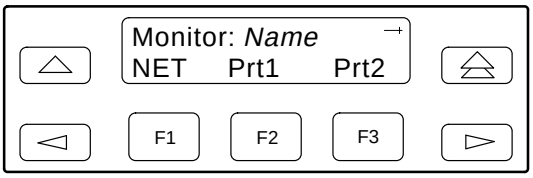
3. From the Patterns screen, select Mon.



4. From the Patterns Mon screen, press F1 for QRSS or F2 for 511.



5. From the Monitor screen, press the Function key that corresponds to network or the port for which you want to send a test pattern. Use the scroll keys, if necessary. (NET does not appear for the 511 pattern.)



The Monitor screen appears with the error count. If the maximum of 99999 is exceeded, **OvrFlw** appears instead of the count. If the receiver loses synchronization while the monitor is active, **No Sync** appears.

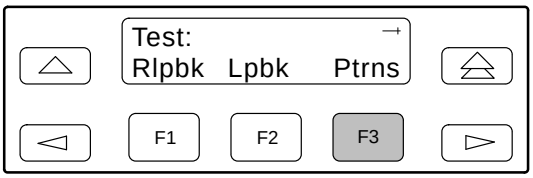
Aborting Test Patterns

Use the Abort command to stop all test patterns or any selected test pattern active on the DSU/CSU.

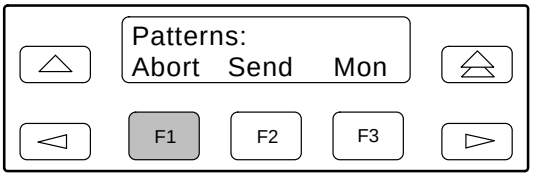
To abort test patterns,

1. From the top-level menu screen, select Test.

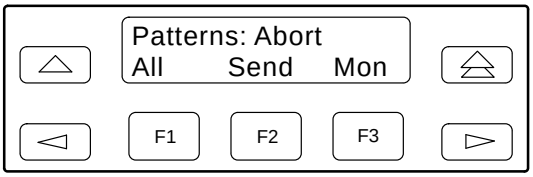
2. From the Test screen, select Ptrns.



3. From the Patterns screen, select Abort.



4. From the Patterns Abort screen, press the desired Function key to abort either All active test patterns, active Send test patterns, or the active Monitor (Mon) test pattern.

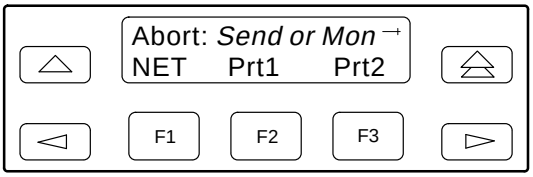


If you select All, the DSU/CSU terminates all active test patterns and displays the message **Command Complete**. Skip Step 5.

NOTE

If you mistakenly choose to abort a test pattern that is not currently running, a **Command Complete** message still displays and the test pattern currently active still runs. Use the TStat branch to view the test status to determine if the abort was successful.

5. From the Abort screen, press the Function key that corresponds to the network or port for which you want to abort a test pattern. Use the scroll keys, if necessary.



The DSU/CSU terminates the selected test pattern and displays the message **Command Complete**.

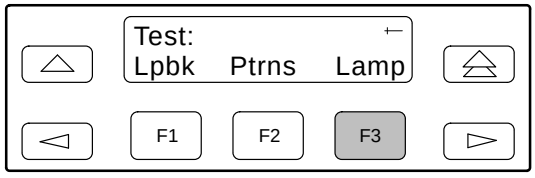
Lamp Test

Use the Lamp Test commands to start and stop a test of the DSU/CSU front panel LCD and LEDs.

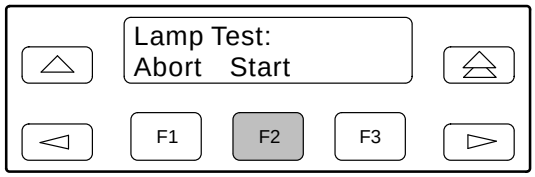
Starting a Lamp Test

To start a Lamp test,

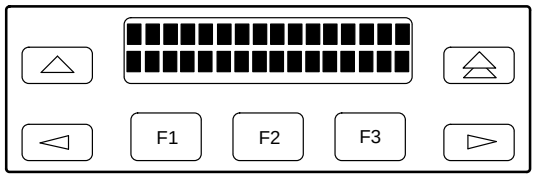
1. From the top-level menu screen, select Test.
2. From the Test screen, press the ▻ key until the Lamp selection appears on the screen.
3. From the Test screen, select Lamp.

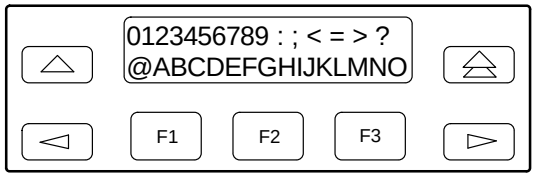


4. From the Lamp Test screen, select Start.



5. The following screens alternately appear on the LCD until you press a Function key to return to the Lamp Test screen. In addition, all LEDs blink.



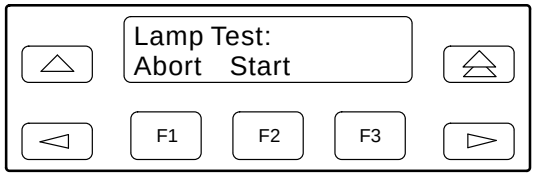


6. When you are satisfied that all LEDs are lighting and the LCD is functioning properly, abort the Lamp test from the Lamp Test screen. If there is no activity on the DSU/CSU front panel for five minutes, the Device Health and Status screen appears automatically. However, the Lamp test remains active until it is aborted.

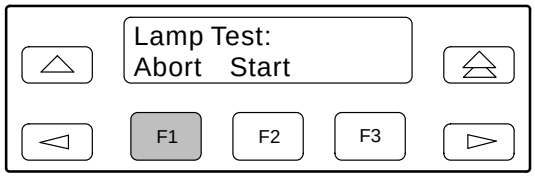
Aborting a Lamp Test

To abort the Lamp test,

1. Display the Lamp Test screen. To do this when the LCD is alternating the Lamp test screens, press any Function key. Otherwise, follow Steps 1 through 3 for starting a Lamp test.



2. From the Lamp Test screen, select Abort.

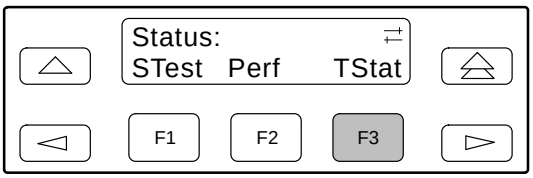


Displaying DSU/CSU Test Status

Use the Test Status command to display the active tests for the DSU/CSU. Status messages that can display on the front panel LCD are listed in Table 4-10.

To display test status,

1. From the top-level menu screen, select Stat.
2. From the Status screen, press the ▷ key until the TStat selection appears on the screen.
3. Select TStat.

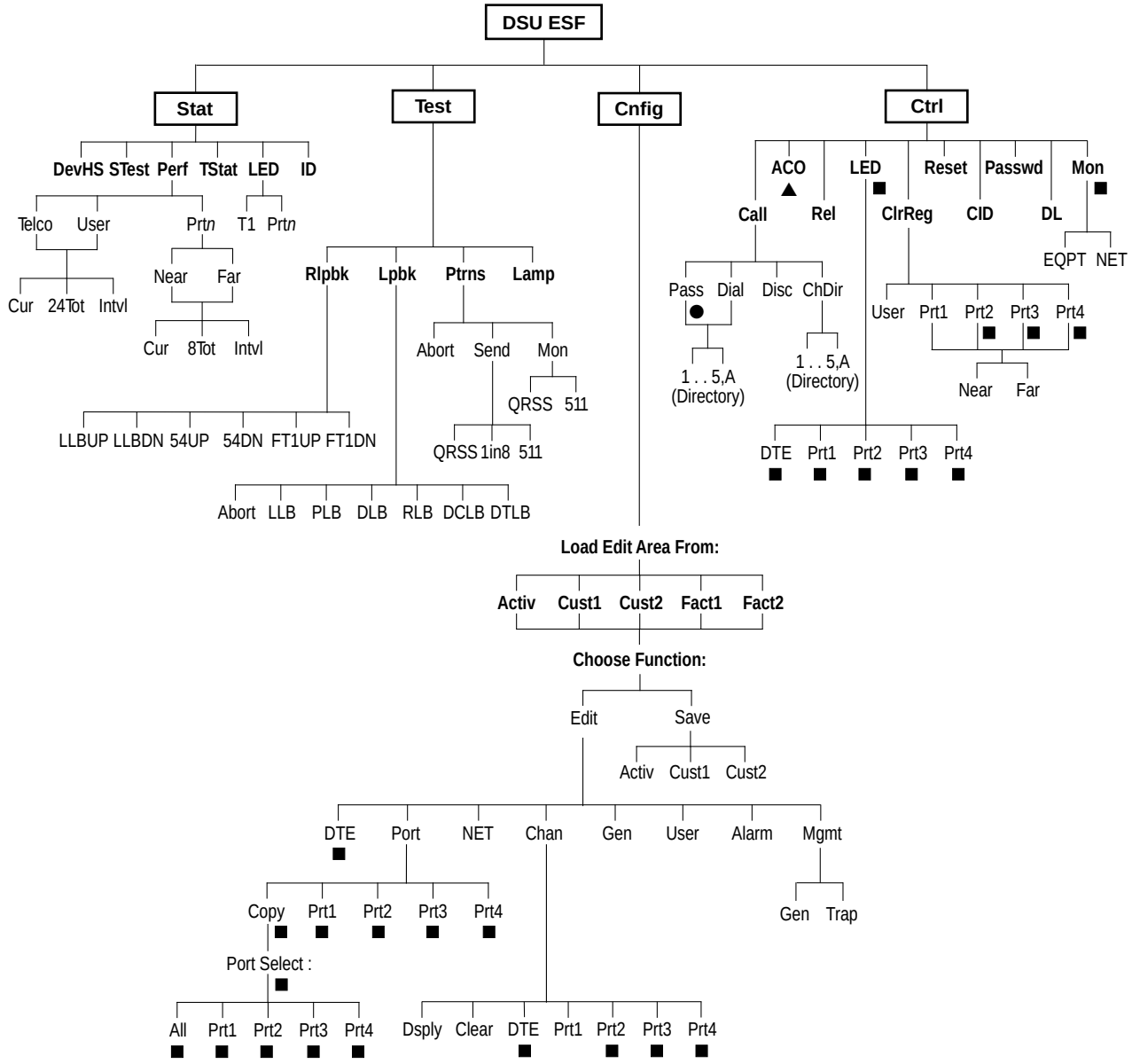


The Test Status screen appears showing you what tests are active for the DSU/CSU.

Table 4-10
Test Status Messages

Message	Description
No Test Active	No tests are currently active.
LLB Test Active	The network interface is in Line loopback.
PLB Test Active	The network interface is in Payload loopback.
DLB Test Active	The DTE Drop/Insert (DSX-1) port is in DTE loopback.
RLB Test Active	The DTE Drop/Insert (DSX-1) port is in Repeater loopback.
DCLB on Port *n*	Port *n* is in a Data Channel loopback.
DTLB on Port *n*	Port *n* is in a Data Terminal loopback.
QRSS on Net	A QRSS test pattern is being sent on the network interface.
1–8 Test Active	A 1-in-8 test pattern is being sent on the network interface.
QRSS on Port *n*	A QRSS test pattern is being sent to the network on the channels allocated to port *n*.
511 on Port *n*	A 511 test pattern is being sent to the network on the channels allocated to port *n*.
Mon QRSS, Net	A QRSS test pattern is being monitored on the network interface.
Mon QRSS, Port *n*	A QRSS test pattern is being monitored on the channels allocated to port *n*.
Mon 511, Port *n*	A 511 test pattern is being monitored on the channels allocated to port *n*.
DLB Test, Extrn	The DTE Drop/Insert (DSX-1) port is being held in DTE loopback by the external contact.
Lamp Test Active	The Lamp test is currently active.

Front Panel Menu A



▲ For Carrier-Mounted DSU/CSUs only
● For Standalone DSU/CSUs only
■ For 2-port and 4-port DSU/CSUs only

496-14945

Technical Specifications B

Overview B-1

Overview

The technical specifications for the standalone DSU/CSUs are listed in Table B-1. The technical specifications for the carrier-mounted DSU/CSUs are listed in Appendix B of the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide*.

Table B-1
(1 of 2)
Models 3160/3164/3165 DSU/CSUs Technical Specifications

Specifications	Criteria
POWER REQUIREMENTS Typical: AC Power Module Optional: +24 Vdc –48 Vdc –48 Vdc Redundant	 Refer to the labeling on the ac power module for input requirements +20 Vdc to +32 Vdc, 0.50A –38 Vdc to –60 Vdc, 0.25A –38 Vdc to –60 Vdc, 0.25A
POWER CONSUMPTION AND DISSIPATION	16.0 watts, 55.0 Btu per hour at 115 volts (ac power); 12.0 watts, 41 Btu per hour at +24 and –48 Vdc (dc power)
DTE DROP/INSERT (DSX-1) INTERFACE (Models 3160/3164) Physical Interface Framing Format Coding Format DTE Line Equalization Send AIS	 DB15 socket D4, ESF AMI, B8ZS 5 selectable ranges from 0 to 655 feet (0 to 196.5 meters) Selectable

Table B-1
(2 of 2)
Models 3160/3164/3165 DSU/CSUs Technical Specifications

Specifications	Criteria
NETWORK T1 INTERFACE	
Physical Interface (USA)	RJ48C
Physical Interface (Canada)	CA81A using adapter cable
Framing Format	D4, ESF
Coding Format	AMI, B8ZS
Line Build-Out (LBO)	0.0 dB, –7.5 dB, –15 dB, –22.5 dB
ANSI PRM	Selectable
Bit Stuffing	FCC Part 68, AT&T TR 62411
Yellow Alarm Generation	Selectable
LOOPBACKS	
Standard	AT&T TR 54016, AT&T TR 62411, ANSI T1.403.1989
Additional	RLB (Repeater Loopback), DLB (DTE Loopback), V.54 Loop 2 and Loop 3, ANSI T1.403 Annex B Fractional T1 Loopback
PORT INTERFACE	
Standards	EIA 530A, V.35, RS-449, X.21
Rates	Nx64 – 64K-1.536 Mb Nx56 – 56K-1.344 Mb
APPROVALS	Refer to the product labeling
CLOCKING SOURCES	T1 network interface, Port 1, internal clock, or (for Models 3160/3164 DSU/CSUs) DTE Drop/Insert (DSX-1) interface or external clock
MODEM INTERFACE	
Physical Interface	RJ11C (USA), CA11A (Canada)
Rate	2400 bps
Integral Dial Modem	V.22
PHYSICAL DIMENSIONS	
Height	Models 3160/3164 DSU/CSUs = 3.90 inches (10.0 cm) Model 3165 DSU/CSU = 2.13 inches (5.4 cm)
Width	7.63 inches (19.4 cm)
Depth	12.13 inches (30.8 cm)
WEIGHT	Models 3160/3164 DSU/CSUs = 3.6 pounds (1.7 kg) Model 3165 DSU/CSU = 2.4 pounds (1.1 kg)
ENVIRONMENT	
Operating Temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	–4°F to 158°F (–20°C to 70°C)
Relative Humidity Shock and Vibration	5%—95% (noncondensing) Withstands normal shipping and handling

Configuration Options C

Overview C-1
DTE Interface Configuration Options C-2
Port Configuration Options C-4
Network Interface Configuration Options C-9
Channel Configuration Options C-11
General Configuration Options C-15
User Interface Configuration Options C-17
Alarm Configuration Options C-25
Management Configuration Options C-28
Configuration Worksheets C-37

Overview

The DSU/CSU configuration option tables contain a list of all configuration options and their available selections. The configuration options are arranged into functional groups:

- **DTE Interface Configuration Options**

  The DTE Interface configuration options configure the DTE Drop/Insert (DSX-1) interface on the DSU/CSU (Table C-1).

- **Port Configuration Options**

  The Port configuration options configure the synchronous data ports on the DSU/CSU (Table C-2).

- **Network Interface Configuration Options**

  The Network Interface configuration options configure the network interface on the DSU/CSU (Table C-3).

- **Channel Configuration Options**

  The Channel configuration options configure the DTE Drop/Insert (DSX-1) and synchronous data port channel allocations on the DSU/CSU (Tables C-4 and C-5).

- **General Configuration Options**

  The General configuration options configure alarms and clocks on the DSU/CSU (Table C-6).

- **User Interface Configuration Options**

  The User Interface configuration options configure and control the DSU/CSU user interfaces (Table C-7).

- **Alarm Configuration Options**

  The Alarm configuration options specify how alarm conditions are handled by the DSU/CSU (Table C-8).

- **Management Configuration Options**

  The Management configuration options configure the DSU/CSU for SNMP or Telnet access (Tables C-9 and C-10).

The configuration tables include a description of each configuration function and its available selections. In the tables, **the top line of each configuration option entry indicates the factory default setting**.

DTE Interface Configuration Options

NOTE

These configuration options are only available for 2-port and 4-port DSU/CSUs.

Table C-1
(1 of 2)
DTE Interface Configuration Options

DTE Port: Enab **Next Enab Disab Prev**
DTE Drop/Insert (DSX-1) Port. Enables the use of the DTE Drop/Insert (DSX-1) port. **Enab** – Allows the use of the DTE Drop/Insert (DSX-1) interface. **Disab** – Prohibits the use of the DTE Drop/Insert (DSX-1) interface. **NOTE:** When this configuration option is disabled, you cannot display or configure any other DTE Interface configuration options. If the clock source configuration option is set to DTE, it is changed to NET.
DTE Framing: ESF (Factory 1) D4 (Factory 2) **Next D4 ESF Prev**
DTE Line Framing Format. Designates the framing format for the DTE Drop/Insert (DSX-1) interface. **D4** – Configures for the D4 framing format. **ESF** – Configures for the Extended Superframe framing format.
DTE Coding: B8ZS (Factory 1) AMI (Factory 2) **Next AMI B8ZS Prev**
DTE Line Coding Format. Designates the line coding format to be used on the DTE Drop/Insert (DSX-1) interface. **AMI** – Uses the Alternate Mark Inversion coding format. **B8ZS** – Uses the Bipolar 8 Zero Suppression coding format.
Equal: 0—133 **Next 0—133 133—266 266—399 399—533 533—655 Prev**
DTE Line Equalization. Specifies the DTE line equalization compensation parameters that permit a standard DTE Drop/Insert (DSX-1) signal to be delivered over a distance of up to 655 feet.

Table C-1
(2 of 2)
DTE Interface Configuration Options

Extrn DLB: Disab **Next Enab Disab Prev**
DTE Loopback on External Contact. Allows the control of a DTE Loopback (DLB) by an external contact on the DTE Drop/Insert (DSX-1) interface. **Enab** – Allows the DSU/CSU to begin a DLB when the external contact is closed. The DSU/CSU remains in DLB as long as the contact remains closed. **Disab** – Prevents the state of the external contact from affecting the operation of DLB.
Send Ones: Enab **Next Enab Disab Prev**
Send All Ones on DTE Failure. Specifies the action to take on the signal transmitted to the network when a valid signal cannot be recovered from the DTE Drop/Insert (DSX-1) interface (due to an LOS, OOF, or AIS condition). **Enab** – Sends all ones on the DS0 channels allocated to the network interface when an LOS, AIS, or OOF condition occurs on the DTE Drop/Insert (DSX-1) interface. **Disab** – Passes the data unchanged to the network interface channels.

Port Configuration Options

Table C-2
(1 of 5)
Port Configuration Options

Port Type: E530 (Factory 1) V.35 (Factory 2) **Next E530 V.35 RS449 X.21 Prev**
Data Port Type. Allows selection of the data port interface type. **E530** – Configures the port as an EIA 530A compatible interface. EIA 530A DTEs can be directly connected to a port connector on the back of the DSU/CSU. **V.35** – Configures the port as a V.35 compatible interface. V.35 DTEs can be connected to a port connector using an EIA 530A-to-V.35 adapter cable. **RS449** – Configures the port as an RS449 compatible interface. RS449 DTEs can be connected to a port connector using an EIA 530A-to-RS449 adapter cable. **X.21** – Configures the port as an X.21 compatible interface. X.21 DTEs can be connected to a port connector using an EIA 530A-to-X.21 adapter cable. **NOTE:** If this configuration option is set to X.21, set the All Ones configuration option to RTS or Disab.
Base Rate: Nx64 **Next Nx64 Nx56 Prev**
Data Port Base Rate. Allows selection of the base rate for the data port. The data rate for the port is a multiple (from 1 to 24) of the base rate specified with this configuration option. **Nx64** – Sets the base rate for this port to 64 kbps. The data rate is *N*x64 kbps, where *N* is a number from 1 to 24. **Nx56** – Sets the base rate for this port to 56 kbps. The data rate is *N*x56 kbps, where *N* is a number from 1 to 24.
Net DCLB: Disab (Factory 1) Both (Factory 2) **Next Disab V.54 FT1 Both Prev**
Network Initiated DCLB. Allows the initiation and termination of a Data Channel Loopback (V.54 loop 2) by the receipt of a V.54 DCLB-actuate sequence or DCLB-release sequence from the network or far-end device. The sequences may be either V.54 or FT1 (ANSI) compliant sequences. **Disab** – Ignores the DCLB-actuate and DCLB-release sequences for this port. **V.54** – Enables DCLB-actuate and DCLB-release sequences that comply with the V.54 standard for “Inter-DCE signaling for point to point circuits.” **FT1** – Enables DCLB-actuate and DCLB-release sequences that comply with the ANSI T1.403, Annex B standard for “In-band signaling for fractional-T1 (FT1) channel loopbacks.” **Both** – Enables DCLB-actuate and DCLB-release sequences that comply with either the ANSI or V.54 standard. The type of actuate and release sequences do not have to match.

Table C-2
(2 of 5)
Port Configuration Options

Port LB: Disab (Factory 1) Both (Factory 2) **Next Disab DTLB DCLB Both Prev**
Port (DTE) Initiated Loopbacks. Allows the initiation and termination of a local Data Terminal Loopback (DTLB) or remote Data Channel Loopback (DCLB) by the DTE connected to this port. (DTLB is equivalent to a V.54 loop 3, and DCLB is equivalent to a V.54 loop 2.) Control of these loopbacks is through the DTE interchange circuits as specified by the V.54 standard. **Disab** – Disables control of local DTLBs and remote DCLBs by the DTE connected to this port. **DTLB** – Gives control of the local DTLBs for this port to the DTE attached to this port. This loopback is controlled by the Local Loopback interchange circuit LL (CCITT 141). **DCLB** – Gives control of the remote DCLBs for the far-end port connected to this port to the DTE attached to this port. This loopback is controlled by the Remote Loopback interchange circuit RL (CCITT 140). The far-end equipment must support in-band V.54 loopbacks. **Both** – Gives control of local DTLBs and remote DCLBs to the DTE connected to this port.
All Ones: Both **Next Disab DTR RTS Both Prev**
Send All Ones on Data Port Not Ready. Specifies the conditions on the data port that determine when valid data is not being sent from the DTE. When this condition is detected, all ones are sent to the network on the DS0 channels allocated to the port. **Disab** – Disables the monitoring of interchange circuits from the DTE connected to this port. **DTR** – Monitors the DTE Ready interchange circuit CD (CCITT 108/1/2). When DTR is interrupted, all ones are sent to the network. **RTS** – Monitors the Request-to-Send interchange circuit CA (CCITT 105). When RTS is interrupted, all ones are sent to the network. **Both** – Monitors both DTR and RTS. If either is interrupted, all ones are sent to the network. **NOTE:** If the Port Type configuration option is set to X.21, set this configuration option to RTS or Disab.
Rcv Yellow: Halt **Next None Halt Prev**
Action on Network Yellow Alarm. Specifies the action taken on this port when a Yellow Alarm is received on the network interface. **None** – Makes the data port unaffected by Yellow Alarms received on the network interface. **Halt** – Stops the transmission of data on the port and disables the data port when Yellow Alarms are received on the network interface. When Yellow Alarms are received, all ones are sent on the Received Data interchange circuit BB (CCITT 104). The Clear-to-Send interchange circuit CB (CCITT 106) is interrupted.
Tx Clock: Int **Next Int Ext Prev**
Data Port Transmit Clock. Specifies whether the transmitted data for the port is clocked using an internal clock provided by the DSU/CSU (synchronized to the clock source specified by the clock source configuration option in the General configuration option group) or an external clock provided by the DTE connected to the port. When an external clock is used, it must be synchronized to the same clock source as the DSU/CSU. **Int** – Indicates the clock is provided internally by the DSU/CSU on the TXC interchange circuit DB (CCITT 114). **Ext** – Indicates the clock is provided externally by the DTE on the XTXC interchange circuit DA (CCITT 113). Use this selection when the clock source is set to this data port.

Table C-2
(3 of 5)
Port Configuration Options

InvertTxC: Disab **Next Enab Disab Prev**
Invert Transmit Clock. Specifies whether the clock supplied by the DSU/CSU on the TXC interchange circuit DB (CCITT 114) is phase inverted with respect to the Transmitted Data interchange circuit BA (CCITT 103). This configuration option is useful when long cable lengths between the DSU/CSU and the DTE are causing data errors. **Enab** – Indicates TXC supplied by the DSU/CSU on this port is phase inverted. **Disab** – Indicates TXC supplied by the DSU/CSU on this port is not phase inverted.
InvrtData: Disab **Next Enab Disab Prev**
Invert Transmitted and Received Data. Specifies whether the port's transmitted data and received data are logically inverted before being transmitted or received. This configuration option is useful for applications where HDLC data is being transported. Inverting the data ensures that the density requirements for the network interface are met. **Enab** – Indicates the transmitted data and received data for this port are inverted. **Disab** – Indicates the transmitted data and received data for this port are not inverted.
EDL: Disab **Next Enab Disab Prev**
Embedded Data Link. Specifies whether Embedded Data Link (EDL) is enabled for a particular port. If EDL is enabled, then 8 kbps of the total bandwidth allocated for this port is not available to the synchronous data port. For example, if the port rate is 256 kbps (4 DS0 channels allocated) and EDL is enabled, then only 248 kbps is available to the port. EDL provides the following: detection of frame synchronization, CRC of the data stream (excluding the 8 kbps EDL), and an in-band data link (4 kbps) between the local and remote units. The 4 kbps in-band data link can be used for performance report messages and as an IP link for SNMP or Telnet sessions. **Enab** – Indicates the port's EDL is enabled. **Disab** – Indicates the port's EDL is disabled. **NOTE:** This configuration option is only available on 2-port and 4-port DSU/CSUs. **NOTE:** If the local DSU/CSU's EDL is enabled, then the remote DSU/CSU's EDL must also be enabled. **NOTE:** EDL is not recommended for networks in which data is examined for routing purposes (e.g., frame relay, x.25).

Table C-2
(4 of 5)
Port Configuration Options

Err Rate: 10E-4 **Next 10E-4 10E-5 10E-6 10E-7 10E-8 10E-9 Prev**
Port Excessive Error Rate Threshold. Sets the error rate threshold that determines when an Excessive Error Rate (EER) condition is declared for a particular port. The error rate selected by this configuration option is determined by the ratio of the number of CRC5 errors to the total number of bits received over a set period of time. **10E-4** – 10E-4 Threshold. For example, at 1536 kbps, EER is declared if more than 1,535 CRC5 errors are detected in a 10-second period. It is cleared with less than 1,536 errors in ten seconds. **10E-5** – 10E-5 Threshold. For example, at 1536 kbps, EER is declared if more than 921 CRC5 errors are detected in a 60-second period. It is cleared with less than 922 errors in sixty seconds. **10E-6** – 10E-6 Threshold. For example, at 1536 kbps, EER is declared if more than 92 CRC5 errors are detected in a 60-second period. It is cleared with less than 93 errors in sixty seconds. **10E-7** – 10E-7 Threshold. For example, at 1536 kbps, EER is declared if more than 9 CRC5 errors are detected in a 60-second period. It is cleared with less than 10 errors in sixty seconds. **10E-8** – 10E-8 Threshold. For example, at 1536 kbps, EER is declared if more than 41 CRC5 errors are detected in three 15-minute intervals. It is cleared with less than 42 errors in three 15-minute intervals. **10E-9** – 10E-9 Threshold. For example, at 1536 kbps, EER is declared if more than 4 CRC5 errors are detected in three 15-minute intervals. It is cleared with less than 5 errors in three 15-minute intervals. **NOTE:** This configuration option is only available on 2-port and 4-port DSU/CSUs. **NOTE:** This configuration option is not available if EDL is disabled.
Near-end: Disab **Next Disab Maint Send Both Prev**
Near-End Performance Statistics. Specifies whether the DSU/CSU maintains near-end performance statistics and sends performance report messages (PRMs) for a particular port. **Disab** – Disables near-end performance statistics and does not send PRMs. **Maint** – Maintains near-end performance statistics for this port. **Send** – Sends PRMs over the port's EDL every second. Each PRM contains the performance statistics for the previous 4 seconds. **Both** – Maintains near-end performance statistics and sends PRMs over the port's EDL. **NOTE:** This configuration option is only available on 2-port and 4-port DSU/CSUs. **NOTE:** This configuration option is not available if EDL is disabled. **NOTE:** If the local DSU/CSU is configured to send near-end performance statistics, then the remote device must be configured to maintain far-end performance statistics.

Table C-2
(5 of 5)
Port Configuration Options

Far-end: Disab **Next Disab Maint Prev**
Far-End Performance Statistics. Specifies whether to monitor for far-end performance report messages (PRMs) and maintain far-end performance registers for a particular port. **Disab** – Disables far-end performance statistics. **Maint** – Monitors the port's EDL for PRMs and maintains far-end performance statistics. **NOTE:** This configuration option is only available on 2-port and 4-port DSU/CSUs. **NOTE:** This configuration option is not available if EDL is disabled. **NOTE:** If the local DSU/CSU is configured to maintain far-end performance statistics, then the remote device must be configured to send near-end performance statistics.
Mgmt Link: Disab **Next Enab Disab Prev**
EDL Management Link. Specifies whether the EDL management link is enabled for a particular port. Selecting Enab allows SNMP or Telnet traffic to flow over the 4 kbps in-band data link provided by EDL. **Enab** – Enables the port's EDL management link. **Disab** – Disables the port's EDL management link. **NOTE:** This configuration option is only available on 2-port and 4-port DSU/CSUs. **NOTE:** This configuration option is not available if EDL is disabled or the FDL is enabled. **NOTE:** If the local DSU/CSU's EDL is enabled, then the remote device's EDL must also be enabled.

Network Interface Configuration Options

Table C-3
(1 of 2)
Network Interface Configuration Options

NET Framing: ESF (Factory 1) D4 (Factory 2) **Next D4 ESF Prev**
Network Line Framing Format. The framing format to be used on the network interface. **D4** – Configures for the D4 framing format. **ESF** – Configures for the Extended Superframe format.
NET Coding: B8ZS (Factory 1) AMI (Factory 2) **Next AMI B8ZS Prev**
Network Line Coding Format. The line coding format to be used on the network interface. **AMI** – Configures for the Alternate Mark Inversion coding format. **B8ZS** – Configures for the Bipolar 8 Zero Suppression coding format.
LBO: 0.0 **Next 0.0 –7.5 –15 –22.5 Prev**
Line Build Out. The line build out (LBO) for the signal transmitted to the network (0.0 dB is the factory default).
ANSI PRM: Disab **Next Enab Disab Prev**
Generate ANSI Performance Report Messages. Specifies whether ANSI T1.403 compliant performance report messages (PRMs) are generated. **Enab** – Generates and sends ANSI PRMs over the FDL every second. **Disab** – Prevents the DSU/CSU from generating ANSI PRMs. **NOTE:** This configuration option is only available if the framing format is set to ESF.
Mgmt Link: Disab **Next Enab Disab Prev**
FDL Management Link. Specifies whether Facility Data Link (FDL) is enabled. Selecting Enab allows SNMP or Telnet traffic to flow over the 4 kbps data link provided by FDL. Running SNMP or Telnet over FDL requires an end-to-end FDL connection and cannot be terminated within the network. **Enab** – Enables the FDL management link for SNMP or Telnet. **Disab** – Disables the FDL management link. **NOTE:** This configuration option is only available if the framing format is set to ESF. **NOTE:** This configuration option is not available if EDL is enabled. **NOTE:** If the local DSU/CSU's FDL is enabled, the remote DSU/CSU's FDL must also be enabled.

Table C-3
(2 of 2)
Network Interface Configuration Options

NET LLB: Enab
Next Enab Disab Prev

Network Initiated Line Loopback (LLB). Allows initiation and termination of the LLB to be controlled by the receipt of LLB-Actuate and LLB-Release commands from the network (or remote DSU/CSU).

Enab – Causes the DSU/CSU to enter an LLB (if the DSU/CSU can perform an LLB in its current state) and to cause an LLB-Release command to terminate the LLB.

Disab – Causes the DSU/CSU to ignore LLB-Actuate and LLB-Release commands (the DSU/CSU is not in compliance with ANSI T1.403 and AT&T TR 62411).

NOTE: When this configuration option is enabled, the DSU/CSU recognizes the in-band LLB-Actuate and LLB-Release codes specified by AT&T as well as the bit-oriented FDL messages specified by ANSI (for ESF only).

NET PLB: Enab
Next Enab Disab Prev

Network Initiated Payload Loopback (PLB). Allows initiation and termination of the PLB to be controlled by the receipt of PLB-Actuate and PLB-Release commands from the network (or remote DSU/CSU).

Enab – Causes the DSU/CSU to enter a PLB (if the DSU/CSU can perform a PLB in its current state) and to cause a PLB-Release command to terminate the PLB.

Disab – Causes the DSU/CSU to ignore PLB-Actuate and PLB-Release commands (the DSU/CSU is not in compliance with ANSI T1.403 and AT&T TR 54016).

NOTE: When this configuration option is enabled, the DSU/CSU recognizes the in-band PLB-Actuate and PLB-Release codes specified by AT&T as well as the bit-oriented FDL messages specified by ANSI.

NOTE: This configuration option is only available when the network interface framing is set to ESF.

Bit Stuff: 62411
Next 62411 Part68 Disab Prev

Bit Stuffing. Determines when bit stuffing is performed to meet the ones density requirements for data transmission on the network. You must choose the maximum number of consecutive zeros the DSU/CSU can receive before it inserts a one.

62411 – Specifies that a one be inserted in the data stream after 15 consecutive zeros or when the density of ones falls below 12.5% (complies with AT&T TR 62411).

Part68 – Specifies that a one be inserted in the data stream after 80 consecutive zeros (complies with FCC Part 68).

Disab – Disables bit stuffing so that ones density is not enforced.

NOTE: To comply with Canadian DOC CS-03 regulations, equipment installed in Canada must be configured to select 62411.

NOTE: To comply with USA Part 68 regulations, equipment installed in the USA must be configured to select Part 68.

NOTE: This configuration option is only available if the network interface line coding format is set to AMI.

Circuit Ident:
Next Edit Clear Prev

Network Circuit Identifier. Specifies the transmission vendor's circuit identifier for the purpose of facilitating troubleshooting. The network circuit identifier is an ASCII text string that may be up to 255 characters in length.

Edit – Allows you to edit and/or display the network circuit identifier using the generic text string entry screen.

Clear – Allows you to clear the network circuit identifier. The network circuit identifier is set to a null string.

Channel Configuration Options

The Channel configuration options are divided into two tables as follows:

- DTE Channel Configuration Options (Table C-4)
- Data Port Channel Configuration Options (Table C-5)

NOTE

Tables C-4 and C-5 describe the DTE channel and data port channel configuration options. The configuration options in Table C-4 (below) only appear if the DTE Drop/Insert (DSX-1) port is enabled and you are using a 2-port or 4-port DSU/CSU.

Table C-4
DTE Channel Configuration Options

DTE Channels:
Assign Voice

DTE Drop/Insert (DSX-1) Channel. Assigns DS0 channels from the DTE Drop/Insert (DSX-1) interface to DS0 channels on the network interface, and specifies which DS0 channels carry voice signaling information.

Assign – Assigns DS0 channels from the DTE Drop/Insert (DSX-1) interface to the network interface.

Voice – Specifies which DS0 channels from the DTE Drop/Insert (DSX-1) interface are voice channels and should pass Robbed Bit Signaling (RBS) information to the network interface.

N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	...	N24
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	...	–

DTE Drop/Insert (DSX-1) Channel Allocation. Assigns DS0 channels from the DTE Drop/Insert (DSX-1) interface to the network interface.

Line 1 displays the 24 channels for the network interface. Line 2 displays what is allocated to the DS0 channel indicated in Line 1. Possible values for Line 2 are:

Value	Meaning
–	This DS0 channel is not allocated. You can modify this value on this screen.
Prt*n*	This DS0 channel is allocated to port *n,* where *n* is a number from 1 to 4. You cannot modify this value on this screen.
D*n*	This DS0 channel is allocated to the DTE Drop/Insert (DSX-1) interface DS0 channel *n*, where *n* is a number from 1 to 24. You can modify this value on this screen.

Assign DTE channels to network channels by pressing the Function key below the network channel desired. The DTE channel number scrolls up one number each time you press the Function key. Only unassigned DTE channels appear during scrolling.

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	...	D24
RBS	RBS	RBS	RBS	RBS	RBS	RBS	RBS	RBS	RBS	RBS	RBS	RBS	...	RBS

Specify DTE Drop/Insert (DSX-1) Voice Channels. Specifies which DS0 channels from the DTE Drop/Insert (DSX-1) interface are voice channels and should pass Robbed Bit Signaling information to the network interface.

Line 1 displays the 24 channels for the DTE Drop/Insert (DSX-1) interface. Line 2 displays whether the DS0 channel indicated in Line 1 is a voice or data channel. Possible values for Line 2 are:

Value	Meaning
RBS	This DS0 channel is a voice channel carrying RBS information. When this DS0 channel is assigned to a network DS0 channel, RBS information is preserved across the connection.
Data	This DS0 channel is a data channel that does not contain RBS information. Signaling is not preserved across the connection.

Press the Function key below the desired channel to toggle between RBS and Data.

Table C-5
(1 of 3)
Data Port Channel Configuration Options

Channel Config: **Dsply Clear DTE Prt1 Prt2 Prt3 Prt4** **NOTE: The configuration options described in this table are made available by selecting Prt1, Prt2, Prt3, or Prt4 from the Channel Config screen. Table C-4 describes the DTE configuration options. For information about the operation of Display and Clear, refer to the *Configuring DS0 Channels* section in Chapter 3, *Operation*.**
Data Port Channel. Allows the assignment of a particular port to DS0 channels on either the network interface, the DTE Drop/Insert (DSX-1) interface, or another port (see the Assign To configuration option below). **NOTE:** For 2-port DSU/CSUs, only Ports 1 and 2 are available; for 1-port DSU/CSUs, only Port 1 is available, and only the Port Rate configuration option appears if you select this port.
Assign To: NET **Next NET DTE Prt*n* Prt*n* Prt*n* Prev**
Data Port Channel Allocation Destination. Allows you to assign this port to DS0 channels on either the network interface, the DTE Drop/Insert (DSX-1) interface, or another port. **NET** – Assigns this port to DS0 channels on the network interface. **DTE** – Assigns this port to DS0 channels on the DTE Drop/Insert (DSX-1) interface. If the DTE Drop/Insert (DSX-1) interface is disabled, this selection does not appear. **Prt*n*** – Assigns this port to another port, where *n* is the port number of all available ports except the port selected from the Channel Config screen. For example, if you select Prt1 from the Channel Config screen, Prt2, Prt3, and Prt4 appear for 4-port DSU/CSUs. Use this feature to designate a port as a backup port. You can attach an external backup device to Prt*n* and manually assign the selected port to the backup port (i.e., route data from the selected port to the backup port). When a port is assigned to another port, DSR is turned on. Selecting Prt*n* and Next takes you directly to the Port Rate configuration option, bypassing the Assign By configuration option. EDL (for 2-port and 4-port DSU/CSUs) does not operate when a synchronous data port is assigned to another synchronous data port. Therefore, if EDL is enabled, it is ignored. **NOTE:** Changing this configuration option from one T1 interface to the other (NET or DTE) deallocates all DS0 channels assigned to the previous interface.
Assign By: Block **Next Block ACAMI Chan Prev**
Data Port Channel Allocation Method. If NET or DTE is selected using the Assign To configuration option, this configuration option designates the method for assigning DS0 channels to the destination T1 interface. **Block** – Allocates DS0 channels to this port by the block method. **ACAMI** – Allocates DS0 channels to this port by the Alternate Channel Alternate Mark Inversion method. The difference between block and ACAMI is that the number of channels allocated with ACAMI is double the number needed for the port rate. With ACAMI, every alternate DS0 channel does not carry data from the port but always transmits and receives all ones. **Chan** – Allocates DS0 channels to this port by the individual channel method. **NOTE:** Changing this configuration option from one method to another (Block, ACAMI, or Chan) deallocates all DS0 channels assigned to either the network interface or the DTE Drop/Insert (DSX-1) interface.

Table C-5
(2 of 3)
Data Port Channel Configuration Options

Port Rate: 384 **Next 64 128 192 256 320 384 448 512 576 640 704 768 832 896 960 1024 1088 1152 1216 1280 1344 1408 1472 1536 Prev** ***OR*** **Next 56 112 168 224 280 336 392 448 504 560 616 672 728 784 840 896 952 1008 1064 1120 1176 1232 1288 1344 Prev**
Data Port Rate (appears when using the block or ACAMI channel allocation method, or when a synchronous data port is assigned to another synchronous data port). Designates the data rate for the port. Available selections depend on the current base rate configured for the port. The factory default for Nx64 is 384 kbps, and Nx56 is 336 kbps. **NOTE:** This configuration option does not appear if the individual channel allocation method (Chan) is selected using the Assign By configuration option. **NOTE:** Changing this configuration option from one rate to another deallocates all DS0 channels assigned to either the network interface or the DTE Drop/Insert (DSX-1) interface. **NOTE:** When you enable EDL (for 2-port and 4-port DSU/CSUs), 8 kbps of the total bandwidth allocated for this port is not available to the synchronous data port. For example, if you select 256 kbps and EDL is enabled, only 248 kbps are available. **NOTE:** When you enable EDL (for 2-port and 4-port DSU/CSUs) on a synchronous data port and the clock source is set to that synchronous data port, the external device must provide a clock of 8 kbps less than the expected data port rate. For example, if you select 64 kbps, the external clock source must supply a 56 kbps clock signal. **NOTE:** For the 3164 DSU/CSU there is a hardware limitation that limits the combined bandwidth used by Port 1 and Port 3 to a total of 2048 kbps and the combined bandwidth used by Port 2 and Port 4 to 2048 kbps. Thus, when entering this menu, the rate choices are limited due to this constraint. This limitation only occurs in configurations mapping a port to a port or when mapping ports to the DTE Drop/Insert (DSX-1) interface and to the network.
Start At: **Next Clear N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 ... N24 Prev** ***OR*** **Start At:** **Next Clear D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 ... D24 Prev**
Data Port Channel Allocation (appears for the block and ACAMI methods only). Designates the starting DS0 channel, N1–N24 for the network interface and D1–D24 for the DTE Drop/Insert (DSX-1) interface. Available selections are only those DS0 channels that provide enough bandwidth (based on the configured data rate) to be used as a starting channel number. Select the desired starting channel number by pressing the Function key under that number. When you make the selection, the DSU/CSU allocates the correct amount of DS0 channels to support the data rate currently configured for the port. **Clear** – Deallocates all DS0 channels for this port from the network interface or the DTE Drop/Insert (DSX-1) interface. **NOTE:** This configuration option is not available if the individual channel allocation method (Chan) is selected using the Assign By configuration option, or if Prt*n* is selected using the Assign To configuration option.

Table C-5
(3 of 3)
Data Port Channel Configuration Options

	N1	**N2**	**N3**	**N4**	**N5**	**N6**	**N7**	**N8**	**N9**	**N10**	**N11**	**N12**	**...**	**N24**	
Next	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**...**		**Prev**
OR															
	D1	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**	**D9**	**D10**	**D11**	**D12**	**...**	**D24**	
Next	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**-–**	**...**		**Prev**

Data Port Channel Allocation (appears for the individual channel method only). Designates the DS0 channel to allocate to this port, N1–N24 for the network interface and D1–D24 for the DTE Drop/Insert (DSX-1) interface.

Line 1 displays the 24 channels for the network interface or the DTE Drop/Insert (DSX-1) interface. Line 2 displays what is allocated to the DS0 channel indicated in Line 1. Possible values for Line 2 are:

Value	Meaning
–	This DS0 channel is not allocated. You can modify this value on this screen.
Prt*n*	This DS0 channel is allocated to port *n,* where *n* is a number from 1 to 4. You can modify this value on this screen for this port only.
N*n*	This DS0 channel is allocated to the network interface DS0 channel *n*, where *n* is a number from 1 to 24. You cannot modify this value on this screen.
D*n*	This DS0 channel is allocated to the DTE Drop/Insert (DSX-1) interface DS0 channel *n*, where *n* is a number from 1 to 24. You can modify this value on this screen.

Select the channel by pressing the Function key under that number. To deallocate a port, press the Function key under that port number. Pressing the Function key under channels assigned to other ports has no effect.

NOTE: The DSU/CSU automatically derives the data rate for the port from the number of DS0 channels allocated.

NOTE: For the 3164 DSU/CSU there is a hardware limitation that limits the combined bandwidth used by Port 1 and Port 3 to a total of 2048 kbps and the combined bandwidth used by Port 2 and Port 4 to 2048 kbps. If a selection of Prt*n* causes this limit to be exceeded, the selection is ignored and the "–" continues to be displayed for the channel.

General Configuration Options

Table C-6
(1 of 2)
General Configuration Options

Gen Yellow: Enab **Next Enab Disab Prev**
Generate Yellow Alarm Signals. Determines whether the DSU/CSU generates Yellow Alarm signals on the network and DTE Drop/Insert (DSX-1) interfaces. **NOTE:** This configuration option is not available for 1-port DSU/CSUs or if the DTE Drop/Insert (DSX-1) Interface is disabled. If the DTE Drop/Insert (DSX-1) interface is disabled, the DSU/CSU always generates the Yellow Alarm signal on the network interface. **Enab** – Generates the Yellow Alarm signal for both the network and DTE Drop/Insert (DSX-1) interfaces. **Disab** – Disables the Yellow Alarm signal. When this configuration option is disabled, Yellow Alarm conditions on the network interface cause an AIS signal to be transmitted on the DTE Drop/Insert (DSX-1) interface. **NOTE:** When this configuration option is disabled, the DTE equipment connected to the DTE Drop/Insert (DSX-1) interface is responsible for generation of the Yellow Alarm signal on the network interface. In this case, the interface port marked DTE must only be connected to an FCC Part 68 Registered (for USA) and Canadian DOC Certified (for Canada) Digital Service Unit or System, such as PBX, with a DTE Drop/Insert (DSX-1) interface. Failure to do so is a violation of FCC Rules or DOC Regulations.
Clock Src: NET **Next NET DTE Prt1 Int Ext Prev**
DSU/CSU Clock Source. Specifies the master clock source for the DSU/CSU. This selection synchronizes all internal timing and external interface clocks. The clock rate(s) for the external timing interfaces are independent of the input rate for the master clock. Failure of the clock specified by the Clock Source selection results in automatic fallback to internal clock. **NET** – Configures the network interface as the master clock source. **DTE** – Configures the DTE Drop/Insert (DSX-1) interface as the master clock source. This selection is not available for 1-port DSU/CSUs or if the DTE Drop/Insert (DSX-1) interface is disabled. If the DTE Drop/Insert (DSX-1) interface is disabled after making this selection, the master clock source is changed to NET. **Prt1** – Configures data port 1 as the master clock source. This is the only synchronous data port you can use for the master clock. If you enable EDL if for Port 1 and the DSU/CSU Clock Source is set to Prt1, the external device must provide clocking of 8 kbps less than the expected data port rate. For example, if you select 64 kbps, the external clock must supply a 56 kbps clock signal. **Int** – Configures the internal clock as the master clock source. **Ext** – Configures an external clock (provided through the Clock In connector) as the master clock source. This selection is only available on 2-port and 4-port DSU/CSUs.
Clock Rate: 1544 **Next 2048 1544 8 Prev**
External Clock Rate. Specifies the clock rate when the master clock source is configured for external clock (Ext). This configuration option does not appear when the clock source is not an external clock. **2048** – Sets the input rate of the external clock to 2,048 kHz. **1544** – Sets the input rate of the external clock to 1,544 kHz. **8** – Sets the input rate of the external clock to 8 kHz. **NOTE:** This configuration option is only available on 2-port and 4-port DSU/CSUs. **NOTE:** External clock rate 2,048 kHz does not imply E1 compatibility.

Table C-6
(2 of 2)
General Configuration Options

Tst Timeout: Enab **Next Enab Disab Prev**
Test Timeout. Specifies whether user-initiated loopback and pattern tests have durations that are specified by the Tst Duration configuration option. **Enab** – Loopback and pattern tests initiated on the DSU/CSU have specified durations. **Disab** – Disables test timeout. The tests are terminated manually. **NOTE:** For DSU/CSUs that are remotely managed through an inband data stream such as EDL or FDL, the recommended setting is Enab. If tests are inadvertently left in the active state, the Enab setting will allow the test to timeout (terminate) after a specified time.
Tst Duration: 10 **Next Up Down Save Prev**
Test Duration. Specifies the duration (1 to 120 minutes) of user-initiated loopback and pattern tests. (The Tst Timeout configuration option must be set to Enab.) Use the left or right arrow key to position the cursor on the digit you want to change. Use the Function keys (Up or Down) to increment or decrement the digit. **Up** – Increments the test duration. **Down** – Decrements the test duration. **Save** – Stores the test duration.

User Interface Configuration Options

NOTE

A circular symbol (●) identifies configuration options that are available on standalone DSU/CSUs only. A triangular symbol (▲) identifies configuration options that are available on carrier-mounted DSU/CSUs only.

Table C-7
(1 of 8)
User Interface Configuration Options

Self-Test: Enab **Next Enab Disab Prev**
Initial Self-Test. Specifies whether the DSU/CSU performs a device self-test at power-up and after a device reset. **Enab** – Enables a self-test. **Disab** – Disables the self-test.
FP Access: Enab **Next Enab Disab Prev**
Front Panel Access. Determines whether front panel access or display is allowed at the DSU/CSU. **Enab** – Allows the front panel to access and display data. **Disab** – Prevents the access and display of data. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
FP Pass: Disab **Next Enab Disab Prev**
Front Panel Pass-Through. Allows dial-out access to a remote DSU/CSU using the front panel pass-through operation. **Enab** – Allows dial-out access to a remote DSU/CSU. **Disab** – Prevents dial-out access to a remote DSU/CSU. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Dial-In: Disab **Next Enab Disab Prev**
Dial-in Access. Allows dial-in access to the DSU/CSU. For standalone DSU/CSUs, dial-in access is through the modem port. For carrier-mounted DSU/CSUs, dial-in access is through an external device that is connected to the communication port. **Enab** – Allows dial-in access to the DSU/CSU. **Disab** – Prevents dial-in access. Incoming calls to the DSU/CSU are not answered. **NOTE:** To enable Dial-In for carrier-mounted DSU/CSUs, the external device must be configured for automatic answer and the ComExtDev configuration option must be enabled.

Table C-7
(2 of 8)
User Interface Configuration Options

Password: None **Next None Com Modem Both Prev**
Password Mode. Activates a password prompt that prevents access until a password is entered. **None** – Does not require a password. **Com** – Prompts the communications port user to enter a password. **Modem** – Prompts the remote modem port user to enter a password. **Both** – Prompts both the communications port user and the remote modem port user to enter a password.
Com Port: Disab **Next Enab Disab Prev**
Setting the Carrier Communication Port. Enables the use of the communication port in carrier-mounted DSU/CSUs. **Enab** – This communication port is enabled. **Disab** – The communication port is disabled. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲
Com Use: ASCII **Next Mgmt ASCII Daisy Term Prev**
Communication Port Use. Specifies how the communication port is used. **Mgmt** – Configures the communication port as the link to an SNMP or Telnet system. **ASCII** – Configures the communication port as a proprietary ASCII port supporting Front Panel Emulation software and ASCII alarm messages. Only one ASCII communication port is allowed per 3000 Series carrier. **Daisy** – Configures the communication port as an SNMP or Telnet port that is daisy chained to the auxiliary port of an another 31xx Series device. This selection is available on standalone DSU/CSUs only. **Term** – Configures the communication port as the interface to an async terminal.
ComExtDev: Disab **Next Disab AT Other Prev**
Carrier Communication Port's External Device Commands. Specifies the communication port's external device commands. When this configuration option is disabled, no commands are sent out the communication port. Select AT to have standard attention (AT) commands sent out the communication port to control the external device. Select Other to configure the connect prefix, the connect indication string, the escape sequence, the escape sequence delay, and the disconnect string. **Disab** – Allows no commands to be sent out the communication port. **AT** – Allows standard AT commands to be sent out the communication port. **Other** – Allows user configurable commands to be sent out the communication port. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲ **NOTE:** This configuration option is not available if the communications port is disabled. **NOTE:** Carrier Detect (CD) is used to detect that the external device's connection is lost. Therefore, do not allow the CD lead to be forced on by the external device. **NOTE:** The external device should be strapped to ignore Data Terminal Ready (DTR).

Table C-7
(3 of 8)
User Interface Configuration Options

ComConnPrefix: **Next Edit Clear Prev**
Carrier Communication Port Connect Prefix. Specifies the connect prefix to the dial directory phone number. When you make a connection or the DSU/CSU automatically makes a connection (dial-out alarms or traps) through the communication port, the connect prefix and the dial directory phone number are used to establish the connection. The connect prefix is an ASCII text string and may be up to 20 characters in length. If the connect prefix is NULL, then no connect prefix is used. **Edit** – Allows you to edit and/or display the connect prefix using the generic text string entry screen. **Clear** – Allows you to clear the connect prefix. The connect prefix is set to a null string. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲ **NOTE:** This configuration option is not available if the ComExtDev configuration option is set to AT or the communication port is disabled. **NOTE:** If ComExtDev is configured for Other and the external device requires characters after the dial phone number, you must append the characters to the phone number.
ComConnected: **Next Edit Clear Prev**
Carrier Communication Port Connect Indication String. Specifies the communication port's connect indication string. When you make a connection or the DSU/CSU automatically makes a connection (dial-out alarms or traps) through the communication port, this string determines that the connection has been established. The connect indication string is an ASCII text string and may be up to 20 characters in length. If the connect indication string is not received within 1 minute, it will time-out the connection. If the connect indication string is NULL, the communication port's receive data stream is not searched and a transition in the Carrier Detect (CD) lead is used to determine that a connection has been established. **Edit** – Allows you to edit and/or display the case-sensitive connect indication string using the generic text string entry screen. **Clear** – Allows you to clear the connect indication string. The connect indication string is set to a null string. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲ **NOTE:** This configuration option is not available if the ComExtDev configuration option is set to AT or the communication port is disabled.
ComEscapeSeq: **Next Edit Clear Prev**
Carrier Communication Port Escape Sequence. Specifies the communication port's escape sequence. Once the external device connection has been established, either you or the DSU/CSU can command the external device to disconnect. Before doing so, you may need to send the escape sequence out to switch the external device into command mode. The escape sequence is an ASCII text string and may be up to 20 characters in length. If the escape sequence is NULL, no escape sequence is sent out. **Edit** – Allows you to edit and/or display the escape sequence using the generic text string entry screen. **Clear** – Allows you to clear the escape sequence. The escape sequence is set to a null string. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲ **NOTE:** This configuration option is not available if the ComExtDev configuration option is set to AT or the communication port is disabled.

Table C-7
(4 of 8)
User Interface Configuration Options

ComEscDel: None
Next None 0.2s 0.4s 0.6s 0.8s 1.0s Prev

Carrier Communication Port Escape Sequence Delay. Specifies the delay used while sending the communication port escape sequence. Use the communication port escape delay to specify the delay before sending the first character of the escape sequence and the delay after the last character of the escape sequence. During the delay, no data is sent out the communication port.

None – No communication port escape sequence delay.

***X.X*s** – The delay used during the communication port escape sequence (where *X.X* is 0.2, 0.4, 0.6, 0.8, or 1.0 seconds).

NOTE: This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲

NOTE: This configuration option is not available if the ComExtDev configuration option is set to AT or the communication port is disabled.

NOTE: ComEscDel must be configured for a delay greater than or equal to the escape guard time required by the external device.

ComDisconnect:
Next Edit Clear Prev

Carrier Communication Port Disconnect String. Specifies the communication port's disconnect string. The communication port's disconnect string is sent to the external device if either you or the DSU/CSU wants to command the external device to disconnect. The external device must be in command mode before this command can be sent, so the escape sequence will always be sent before the disconnect string. The disconnect string is an ASCII text string and may be up to 20 characters in length. If the disconnect string is NULL, then no disconnect string is sent out.

Edit – Allows you to edit and/or display the disconnect string using the generic text string entry screen.

Clear – Allows you to clear the disconnect string. The disconnect string is set to a null string.

NOTE: This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲

NOTE: This configuration option is not available if the ComExtDev configuration option is set to AT or the communication port is disabled.

Com Type: Async
Next Async Sync Prev

Communication Port Type. Specifies whether the communication port uses synchronous or asynchronous operation when it is configured as the SNMP management link.

Async – Configures the communication port for asynchronous operation.

Sync – Configures the communication port for synchronous operation.

NOTE: This configuration option is available on **standalone DSU/CSUs only.** ●

NOTE: This configuration option is not available if the Com Use configuration option is set to ASCII, Daisy, or Term. In these cases, the communication port is always asynchronous.

Com Clk: Int
Next Int Ext Prev

Communication Port Synchronous Clock. Specifies whether the communication port uses internal or external clocking when it is configured for synchronous operation.

Int – Configures the communication port for internal clocking.

Ext – Configures the communication port for external clocking.

NOTE: This configuration option is available on **standalone DSU/CSUs only.** ●

NOTE: This configuration option is not available if the Com Type configuration option is set to Async.

Table C-7
(5 of 8)
User Interface Configuration Options

Com Rate: 9.6 **Next 1.2 2.4 4.8 9.6 14.4 19.2 38.4 Prev**
Communication Port Rate. Configures the bit rate for the communication port. **1.2** – Sets the bit rate to 1200 bps (for asynchronous operation only). **2.4** – Sets the bit rate to 2400 bps. **4.8** – Sets the bit rate to 4800 bps. **9.6** – Sets the bit rate to 9600 bps. **14.4** – Sets the bit rate to 14,400 bps. **19.2** – Sets the bit rate to 19,200 bps. **38.4** – Sets the bit rate to 38,400 bps. This rate is not supported for carrier-mounted DSU/CSUs. **NOTE:** This configuration option is not available if the communication port is configured for synchronous operation and the clock source is external.
Char Length: 8 **Next 7 8 Prev**
Communication Port Character Length. Configures the character length (7 or 8 bits) for the communication port. **NOTE:** This configuration option must be set to 8 if the communication port is used as the network communication link. **NOTE:** This configuration option is not available if the communication port is configured for synchronous operation.
CParity: None **Next None Even Odd Prev**
Communication Port Parity. Configures the parity (none, even, or odd) for the communication port. **NOTE:** This configuration option is not available if the communication port is configured for synchronous operation.
CStop Bits: 1 **Next 1 1.5 2 Prev**
Communication Port Stop Bits. Configures the number of stop bits (1, 1.5, or 2) for the communication port. **NOTE:** This configuration option is not available if the communication port is configured for synchronous operation.
Ignore DTR: No **Next Yes No Prev**
Communication Port Ignore DTR State. Specifies whether the DSU/CSU ignores the state of the Data Terminal Ready (DTR) input to the communication port. **Yes** – DTR is ignored. **No** – DTR is not ignored. **NOTE:** This configuration option is not available if the communication port is configured for synchronous operation.
CmInActTm: Disab **Next Enab Disab Prev**
Communication Port Inactivity Timeout. Specifies whether the communication port disconnects after a period of inactivity specified by the CmDiscTm configuration option. **Enab** – The communication port disconnects after the period of inactivity specified by the CmDiscTm configuration option. **Disab** – The communication port does not disconnect due to inactivity.

Table C-7
(6 of 8)
User Interface Configuration Options

CmDiscTm: 5 **Next Up Down Save Prev**
Communication Port Disconnect Time. Specifies the period of time (1 to 60 minutes) before the communication port disconnects due to inactivity. (The CmInActTm configuration option must be set to Enab.) Use the left or right arrow key to position the cursor on the digit you want to change. Use the Function keys (Up or Down) to increment or decrement the digit. **Up** – Increments the time delay. **Down** – Decrements the time delay. **Save** – Stores the time delay for use with inactivity disconnects.
Modem Use: ASCII **Next Mgmt ASCII Term Prev**
Modem Port Use. Specifies how the modem port is used. **Mgmt** – Configures the modem port as the link to an SNMP or Telnet system. **ASCII** – Configures the modem port as a proprietary ASCII port. This selection supports dial-out ASCII alarm messages and dial-in/dial-out front panel access. **Term** – Configures the modem port as the interface to an async terminal. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Modem Type: Async **Next Async Sync Prev**
Modem Type. Specifies whether the port uses synchronous or asynchronous communication if the modem port is configured as the SNMP management link. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ● **NOTE:** This configuration option is not available if the Modem Use configuration option is set to ASCII. In this case, the modem port is always asynchronous.
Modem Rate: 2.4 **Next 1.2 2.4 Prev**
Modem Port Rate. Configures the bit rate for the modem port. **1.2** – Sets the bit rate at 1200 bps. **2.4** – Sets the bit rate at 2400 bps. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
MChar Len: 8 **Next 7 8 Prev**
Modem Character Length. Configures the character length (number of data bits) for the modem port. This does not include the start bit (always 1) or the stop bits; 8 is the factory default. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ● **NOTE:** This option must be set to 8 to perform PC emulation or pass-through operations, or SNMP management.
MParity: None **Next None Even Odd Prev**
Modem Parity. Configures the parity for the modem port. None is the factory default. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●

Table C-7
(7 of 8)
User Interface Configuration Options

MStop Bits: 1 **Next 1 2 Prev**
Modem Port Stop Bits. Configures the number of stop bits for the modem port; 1 is the factory default. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
LSpaceDsc: Disab **Next Enab Disab Prev**
Long Space Disconnect. Specifies how the modem disconnects a call. This makes call disconnecting more robust and prevents invalid data at the remote modem if the call is disconnected. To be effective, the remote modem must be configured to disconnect if it detects continuous space. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ● **NOTE:** This configuration option is not available if the modem port is configured as an SNMP management link and the link is configured for synchronous operation.
MInActTm: Disab **Next Enab Disab Prev**
Modem Port Inactivity Timeout. Specifies whether the modem port disconnects after a period of inactivity specified by the MDiscTm configuration option. **Enab** – The modem port disconnects after the period of inactivity specified by the MDiscTm configuration option. **Disab** – The modem port does not disconnect due to inactivity. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
MDiscTm: 5 **Next Up Down Save Prev**
Modem Port Disconnect Time. Specifies the period of time (1 to 60 minutes) before the modem port disconnects due to inactivity. (The MInActTm configuration option must be set to Enab.) Use the left or right arrow key to position the cursor on the digit you want to change. Use the Function keys (Up or Down) to increment or decrement the digit. **Up** – Increments the time delay. **Down** – Decrements the time delay. **Save** – Stores the time delay for use with inactivity disconnects. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Aux Use: None **Next None Mgmt Daisy Prev**
Auxiliary Port Use. Specifies how the auxiliary port is used. The auxiliary port only supports Point-to-Point Protocol (PPP) with the following parameters: type is asynchronous, character length is 8, parity is none, and stop bit is 1. **None** – Specifies that the auxiliary port is not to be used. **Mgmt** – Configures the auxiliary port as the link to an SNMP manager or Telnet client via an external LAN Adapter. **Daisy** – Configures the auxiliary port as an SNMP or Telnet port that is daisy chained to the communication port of an another 31xx Series device. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●

Table C-7
(8 of 8)
User Interface Configuration Options

Aux Rate: 19.2 **Next 9.6 14.4 19.2 38.4 Prev**
Auxiliary Port Rate. Configures the bit rate for the auxiliary port. **9.6** – Configures the auxiliary port rate as 9600 bps. **14.4** – Configures the auxiliary port rate as 14,400 bps. **19.2** – Configures the auxiliary port rate as 19,200 bps. **38.4** – Configures the auxiliary port rate as 38,400 bps. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
TnSession: Disab **Next Enab Disab Prev**
Telnet Session Enable. Specifies whether the DSU/CSU responds to Telnet session requests. **Enab** – The DSU/CSU responds to Telnet session requests. **Disab** – The DSU/CSU does not respond to Telnet session requests.
TnPaswd: Disab **Next Enab Disab Prev**
Telnet Password Mode. Specifies whether a password is required for Telnet access. **Enab** – A password is required for Telnet access. **Disab** – A password is not required for Telnet access.
TnInActTm: Disab **Next Enab Disab Prev**
Telnet Inactivity Timeout. Specifies whether the Telnet session disconnects after a period of inactivity specified by the TnDiscTm configuration option. **Enab** – The Telnet session disconnects after the period of inactivity specified by the TnDiscTm configuration option. **Disab** – The Telnet session does not disconnect due to inactivity.
TnDiscTm: 5 **Next Up Down Save Prev**
Telnet Disconnect Time. Specifies the period of time (1 to 60 minutes) before the Telnet session disconnects due to inactivity. (The TnInActTm configuration option must be set to Enab.) Use the left or right arrow key to position the cursor on the digit you want to change. Use the Function keys (Up or Down) to increment or decrement the digit. **Up** – Increments the time delay. **Down** – Decrements the time delay. **Save** – Stores the time delay for use with inactivity disconnects.

Alarm Configuration Options

NOTE

A triangular symbol (▲) identifies a configuration option that is available on carrier-mounted DSU/CSUs only.

Table C-8
(1 of 3)
Alarm Configuration Options

Alrm Msg: Disab **Next Disab Modem Com Both Prev**
Alarm Messages. Controls the generation of alarm messages, which are routed to an ASCII terminal or printer attached to the communication port and/or the modem port. **Disab** – Prevents an alarm message for any alarm conditions. **Modem** – Enables alarm messages routed to the modem port. This selection does not appear on carrier-mounted DSU/CSUs. **Com** – Enables alarm messages routed to the communication port. **Both** – Enables alarm messages routed to both the modem and communication ports. This selection does not appear on carrier-mounted DSU/CSUs. **NOTE:** Alarm messages are only sent to the communication port if the Com Use configuration option is set to ASCII, otherwise the alarm messages are discarded.
SNMP Trap: Disab **Next Enab Disab Prev**
SNMP Trap Enable. Specifies whether SNMP trap messages are sent over the SNMP management link. **Enab** – Enables sending SNMP trap messages from this unit over any SNMP management link. **Disab** – Disables sending SNMP trap messages from this unit over any SNMP management link. **NOTE:** For carrier-mounted DSU/CSUs that have the communication port enabled, the only traps that are disabled are those that pertain to this particular unit. Traps from other units are passed through.
Trap Disc: Enab **Next Enab Disab Prev**
SNMP Trap Disconnect. Specifies whether the modem connection or carrier external communication port device connection is disconnected after sending a trap message. This configuration option applies only to modem connections or carrier external communication port device connections initiated as a result of the trap message being sent. **Enab** – Specifies that the modem call or carrier external communication port device call is disconnected after a trap message is sent. **Disab** – Specifies that the modem call or carrier external communication port device call is not disconnected after a trap message is sent. The line is held until it is manually disconnected or disconnected by the remote modem. **NOTE:** This configuration option is only available if SNMP traps are enabled and the integral modem or the carrier external communication port device is enabled and configured as an SNMP management link.

Table C-8
(2 of 3)
Alarm Configuration Options

DialOut: Disab **Next Enab Disab Prev**
Alarm and Trap Dial Out. Controls whether generated alarm or trap messages initiate a call if the integral modem connection or carrier external communication port device connection has not already been established. When enabled, a call is placed to the phone number contained in the alarm directory (directory A). If the call cannot be completed and the retry option is enabled, the alarm or trap message is held until the call is completed or the maximum (five) retry count has been exceeded. If more than one alarm message is received while waiting for a call retry, only the highest priority alarm message received is held; all previous messages are discarded. When the modem port is configured as the SNMP management link, up to 10 SNMP trap messages can be queued at the interface. **Enab** – Enables automatic call initiation (dial out) if an alarm or trap message needs to be sent. **Disab** – Disables automatic call initiation. Trap messages sent to the modem port or carrier external communication port device are queued (held) if an integral modem connection or carrier external communication port device connection has not been previously established. Alarm messages are not queued. **NOTE:** For carrier-mounted DSU/CSUs, this configuration option is only available if the communication port is enabled for an external device.
Call Retry: Disab **Next Enab Disab Prev**
Call Retry on Alarm or Trap. Determines whether a call that cannot complete (busy, no answer, etc.) is retried. This affects calls that are initiated in attempting to send an alarm or trap message to the modem port or carrier external communication port device. If call retry is specified, the DSU/CSU attempts to complete the call after a configurable delay. **Enab** – Enables call retry. If enabled the call is retried up to a maximum of five times per alarm or trap message. A delay as specified by the dial-out delay time is imposed between call attempts. If an alternate dial-out directory is specified, both the alarm directory as well as the alternate directory are retried up to five times. **Disab** – Disables call retry. If a call setup cannot be completed it is not retried. **NOTE:** For carrier-mounted DSU/CSUs, this configuration option is only available if the communication port is enabled for an external device.
Dial Delay: 5 **Next 1 2 3 4 5 6 7 8 9 10 Prev**
Dial Out Delay Time on Alarm or Trap. Specifies the number of minutes to wait between successive dial-out alarms or traps and between retry attempts after failed alarm dial-outs. The factory default is 5 minutes. **NOTE:** For carrier-mounted DSU/CSUs, this configuration option is only available if the communication port is enabled for an external device.
AltDialDir: None **Next None 1 2 3 4 5 Prev**
Alternate Dial-Out Directory for Alarm or Trap. Specifies whether a call that cannot be completed (busy, no answer, etc.) is retried using an alternate phone number. This affects calls that are initiated in an attempt to send an alarm or trap message to the modem port or carrier external communication port device. The alternate phone number to try is contained in one of the five call directories. If call retry is enabled, the initial call is retried at the original number five times before a call attempt to the alternate number is tried. If the call does not complete at the alternate number, it is also retried up to the five-retry maximum. The alternate dial-out option applies to each alarm/trap event. Once a call for an alarm/trap message either completes or fails all retry attempts, the next alarm/trap attempts to establish a call to the phone number contained in the alarm directory. **None** – Specifies that alternate alarm dial-out is not performed if a call cannot be completed to the telephone number contained in the alarm directory. **1–5** – Specifies the call directory that contains the phone number to call if a call cannot be completed to the telephone number contained in the alarm directory. **NOTE:** For carrier-mounted DSU/CSUs, this configuration option is only available if the communication port is enabled for an external device.

Table C-8
(3 of 3)
Alarm Configuration Options

Err Rate: 10E-4 **Next 10E-4 10E-5 10E-6 10E-7 10E-8 10E-9 Prev**
Excessive Error Rate Threshold. Sets the error rate threshold that determines if an Excessive Error Rate (EER) condition is declared. This rate is determined by the ratio of the number of CRC6 errors to the total number of bits received over a set period of time. Select from the following: **10E-4** – EER is declared if more than 1,535 CRC6 errors are detected within 10 seconds (factory default). **10E-5** – EER is declared if more than 921 CRC6 errors are detected within 60 seconds. **10E-6** – EER is declared if more than 92 CRC6 errors are detected within 60 seconds. **10E-7** – EER is declared if more than 9 CRC6 errors are detected within 60 seconds. **10E-8** – EER is declared if more than 41 CRC6 errors are detected in three 15-minute intervals. **10E-9** – EER is declared if more than 4 CRC6 errors are detected in three 15-minute intervals.
AlrmRelay: Disab **Next Enab Disab Prev**
Alarm Relay. Specifies whether an alarm condition for this circuit card activates the shared alarm relay on the 3000 Series Carrier. The alarm deactivates if the condition(s) causing it is corrected. An Alarm Cut-Off issued from the SDCP (or PC Emulation program) for a particular carrier-mounted DSU/CSU also deactivates the alarm. The carrier-mounted DSU/CSU does not reactivate the alarm relay until all alarm conditions for the unit are cleared. The following alarm conditions activate the alarm relay if this configuration option is enabled: • Continuous Loss of Signal (LOS) or Out of Frame (OOF) at the network or DTE Drop/Insert (DSX-1) interface. • Continuous Out of Frame (OOF) at any synchronous data port that has the Embedded Data Link enabled. • Alarm Indication Signal (AIS) received at either the network or DTE Drop/Insert (DSX-1) interface. • Yellow alarm signal received at either the network or DTE Drop/Insert (DSX-1) interface. • Excessive Error Rate (EER) detected at the network interface. • An Excessive Error Rate (EER) detected at any synchronous data port that has the Embedded Data Link enabled. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲

Management Configuration Options

The Management configuration options are divided into two tables as follows:

- General Management Configuration Options (Table C-9)
- Management Trap Configuration Options (Table C-10)

NOTE

A circular symbol (●) identifies configuration options that are available on standalone DSU/CSUs only. A triangular symbol (▲) identifies configuration options that are available on carrier-mounted DSU/CSUs only.

Table C-9
(1 of 7)
General Management Configuration Options

SNMP Mgt: Disab **Next Enab Disab Prev**
SNMP Management Enable. Specifies whether the DSU/CSU responds to SNMP session requests. **Enab** – The DSU/CSU responds to SNMP session requests. **Disab** – The DSU/CSU does not respond to SNMP session requests.
NMS Valid: Disab **Next Enab Disab Prev**
NMS IP Validation. Specifies whether the DSU/CSU validates (for security reasons) the IP address of an SNMP manager attempting to access the DSU/CSU. Allowable addresses are specified using the NMS *n* IP Adr configuration option. **Enab** – The DSU/CSU validates the IP address of SNMP management systems attempting to access the DSU/CSU. **Disab** – The DSU/CSU does not validate the IP address of SNMP management systems.
Num Sec Mgrs: 1 **Next 1 2 3 4 5 6 7 8 9 10 Prev**
Number of Security Managers. Specifies the number of SNMP managers that are allowed to access the DSU/CSU. **NOTE:** You must configure an IP address for each SNMP manager that is allowed access to the DSU/CSU. Allowable addresses are specified using the NMS *n* IP Adr configuration option.
NMS *n* IP Adr: **Next Edit Clear Prev**
NMS Manager *n* IP Address. Specifies the allowable IP address of an SNMP manager attempting to access the DSU/CSU. The manager number (*n*) is specified by the Num Sec Mgrs configuration option. **Edit** – Allows you to edit and/or display the allowable IP address for the SNMP manager. **Clear** – Allows you to clear the allowable IP address for the SNMP manager. The IP address is set to 000.000.000.000.

Table C-9
(2 of 7)
General Management Configuration Options

NMS *n* Access: Read **Next Read R/W Prev**
NMS Manager *n* Access Type. Specifies the allowable type of access for an SNMP manager attempting to access the DSU/CSU's MIB using community name 1.The manager number (*n*) is specified by the Num Sec Mgrs configuration option. **Read** – Allows read-only access (SNMP Get) to the accessible objects in the MIB for this device when community name 1 is used. This includes all objects specified as either read-only or read/write in the MIB RFCs. **R/W** – Allows read and write access (SNMP Get and Set) to the objects in the MIB for this device when community name 1 is used. Write access is allowed for all objects specified as read/write in the MIB RFCs. Read access is allowed for all objects specified as either read-only or read/write.
System Name: **Next Edit Clear Prev**
System Name. Specifies the system name for this unit. This is the name of this SNMP-managed node. **Edit** – Allows you to edit or display the system name. **Clear** – Allows you to clear the system name.
System Location: **Next Edit Clear Prev**
System Location. Specifies the system location for this unit. This is the physical location of this SNMP-managed node. **Edit** – Allows you to edit or display the system location. **Clear** – Allows you to clear the system location.
System Contact: **Next Edit Clear Prev**
System Contact. Specifies the system contact person for this unit, and how to contact this person. **Edit** – Allows you to edit or display the system contact. **Clear** – Allows you to clear the system contact.
CommunityName1: **Next Edit Clear Prev**
Community Name 1. Specifies the first of two community names that are allowed to access this unit's Management Information Base (MIB). External SNMP managers must supply this name to access an object in the MIB. **Edit** – Allows you to edit or display the first community name. **Clear** – Allows you to clear the first community name.

Table C-9
(3 of 7)
General Management Configuration Options

Access 1: Read **Next Read R/W Prev**
Access 1. Specifies the type of access allowed for Community Name 1. This is the type of access allowed for external SNMP managers accessing objects in the MIB using Community Name 1. **Read** – Allows read-only access (SNMP Get) to the accessible objects in the MIB for this device when community name 1 is used. This includes all objects specified as either read-only or read/write in the MIB RFCs. **R/W** – Allows read and write access (SNMP Get and Set) to the objects in the MIB for this device when community name 1 is used. Write access is allowed for all objects specified as read/write in the MIB RFCs. Read access is allowed for all objects specified as either read-only or read/write.
CommunityName2: **Next Edit Clear Prev**
Community Name 2. Specifies the second of two community names that are allowed to access this unit's Management Information Base (MIB). External SNMP managers must supply this name to access an object in the MIB. **Edit** – Allows you to edit or display the second community name. **Clear** – Allows you to clear the second community name.
Access 2: Read **Next Read R/W Prev**
Access 2. Specifies the type of access allowed for Community Name 2. This is the type of access allowed for external SNMP managers accessing objects in the MIB using Community Name 2. **Read** – Allows read-only access (SNMP Get) to the accessible objects in the MIB for this device when community name 2 is used. This includes all objects specified as either read-only or read/write in the MIB RFCs. **R/W** – Allows read and write access (SNMP Get and Set) to the objects in the MIB for this device when community name 2 is used. Write access is allowed for all objects specified as read/write in the MIB RFCs. Read access is allowed for all objects specified as either read-only or read/write.
IP Adr: **Next Edit Clear Prev**
IP Address for the DSU/CSU. Specifies the IP address needed to access the DSU/CSU. Since this IP Address is not bound to a particular port, it can be used for remote access via the FDL or EDL (for 2-port and 4-port DSU/CSUs) management link. **Edit** – Allows you to edit and/or display the IP address for the DSU/CSU. **Clear** – Allows you to clear the IP address for the DSU/CSU. The IP address is set to 000.000.000.000.
NetMask: **Next Edit Clear Prev**
Subnet Mask for the DSU/CSU. Specifies the subnet mask needed to access the DSU/CSU. Since this subnet mask is not bound to a particular port, it can be used for remote access via the FDL or EDL (for 2-port and 4-port DSU/CSUs) management link. **Edit** – Allows you to edit and/or display the subnet mask for the DSU/CSU. **Clear** – Allows you to clear the subnet mask for the DSU/CSU. The subnet mask is set to 000.000.000.000. If the subnet mask is 000.000.000.000, the IP protocol creates a default subnet mask based on the class of the IP address (Class A: 255.000.000.000, Class B: 255.255.000.000, or Class C: 255.255.255.000).

Table C-9
(4 of 7)
General Management Configuration Options

Com IP Adr: **Next Edit Clear Prev**
Com Port IP Address. Specifies the IP address for the communication port if the Com Use configuration option is set to Mgmt or Daisy. **Edit** – Allows you to edit or display the IP address for the communication port. **Clear** – Allows you to clear the IP address for the communication port. The IP address is set to 000.000.000.000. **NOTE:** This configuration option is not available on carrier-mounted DSU/CSUs if the communication port is disabled.
Com NetMask: **Next Edit Clear Prev**
Subnet Mask for the Communication Port. Specifies the subnet mask for the communication port if the Com Use configuration option is set to Mgmt or Daisy. **Edit** – Allows you to edit and/or display the subnet mask for the communication port. **Clear** – Allows you to clear the subnet mask for the communication port. The subnet mask is set to 000.000.000.000. If the subnet mask is 000.000.000.000, the IP protocol creates a default subnet mask based on the class of the IP address (Class A: 255.000.000.000, Class B: 255.255.000.000, or Class C: 255.255.255.000). **NOTE:** This configuration option is not available on carrier-mounted DSU/CSUs if the communication port is disabled.
Com Link: PPP **Next PPP SLIP Prev**
Com Port Link Layer Protocol. Specifies the link layer protocol for the communication port if the Com Use configuration option is set to Mgmt or Daisy. **PPP** – Specifies PPP as the link layer protocol for the IP management link on the communication port. **SLIP** – Specifies SLIP as the link layer protocol for the IP management link on the communication port. The communication port must be configured for asynchronous operation to support SLIP. This selection does not appear if the Com Use configuration option is set to Daisy. **NOTE:** This configuration option is not available on carrier-mounted DSU/CSUs if the communication port is disabled.
Modem IP Adr: **Next Edit Clear Prev**
Modem Port IP Address. Specifies the IP address for the modem port if the Modem Use configuration option is set to Mgmt. **Edit** – Allows you to edit or display the IP address for the modem port. **Clear** – Allows you to clear the IP address for the modem port. The IP address is set to 000.000.000.000. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●

Table C-9
(5 of 7)
General Management Configuration Options

Mdm NetMask: **Next Edit Clear Prev**
Subnet Mask for the Modem Port. Specifies the Subnet Mask for the modem port if the Modem Use configuration option is set to Mgmt. **Edit** – Allows you to edit and/or display the Subnet Mask for the modem port. **Clear** – Allows you to clear the Subnet Mask for the modem port. The Subnet Mask is set to 000.000.000.000. If the Subnet Mask is 000.000.000.000, the IP protocol creates a default Subnet Mask based on the class of the IP address (Class A: 255.000.000.000, Class B: 255.255.000.000, or Class C: 255.255.255.000). **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Alt Mdm IP Adr: **Next Edit Clear Prev**
Alternate Modem Port IP Address. Specifies the alternate IP address for the modem port if the Modem Use configuration option is set to Mgmt. This IP address is needed if a call attempt does not complete on the primary alarm/trap phone number (contained in the alarm directory) and the alternate dial out directory is used to try another phone number. **Edit** – Allows you to edit or display the alternate IP address for the modem port. **Clear** – Allows you to clear the alternate IP address for the modem port. The IP address is set to 000.000.000.000. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Alt Mdm NetMask: **Next Edit Clear Prev**
Alternate Subnet Mask for the Modem Port. Specifies the alternate Subnet Mask for the modem port if the Modem Use configuration option is set to Mgmt. This Subnet Mask is needed if a call attempt does not complete on the primary alarm/trap phone number (contained in the alarm directory) and the alternate dial-out directory is used to try another phone number. If this configuration option contains a non-zero Subnet Mask, it is used as the Subnet Mask for the modem port if a call is completed to the alternate phone number. **Edit** – Allows you to edit and/or display the alternate Subnet Mask for the modem port. **Clear** – Allows you to clear the alternate Subnet Mask for the modem port. The Subnet Mask is set to 000.000.000.000. If the Subnet Mask is 000.000.000.000, the IP protocol creates a default Subnet Mask based on the class of the IP address (Class A: 255.000.000.000, Class B: 255.255.000.000, or Class C: 255.255.255.000). **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Modem Link: PPP **Next PPP SLIP Prev**
Modem Port Link Layer Protocol. Specifies the link layer protocol for the modem port if the Modem Use configuration option is set to Mgmt. **PPP** – Specifies PPP as the link layer protocol for the IP management link on the modem port. **SLIP** – Specifies SLIP protocol as the link layer protocol for the IP management link on the modem port. The modem port must be configured for asynchronous operation to support SLIP. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●

Table C-9
(6 of 7)
General Management Configuration Options

Aux IP Adr: **Next Edit Clear Prev**
IP Address for the Auxiliary Port. Specifies the IP address for the auxiliary port if the Aux Use configuration option is set to Mgmt or Daisy. The auxiliary port only supports the PPP link protocol. **Edit** – Allows you to edit and/or display the IP address for the auxiliary port. **Clear** – Allows you to clear the IP address for the auxiliary port. The IP address is set to 000.000.000.000. **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
Aux NetMask: **Next Edit Clear Prev**
Subnet Mask for the Auxiliary Port. Specifies the subnet mask for the auxiliary port if the Aux Use configuration option is set to Mgmt or Daisy. **Edit** – Allows you to edit and/or display the subnet mask for the auxiliary port. **Clear** – Allows you to clear the subnet mask for the auxiliary port. The subnet mask is set to 000.000.000.000. If the subnet mask is 000.000.000.000, the IP protocol creates a default subnet mask based on the class of the IP address (Class A: 255.000.000.000, Class B: 255.255.000.000, or Class C: 255.255.255.000). **NOTE:** This configuration option is available on **standalone DSU/CSUs only.** ●
IPBusMast: Disab **Next Enab Disab Prev**
Setting the IP Bus Master. Specifies whether or not a particular carrier-mounted unit is the IP Bus Master. There can only be one IP Bus Master per 3000 Series Carrier. Typically, the carrier-mounted unit that has the SNMP/Telnet management system connected to it is the IP Bus Master. This allows for faster access to the remaining carrier units. If an SNMP/Telnet management system is connected to another carrier-mounted unit (i.e. not the IP Bus Master) and the SNMP/Telnet management system tries to access another carrier-mounted unit, the data has to be routed to the IP Bus Master first. Once the IP Bus Master receives the data, it is routed to the appropriate slot. **Enab** – This unit is the IP Bus Master. Only one IP Bus Master is allowed per 3000 Series Carrier. **Disab** – This unit is not the IP Bus Master. **NOTE:** This configuration option is available on **carrier-mounted DSU/CSUs only**. ▲

Table C-9
(7 of 7)
General Management Configuration Options

Def Netwk: None **Next None IPBus Com Modem Aux FDL EDL1 EDL2 EDL3 EDL4 Prev**
Default Network Destination. Specifies the default network destination. This configuration option specifies where the default network is connected. For example, if the default network is connected to the communication port, you select Com. If the default network is connected to the far-end 31xx Series device over the FDL, you select FDL. The routing protocol uses the default network destination to route data that does not have a specific route. **None** – No default network destination. Data that cannot be routed is discarded. **IPBus** – The default network destination is the IP Bus on the carrier backplane. This selection only appears for carrier-mounted DSU/CSUs which are not configured as the IP Bus Master. **Com** – The default network destination is the communication port. This selection only appears if the Com Use configuration option is set to Mgmt. **Modem** – The default network destination is the modem port. This selection only appears if the Modem Use configuration option is set to Mgmt. This selection does not appear on carrier-mounted DSU/CSUs. **Aux** – The default network destination is the auxiliary port. This selection only appears if the Aux Use configuration option is set to Mgmt. **FDL** – The default network destination is FDL. This selection only appears if the FDL management link is enabled. **EDL*n*** – For 2-port and 4-port DSU/CSUs, the default network destination is the EDL*n* port (where *n* is 1–4). This selection only appears in 2-port and 4-port DSU/CSUs if the synchronous data port's EDL management link is enabled. **NOTE:** If the chosen default network link is disabled or down, data is discarded. Return to this menu and choose another default network.

Table C-10
(1 of 2)
Management Trap Configuration Options

Num Trap Mgrs: 1 **Next 1 2 3 4 5 6 Prev**
Number of Trap Managers. Specifies the number of SNMP trap managers that are to receive traps for this unit. **NOTE:** You must configure an IP address for each trap manager that is to receive trap messages.
Trap*n* IP Adr: **Next Edit Clear Prev**
Trap *n* IP Address. Specifies the IP address for each trap manager. This configuration option is repeated for all trap managers supported by the unit. **Edit** – Allows you to edit or display the IP address for Trap Manager *n*. **Clear** – Allows you to clear the IP address for Trap Manager *n*. The IP address is set to 000.000.000.000.
Trap*n* Dst: None **Next None IPBus Com Modem Aux FDL EDL1 EDL2 EDL3 EDL4 Prev**
Trap Manager *n* Destination. Specifies the network destination for Trap Manager *n*. This configuration option is displayed for the number of trap managers (*n*) specified by the Number of Trap Managers configuration option. **None** – No Trap Manage *n* network destination. Traps are discarded. **IPBus** – The Trap Manager *n* network destination is the IP Bus on the carrier backplane. This selection only appears for carrier-mounted DSU/CSUs which are not configured as the IP Bus Master. **Com** – The Trap Manager *n* network destination is the communication port. This selection only appears if the Com Use configuration option is set to Mgmt or Daisy. **Modem** – The Trap Manager *n* network destination is the modem port. This selection only appears if the Modem Use configuration option is set to Mgmt. This selection does not appear on carrier-mounted DSU/CSUs. **Aux** – The Trap Manager *n* network destination is the auxiliary port. This selection only appears if the Aux Use configuration option is set to Mgmt or Daisy. **FDL** – The Trap Manager *n* network destination is the FDL management link. This selection only appears if the FDL management link is enabled. **EDL*n*** – The Trap Manager *n* network destination is the EDL*n* port (where *n* is 1–4). This selection only appears if the synchronous data port's EDL management link is enabled. **NOTE:** If the chosen destination link is disabled or down, the traps are discarded. Return to this menu and choose another destination.
Gen Trap: Both **Next Disab Warm Auth Both Prev**
General Trap Types. Specifies the general trap types to enable. **Disab** – Disables the sending of trap messages for warmStart and authenticationFailure events. **Warm** – Sends trap messages for warmStart events to the currently configured trap manager(s). **Auth** – Sends trap messages for authenticationFailure events to the currently configured trap manager(s). **Both** – Sends trap messages for warmStart and authenticationFailure events to the currently configured trap manager(s). **NOTE:** This configuration option is not available if the SNMP Trap configuration option (in the *Alarm Configuration Options* section on page C-25) is disabled.

Table C-10
(2 of 2)
Management Trap Configuration Options

Entp Trap: Enab **Next Enab Disab Prev**
Enterprise Specific Traps. Specifies whether enterpriseSpecific traps are enabled. **Enab** – Sends trap messages for enterpriseSpecific events to the currently configured trap manager(s). **Disab** – Disables the sending of trap messages for enterpriseSpecific events. **NOTE:** This configuration option is not available if the SNMP Trap configuration option (in the *Alarm Configuration Options* section on page C-25) is disabled.
Link Trap: Both **Next Disab Up Down Both Prev**
Link Trap Type. Specifies the link trap type to enable. Interfaces monitored for linkUp and linkDown traps are specified with the Trap I/F configuration option. **Disab** – Disables the sending of trap messages for linkDown or linkUp events. **Up** – Sends trap messages for linkUp events to the currently configured trap manager(s). **Down** – Sends trap messages for linkDown events to the currently configured trap manager(s). **Both** – Sends trap messages for linkUp and linkDown events to the currently configured trap manager(s). **NOTE:** This configuration option is not available if the SNMP Trap configuration option (in the *Alarm Configuration Options* section on page C-25) is disabled.
Trap I/F: All **Next NET DTE T1s Ports All Prev**
Link Trap Interfaces. Specifies which interfaces generate linkUp and linkDown trap messages. These traps are supported on the T1 interfaces (network and DTE Drop/Insert) and the synchronous data ports. **NET** – Sends trap messages for linkUp and linkDown events occurring on the network interface. **DTE** – Sends trap messages for linkUp and linkDown events occurring on the DTE Drop/Insert (DSX-1) interface. This selection does not appear if the DTE Drop/Insert (DSX-1) interface is disabled. **T1s** – Sends trap messages for linkUp and linkDown events occurring on the network or DTE Drop/Insert (DSX-1) interface. **Ports** – Sends trap messages for linkUp and linkDown events occurring on the synchronous data ports. **All** – Sends trap messages for linkUp and linkDown events occurring on the network interface, DTE Drop/Insert (DSX-1) interface, or the synchronous data ports. **NOTE:** This configuration option is not available if the Link Trap configuration option is not configured to generate trap messages for linkUp or linkDown events.

Configuration Worksheets

This section contains one set of blank worksheets to be used when configuring your DSU/CSU in the network. In the tables, **default settings** for Factory 1 are indicated by bold type. It is recommended that you copy these blank worksheets before using them.

DTE Options	**Value** (Default in **Bold**)
DTE Port	**Enab**, Disab
DTE Framing	D4, **ESF**
DTE Coding	AMI, **B8ZS**
Equal	**0–133**, 133–266, 266–399, 399–533, 533–655
Extrn DLB	Enab, **Disab**
Send Ones	**Enab**, Disab

General Options	**Value** (Default in **Bold**)
Gen Yellow	**Enab**, Disab
Clock Src	**NET**, DTE, Prt1, Int, Ext
Clock Rate	2048, **1544**, 8
Tst Timeout	**Enab**, Disab
Tst Duration	1–120 (Default = **10**)

Net Options	**Value** (Default in **Bold**)
NET Framing	D4, **ESF**
NET Coding	AMI, **B8ZS**
LBO	**0.0**, –7.5, –15, –22.5
ANSI PRM	Enab, **Disab**
Mgmt Link	Enab, **Disab**
NET LLB	**Enab**, Disab
NET PLB	**Enab**, Disab
BitStuff	**62411**, Part68, Disab
Circuit Ident	Edit, Clear

User Options	Value (Default in **Bold**)
Self-Test	**Enab**, Disab
FP Access ●	**Enab**, Disab
FP Pass ●	Enab, **Disab**
Dial-In	Enab, **Disab**
Password	**None**, Com, Modem, Both
Com Port ▲	Enab, **Disab**
Com Use	Mgmt, **ASCII**, Daisy, Term
ComExtDev ▲	**Disab**, AT, Other
ComConnPrefix ▲	Edit, Clear
ComConnected ▲	Edit, Clear
ComEscapeSeq ▲	Edit, Clear
ComEscDel ▲	**None**, 0.2s, 0.4s, 0.6s, 0.8s, 1.0s
ComDisconnect ▲	Edit, Clear
Com Type ●	**Async**, Sync
Com Clk ●	**Int**, Ext
Com Rate	1.2, 2.4, 4.8, **9.6**, 14.4, 19.2, 38.4
Char Length	7, **8**
CParity	**None**, Even, Odd
CStop Bits	**1**, 1.5, 2
Ignore DTR	Yes, **No**
CmInActTm	Enab, **Disab**
CmDiscTm	1–60 (Default = **5**)
Modem Use ●	Mgmt, **ASCII**, Term
Modem Type ●	**Async**, Sync
Modem Rate ●	1.2, **2.4**
MChar Len ●	7, **8**
MParity ●	**None**, Even, Odd
MStop Bits ●	**1**, 2
LSpaceDisc ●	Enab, **Disab**

User Options	Value (Default in **Bold**)
MInActTm ●	Enab, **Disab**
MDiscTm ●	1–60 (Default = **5**)
Aux Use ●	**None**, Mgmt, Daisy
Aux Rate ●	9.6, 14.4, **19.2**, 38.4
TnSession	Enab, **Disab**
TnPaswd	Enab, **Disab**
TnInActTm	Enab, **Disab**
TnDiscTm	1–60 (Default = **5**)

Alarm Options	Value (Default in **Bold**)
Alrm Msg	**Disab**, Modem, Com, Both
SNMP Trap	**Enab**, Disab
Trap Disc	**Enab**, Disab
DialOut	Enab, **Disab**
Call Retry	Enab, **Disab**
Dial Delay	1, 2, 3, 4, **5**, 6, 7, 8, 9, 10
AltDialDir	**None**, 1, 2, 3, 4, 5
Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Alrm Relay ▲	Enab, **Disab**

NOTE

A circular symbol (●) identifies configuration options that are available on standalone DSU/CSUs only. A triangular symbol (▲) identifies configuration options that are available on carrier-mounted DSU/CSUs only.

Prt1 Options	Value (Default in **Bold**)
Port Type	**E530**, V.35, RS449, X.21
Base Rate	**Nx64**, Nx56
Net DCLB	**Disab**, V.54, FT1, Both
Port LB	**Disab**, DTLB, DCLB, Both
All Ones	Disab, DTR, RTS, **Both**
Rcv Yellow	None, **Halt**
Tx Clock	**Int**, Ext
InvertTxC	Enab, **Disab**
InvrtData	Enab, **Disab**
EDL	Enab, **Disab**
Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-end	**Disab**, Maint, Send, Both
Far-end	**Disab**, Maint
Mgmt Link	Enab, **Disab**

Prt3 Options	Value (Default in **Bold**)
Port Type	**E530**, V.35, RS449, X.21
Base Rate	**Nx64**, Nx56
Net DCLB	**Disab**, V.54, FT1, Both
Port LB	**Disab**, DTLB, DCLB, Both
All Ones	Disab, DTR, RTS, **Both**
Rcv Yellow	None, **Halt**
Tx Clock	**Int**, Ext
InvertTxC	Enab, **Disab**
InvrtData	Enab, **Disab**
EDL	Enab, **Disab**
Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-end	**Disab**, Maint, Send, Both
Far-end	**Disab**, Maint
Mgmt Link	Enab, **Disab**

Prt2 Options	Value (Default in **Bold**)
Port Type	**E530**, V.35, RS449, X.21
Base Rate	**Nx64**, Nx56
Net DCLB	**Disab**, V.54, FT1, Both
Port LB	**Disab**, DTLB, DCLB, Both
All Ones	Disab, DTR, RTS, **Both**
Rcv Yellow	None, **Halt**
Tx Clock	**Int**, Ext
InvertTxC	Enab, **Disab**
InvrtData	Enab, **Disab**
EDL	Enab, **Disab**
Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-end	**Disab**, Maint, Send, Both
Far-end	**Disab**, Maint
Mgmt Link	Enab, **Disab**

Prt4 Options	Value (Default in **Bold**)
Port Type	**E530**, V.35, RS449, X.21
Base Rate	**Nx64**, Nx56
Net DCLB	**Disab**, V.54, FT1, Both
Port LB	**Disab**, DTLB, DCLB, Both
All Ones	Disab, DTR, RTS, **Both**
Rcv Yellow	None, **Halt**
Tx Clock	**Int**, Ext
InvertTxC	Enab, **Disab**
InvrtData	Enab, **Disab**
EDL	Enab, **Disab**
Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-end	**Disab**, Maint, Send, Both
Far-end	**Disab**, Maint
Mgmt Link	Enab, **Disab**

Network Interface

Network Channel	Allocation
N1	
N2	
N3	
N4	
N5	
N6	
N7	
N8	
N9	
N10	
N11	
N12	
N13	
N14	
N15	
N16	
N17	
N18	
N19	
N20	
N21	
N22	
N23	
N24	

Allocations

N1 – N24 indicates allocation to DTE (Drop/Insert) channels.

DTE Drop/Insert (DSX-1) Interface

DTE (DSX-1) Channel	Allocation
D1	
D2	
D3	
D4	
D5	
D6	
D7	
D8	
D9	
D10	
D11	
D12	
D13	
D14	
D15	
D16	
D17	
D18	
D19	
D20	
D21	
D22	
D23	
D24	

Allocations

D1 – D24 indicates allocation to network channels.

DTE Chan Config	Assign: (N1 – 24)	Voice (RBS or Data)
D1		
D2		
D3		
D4		
D5		
D6		
D7		
D8		
D9		
D10		
D11		
D12		
D13		
D14		
D15		
D16		
D17		
D18		
D19		
D20		
D21		
D22		
D23		
D24		

Port Chan Conf	Options		Value (Default in **Bold**)
Port 1	Assign To		**NET**, DTE, Prt2, Prt3, Prt4
	Assign By		**Block**, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)
Port 2	Assign To		**NET**, DTE, Prt1, Prt3, Prt4
	Assign By		**Block**, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)

Port Chan Conf	Options		**Value** (Default in **Bold**)
Port 3	Assign To		**NET**, DTE, Prt1, Prt2, Prt4
	Assign By		**Block**, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)
Port 4	Assign To		**NET**, DTE, Prt1, Prt2, Prt3
	Assign By		**Block**, ACAMI, Chan
	If Assign By Block	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672, 728, 784, 840, 896, 952, 1008, 1064, 1120, 1176, 1232, 1288, 1344
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select One)
	If Assign By ACAMI	Port Rate	Nx64: 64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768 Nx56: 56, 112, 168, 224, 280, 336, 392, 448, 504, 560, 616, 672
		Start At	Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 (Select One)
	If Assign By Chan		Time Slot (N*x* or D*x*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 (Select Multiple)

General Mgmt Options	**Value** (Default in **Bold**)
SNMP Mgt	Enab, **Disab**
NMS Valid	Enab, **Disab**
Num Sec Mgrs	**1**, 2, 3, 4, 5, 6, 7, 8, 9, 10
NMS *n* IP Adr	Edit, Clear
NMS *n* Access	**Read**, R/w
System Name	Edit, Clear
System Location	Edit, Clear
System Contact	Edit, Clear
CommunityName1	Edit, Clear
Access 1	**Read**, R/W
CommunityName2	Edit, Clear
Access 2	**Read**, R/W
IP Adr	Edit, Clear
NetMask	Edit, Clear
Com IP Adr	Edit, Clear
Com NetMask	Edit, Clear
Com Link	**PPP**, SLIP
Modem IP Adr ●	Edit, Clear
Mdm NetMask ●	Edit, Clear
Alt Mdm IP Adr ●	Edit, Clear
Alt Mdm NetMask ●	Edit, Clear
Modem Link ●	**PPP**, SLIP
Aux IP Adr ●	Edit, Clear
Aux NetMask ●	Edit, Clear
IPBusMast ▲	Enab, **Disab**
Def Netwk	**None**, IPBus, Com, Modem, Aux, FDL, EDL*n*

Mgmt Trap Options	**Value** (Default in **Bold**)
Num Trap Mgrs	**1**, 2, 3, 4, 5, 6
Trap*n* IP Adr	Edit, Clear
Trap*n* Dst	**None**, IPBus, Com, Modem, Aux, FDL, EDL*n*
Gen Trap	Disab, Warm, Auth, **Both**
Entp Trap	**Enab**, Disab
Link Trap	Disab, Up, Down, **Both**
Trap I/F	NET, DTE, T1s, Ports, **All**

NOTE

A circular symbol (●) identifies configuration options that are available on standalone DSU/CSUs only. A triangular symbol (▲) identifies configuration options that are available on carrier-mounted DSU/CSUs only.

Pin Assignments D

Overview D-1
T1 Network Interface D-1
DTE Drop/Insert Interface D-3
MODEM Port Interface D-4
AUX Port Interface D-5
COM Port Interface D-6
EIA 530A Port Interface Connector D-8
EIA 530A-to-RS449 Cable Interface D-9
EIA 530A-to-V.35 Cable Interface D-11
EIA 530A-to-X.21 Cable Interface D-13
Serial Crossover Cable D-15
Power Input Connector D-16
Optional DC Power Cable D-16
External Clock Interface D-16

Overview

The DSU/CSU is shipped with a power module and a VF cable. Various other interconnecting cables are available. For cable feature numbers, refer to Appendix I, *Equipment List*. This appendix describes connector pin assignments and cables.

T1 Network Interface

The T1 network interface connector is an RJ48C, 8-position, unkeyed modular jack (Table D-1).

The T1 line interface cable is a 20-foot, 24 AWG solid, 2-twisted pair cable that is either RJ48C-to-RJ48C (Figure D-1) or RJ48C-to-DA15P (Figure D-2).

Table D-1
T1 Network Interface Connector

Signal	Pin Number
Receive Ring	1
Receive Tip	2
Transmit Ring	4
Transmit Tip	5

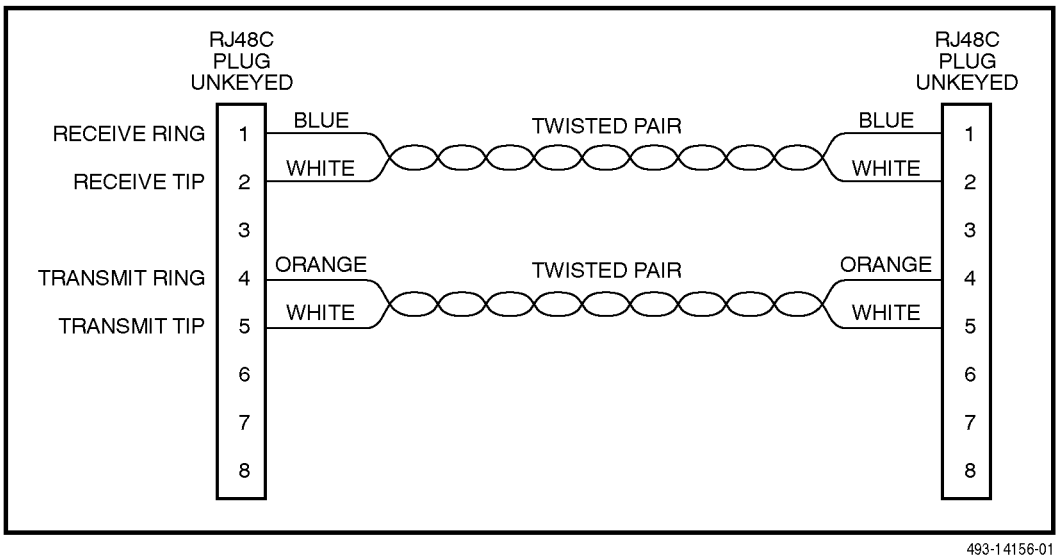


Figure D-1. T1 Line Interface Cable, RJ48C-to-RJ48C

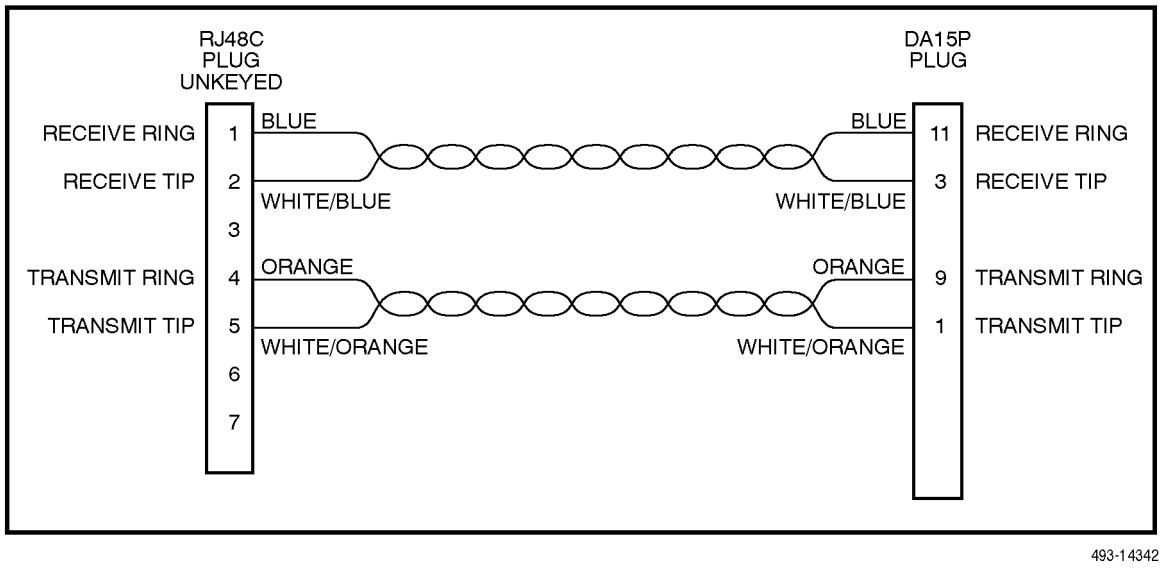


Figure D-2. T1 Line Interface Cable, RJ48C-to-DA15P

DTE Drop/Insert Interface

The DTE Drop/Insert (DSX-1) interface connector is a DB15-type socket connector (Table D-2). For information about using Relay Contact Sense for external DTE loopback, refer to the Extrn DLB configuration option in the *DTE Interface Configuration Options* section of Appendix C.

The DTE Drop/Insert (DSX-1) cable (Figure D-3) is typically supplied by a DTE vendor. It is made of shielded twisted-pair wires (22 AWG). The cable connector is a DB15-type plug connector. Be sure to connect the shield ground only at the DSU/CSU end to prevent ground loops.

Table D-2
DTE Drop/Insert (DSX-1) Connector

Signal	Pin Number
Receiver Tip from DTE	1
Receiver Ring from DTE	9
Transmitter Tip to DTE	3
Transmitter Ring to DTE	11
Relay Contact Sense Return	12
Relay Contact Sense	14
Shield Ground	2,4

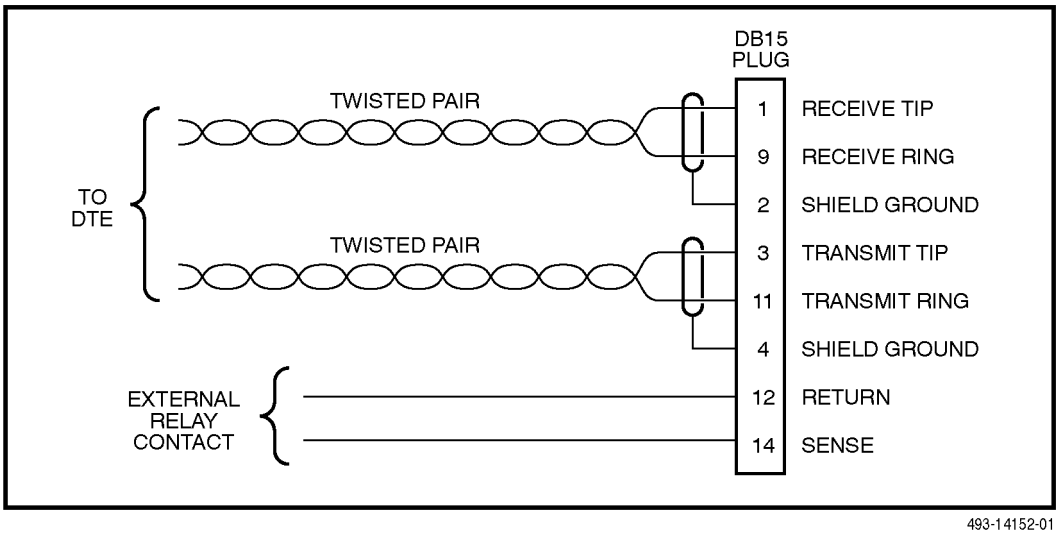


Figure D-3. DTE Drop/Insert (DSX-1) Cable

MODEM Port Interface

The integral modem port connector is a 4-position, RJ11C-like modular jack (Table D-3).

The integral modem VF cable is a 14.5-foot, 26 AWG, 4-conductor keyed cable with an RJ11C-like plug connector (Figure D-4). This cable is supplied with your standalone DSU/CSU.

Table D-3
Integral Modem Port Connector

Signal	Pin Number
VF Ring	2
VF Tip	3

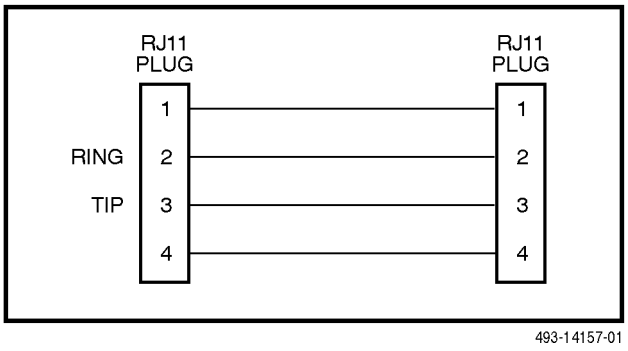


Figure D-4. Integral Modem Cable

AUX Port Interface

The Auxiliary (AUX) port connects to the LAN Adapter for SNMP or Telnet applications, or to another DSU/CSU's COM port for daisy chain connectivity. **(The SNMP LAN Adapter includes the cable that is needed to attach it to the DSU/CSU.)** The AUX port connector is a DB25-type socket connector (Table D-4).

NOTE

For daisy-chaining an AUX port to a COM port, a 25-pin-to-8-pin, cable is required and the appropriate configuration options (Com Use and Aux Use) must be set to Daisy. Whenever the cable is connected or disconnected, you should change the Daisy selection to ensure that the correct parameters have been negotiated for the link layer.

Table D-4
AUX Port Connector

Signal	Direction	Pin Number
DTE Transmit Clock	From DSU/CSU	15
DTE Receive Data	To DSU/CSU	3
Signal Ground	—	7
DTE Transmit Data	From DSU/CSU	2
DTE Receive Clock	From DSU/CSU	17

COM Port Interface

The COM port connects to a PC for front panel emulation, to an ASCII terminal or printer for alarms, to an async terminal, to a network device (e.g., a router) for SNMP or Telnet applications, to the LAN Adapter for SNMP or Telnet applications, or to another DSU/CSU's AUX port for daisy chain connectivity. **(The SNMP LAN Adapter includes the cable that is needed to attach it to the DSU/CSU.)** The COM port connector is an 8-position keyed modular connector (Table D-5). The data signals on this port are referenced to a DTE interface.

The COM port-to-PC cable is shown in Figure D-5 and the COM port-to-terminal/printer cable is shown in Figure D-6.

NOTE

For daisy-chaining an AUX port to a COM port, a 25-pin-to-8-pin, cable is required and the appropriate configuration options (Com Use and Aux Use) must be set to Daisy. Whenever the cable is connected or disconnected, you should change the Daisy selection to ensure that the correct parameters have been negotiated for the link layer.

Table D-5
COM Port Connector

Signal	Direction	Pin Number
DCE Transmit Clock	From DSU/CSU	1
DCE Receive Data	From DSU/CSU	2
Signal Ground	—	3
DCE Transmit Data	To DSU/CSU	4
DCE Data Terminal Ready	To DSU/CSU	5
DCE Carrier Detect	From DSU/CSU	6
DCE Request-to-Send	To DSU/CSU	7
DCE Receive Clock	From DSU/CSU	8

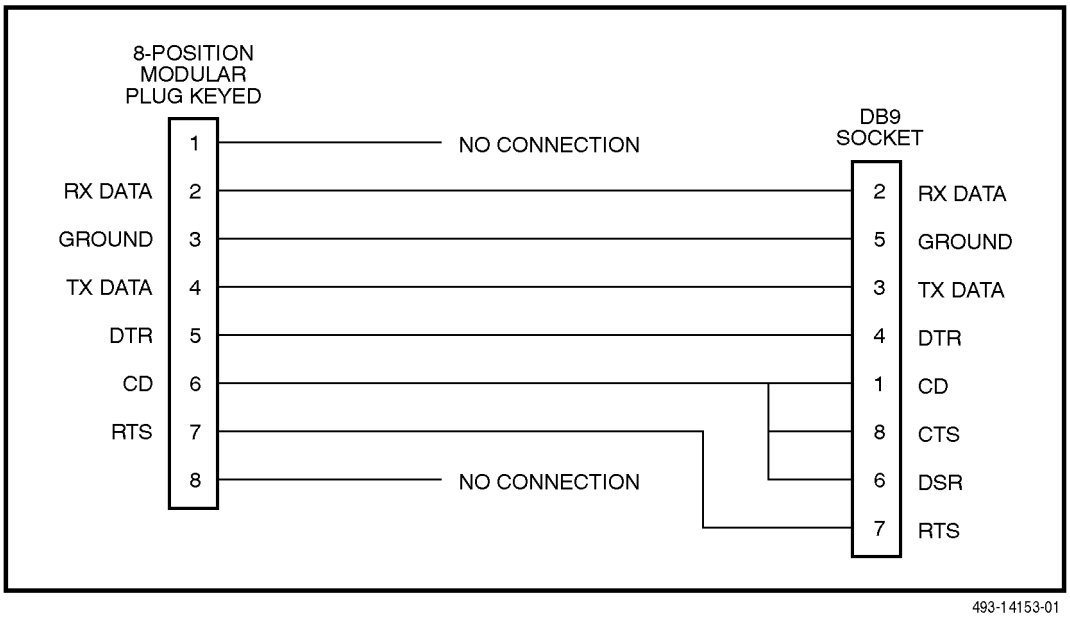


Figure D-5. COM Port-to-PC Cable

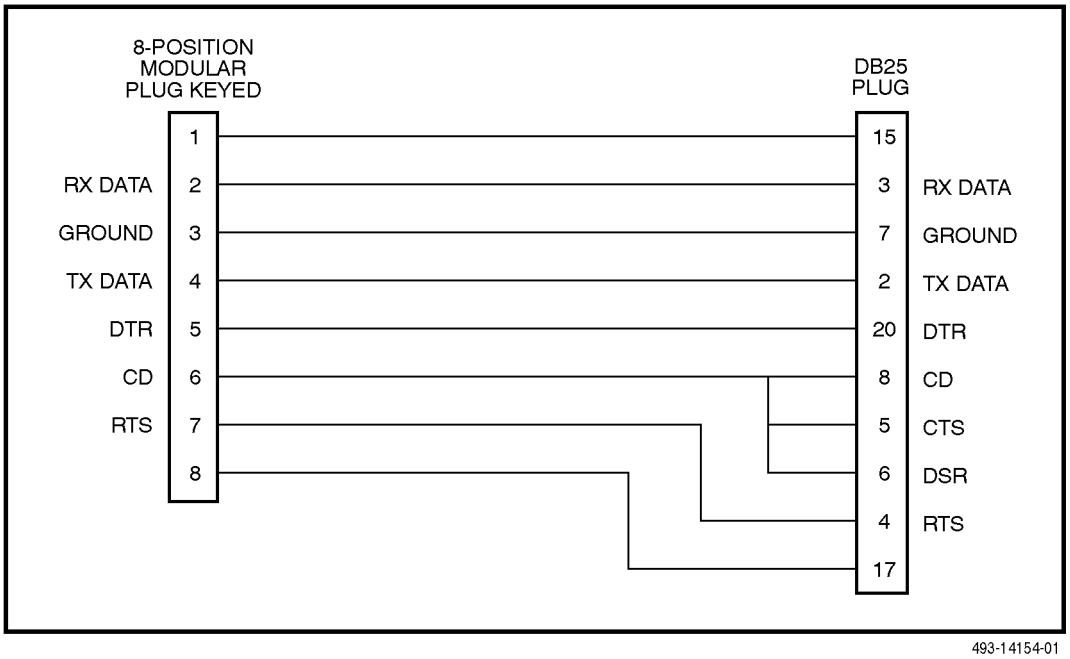


Figure D-6. COM Port-to-Terminal/Printer Cable

EIA 530A Port Interface Connector

The EIA 530A Port interface connector information is shown in Table D-6.

Table D-6
EIA 530A Port Interface Connector

Signal	Circuit Mnemonic	CCITT Number	Direction	Pin
Shield	—	—	—	1
Signal Common	AB	102A	—	7
Signal Common	AC	102B	—	23
Transmitted Data	BA	103	To DSU/CSU	2 (A) 14 (B)
Received Data	BB	104	From DSU/CSU	3 (A) 16 (B)
Request-to-Send	CA	105	To DSU/CSU	4 (A) 19 (B)
Clear-to-Send	CB	106	From DSU/CSU	5 (A) 13 (B)
Received Line Signal Detector	CF	109	From DSU/CSU	8 (A) 10 (B)
DCE Ready	CC	107	From DSU/CSU	6
DTE Ready	CD	108/1, /2	To DSU/CSU	20
Transmit Signal Element Timing (DTE Source)	DA	113	To DSU/CSU	11 (B) 24 (A)
Transmit Signal Element Timing (DCE Source)	DB	114	From DSU/CSU	12 (B) 15 (A)
Receiver Signal Element Timing (DCE Source)	DD	115	From DSU/CSU	17 (A) 9 (B)
Local Loopback	LL	141	To DSU/CSU	18
Remote Loopback	RL	140	To DSU/CSU	21
Test Mode	TM	142	From DSU/CSU	25

EIA 530A-to-RS449 Cable Interface

The EIA 530A-to-RS449 adapter cable (Figure D-7) provides the RS449 interface shown in Table D-7.

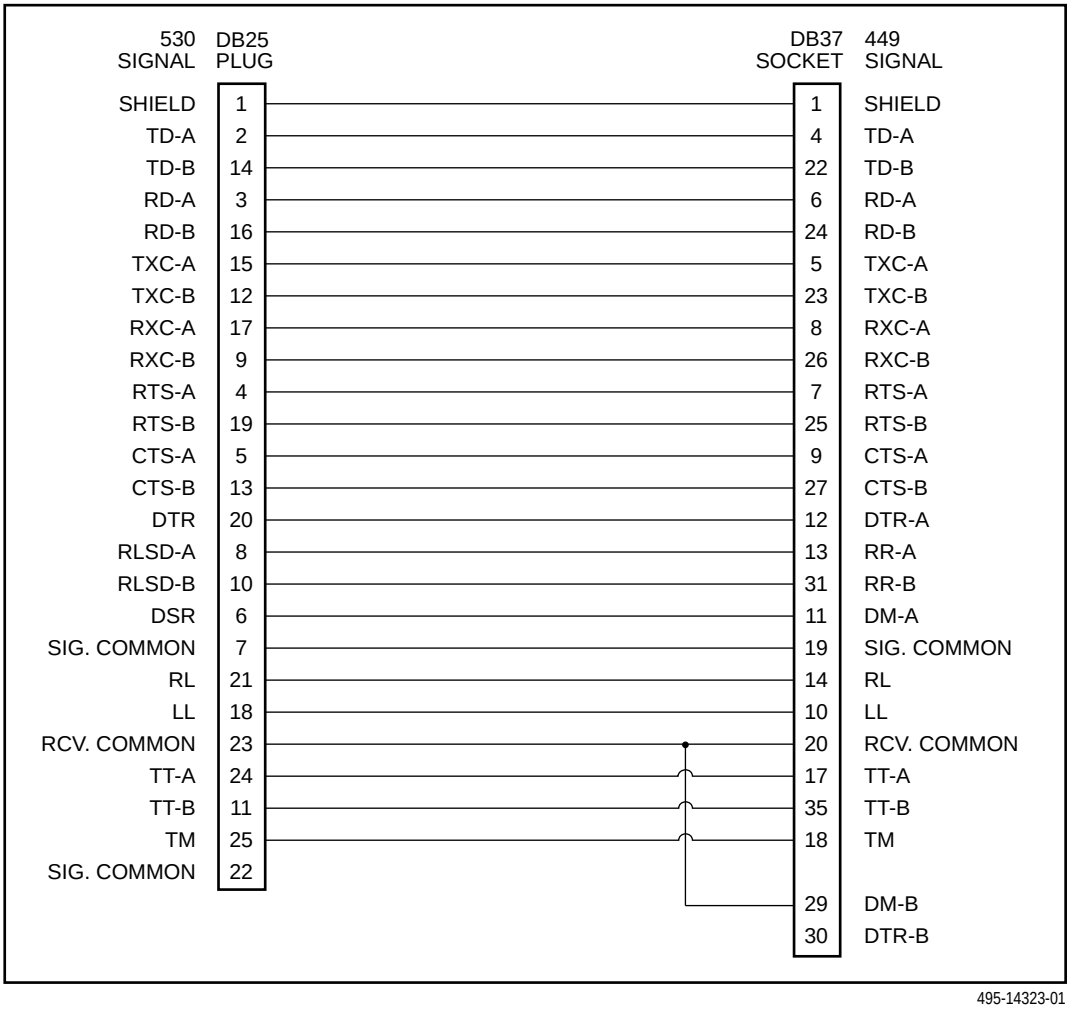


Figure D-7. EIA 530A-to-RS449 Cable

Table D-7
RS449 Cable Interface

Signal	Circuit Mnemonic	CCITT Number	Direction	Pin
Shield	—	—	—	1
Signal Ground	SG	102A	—	19
Receive Ground	RC	102B	—	20
Send Common	SC	—	—	37
Send Data	SD	103	To DSU/CSU	4 (A) 22 (B)
Receive Data	RD	104	From DSU/CSU	6 (A) 24 (B)
Request-to-Send	RS	105	To DSU/CSU	7 (A) 25 (B)
Clear-to-Send	CS	106	From DSU/CSU	9 (A) 27 (B)
Receiver Ready	RR	109	From DSU/CSU	13 (A) 31 (B)
Data Mode	DM	107	From DSU/CSU	11 (A) 29 (B)
Terminal Ready	TR	108/1, /2	To DSU/CSU	12 (A) 30 (B)
Terminal Timing	TT	113	To DSU/CSU	17 (A) 35 (B)
Send Timing	ST	114	From DSU/CSU	5 (A) 23 (B)
Receive Timing	RT	115	From DSU/CSU	8 (A) 26 (B)
Local Loopback	LL	141	To DSU/CSU	10
Remote Loopback	RL	140	To DSU/CSU	14
Test Mode	TM	142	From DSU/CSU	18

EIA 530A-to-V.35 Cable Interface

The EIA 530A-to-V.35 adapter cable (Figure D-8) provides the V.35 interface shown in Table D-8.

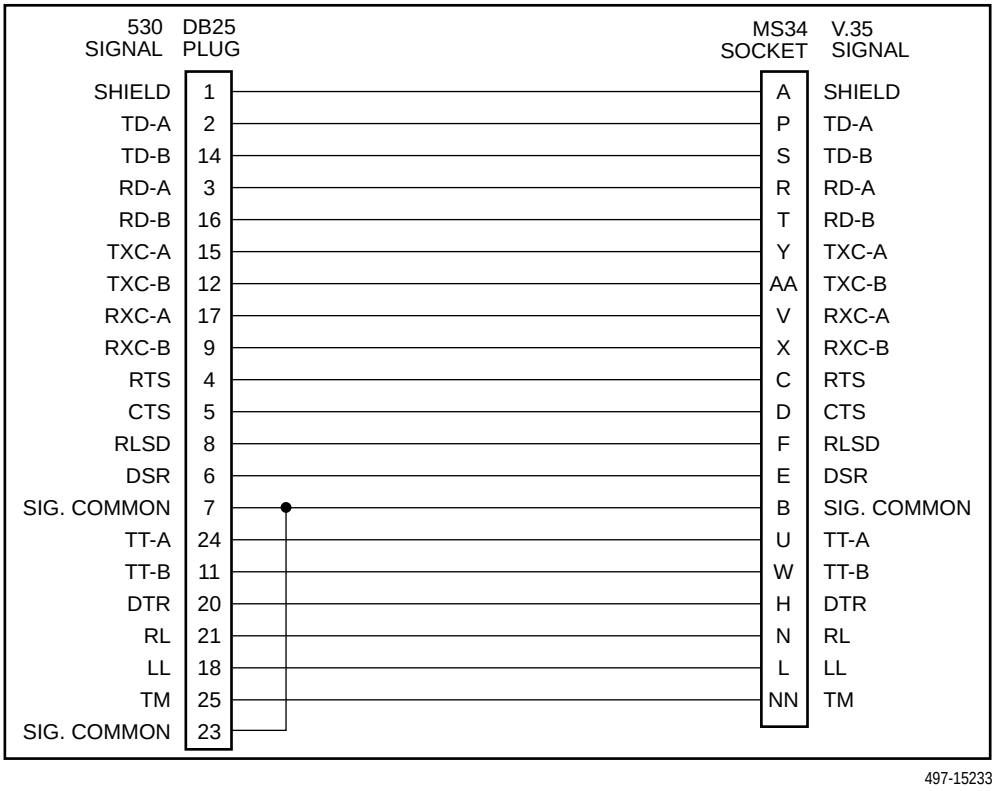


Figure D-8. EIA 530A-to-V.35 Cable

Table D-8
V.35 Cable Interface

Signal	CCITT Number	Direction	Pin
Shield	—	—	A
Signal Common	102	—	B
Transmitted Data	103	To DSU/CSU	P (A) S (B)
Received Data	104	From DSU/CSU	R (A) T (B)
Request to Send	105	To DSU/CSU	C
Clear to Send	106	From DSU/CSU	D
Data Channel Received Line Signal Detector	109	From DSU/CSU	F
Data Set Ready	107	From DSU/CSU	E
Data Terminal Ready	108/1, /2	To DSU/CSU	H
Transmit Signal Element Timing (DTE Source)	113	To DSU/CSU	U (A) W (B)
Transmit Signal Element Timing (DCE Source)	114	From DSU/CSU	Y (A) AA (B)
Receiver Signal Element Timing (DCE Source)	115	From DSU/CSU	V (A) X (B)
Local Loopback	141	To DSU/CSU	L
Loopback/Maintenance	140	To DSU/CSU	N
Test Indicator	142	From DSU/CSU	NN

EIA 530A-to-X.21 Cable Interface

The EIA 530A-to-X.21 adapter cable (Figure D-9) provides the X.21 interface shown in Table D-9.

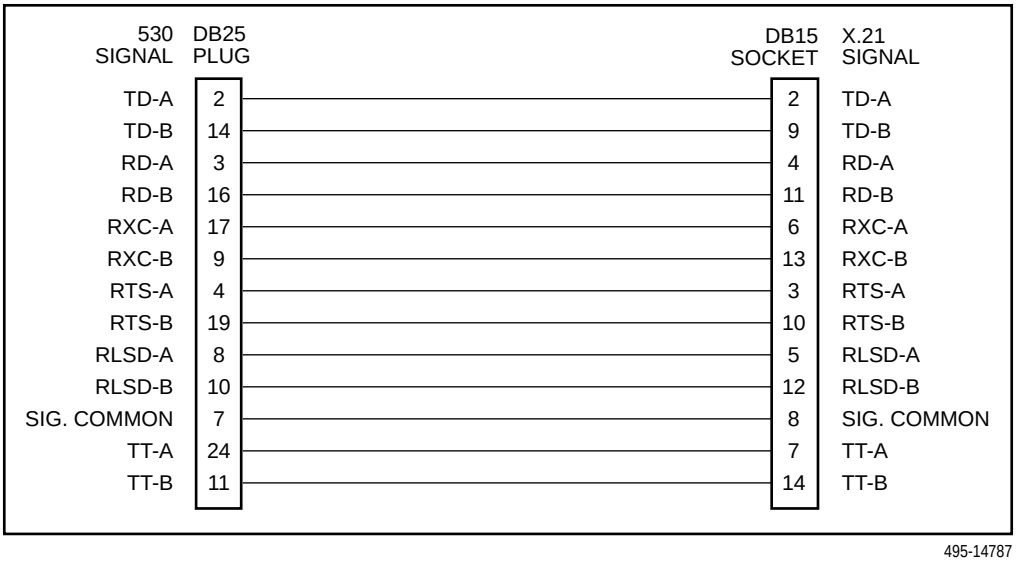


Figure D-9. EIA 530A-to-X.21 Cable

Table D-9
X.21 Cable Interface

Signal	CCITT Number	Direction	Pin
Signal Common	102	—	8
Transmitted Data	103	To DSU/CSU	2 (A) 9 (B)
Received Data	104	From DSU/CSU	4 (A) 11 (B)
Request-to-Send	105	To DSU/CSU	3 (A) 10 (B)
Data Channel Received Line Signal Detector	109	From DSU/CSU	5 (A) 12 (B)
Transmit Signal Element Timing (DTE Source)	113	To DSU/CSU	7 (A) 14 (B)
Receiver Signal Element Timing (DCE Source)	115	From DSU/CSU	6 (A) 13 (B)

Serial Crossover Cable

Use a serial crossover cable like the one shown in Figure D-10 (with an adapter like that shown in Figure D-6) to connect an external modem to the DSU/CSU's COM port.

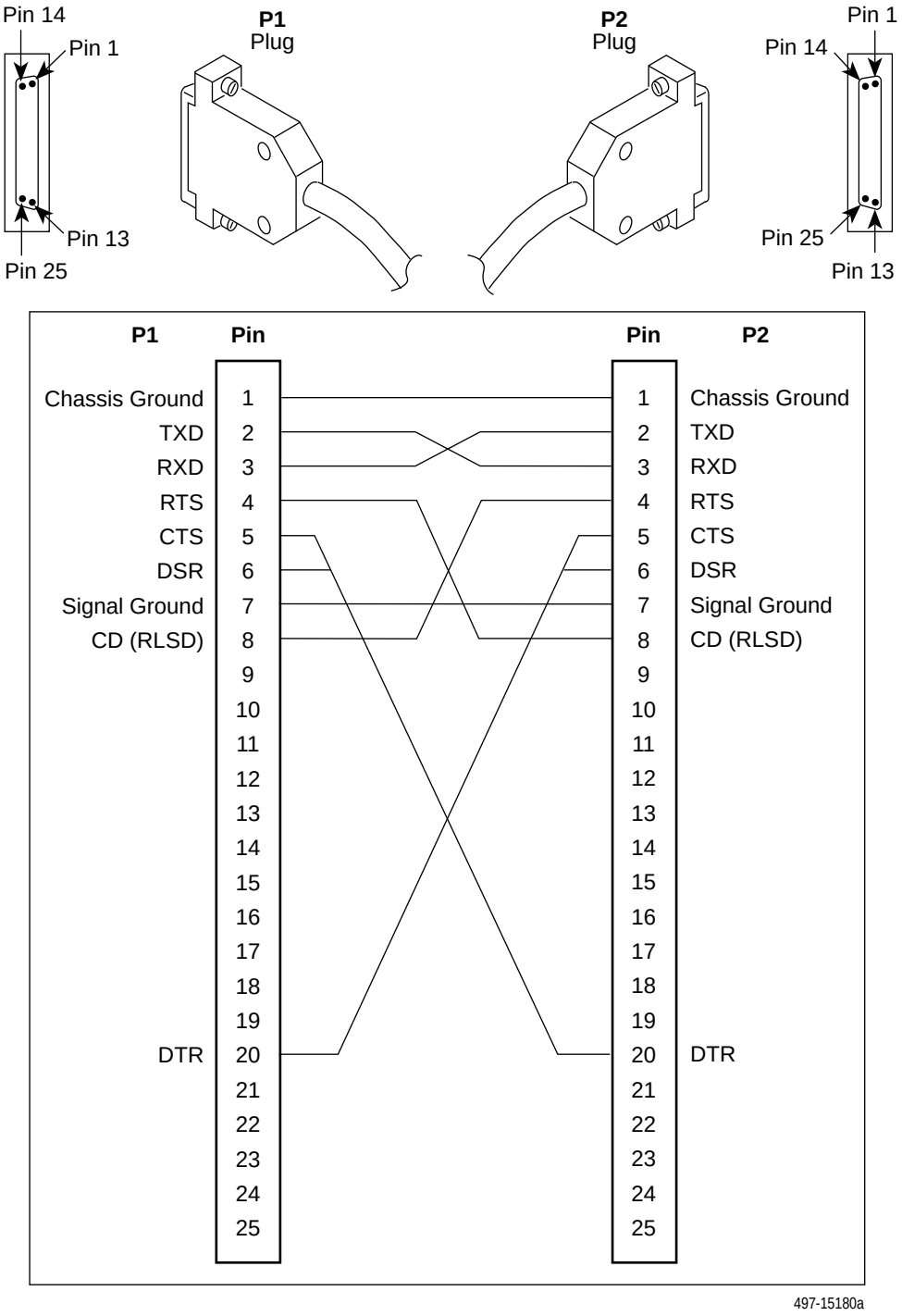


Figure D-10. Serial Crossover Cable

Power Input Connector

The input power connector leads are shown in Table D-10.

Table D-10
DC Power Connector

Signal	Pin Number
–48 Vdc Return	1, 2
–48 Vdc A	6
–48 Vdc B	5
+24 Vdc	5
+24 Vdc Return	4
Chassis Ground	3

External Clock Interface

The External Clock connector pinouts are in Table D-11.

Table D-11
External Clock Connector

Signal	Pin Number
Shield	1
Clock (+) (RS422 only)	2
Clock (–) (RS422 only)	3
Clock In (RS423 only)	9
Signal Common	11

Optional DC Power Cable

The power cable is a 14.5-foot, 18 AWG stranded cable. The connector is terminated at one end with a 6-position connector. The other end of the cable is terminated with a bare wire that should be connected to a dc power source. Figure D-11 shows the wire colors. The power source can be either a single source of +24 Vdc or up to two sources of –48 Vdc (A and B). You cannot connect +24 Vdc and –48 Vdc to the same unit. See the installation instructions in Chapter 2, *Installation*.

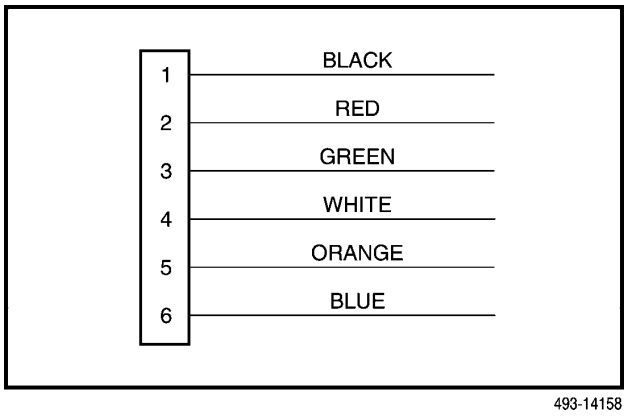


Figure D-11. DC Power Cable

SNMP MIB Objects E

Overview E-1
MIB II (RFC 1213) E-2
System Group, MIB II E-2
Interface Group, MIB II E-3
IP Group, MIB II E-6
ICMP Group, MIB II E-8
TCP Group, MIB II E-8
UDP Group, MIB II E-8
Transmission Group, MIB II E-8
SNMP Group, MIB II E-8
DS1/E1 MIB (RFC 1406) E-8
Near End Group, DS1/E1 MIB E-8
Far End Group, DS1/E1 MIB E-11
DS1 Fractional Group, DS1/E1 MIB E-11
RS-232-like MIB (RFC 1317) E-12
General Port Table, RS-232-like MIB E-12
Asynchronous Port Table, RS-232-like MIB E-13
Synchronous Port Table, RS-232-like MIB E-14
Input Signal Table, RS-232-like MIB E-14
Output Signal Table, RS-232-like MIB E-14
Generic-Interface MIB Extensions (RFC 1229) E-15
Generic Interface Test Table, Generic Interface MIB E-15
Enterprise MIB E-16
Correlation between Menu Commands and SNMP Objects E-16

Overview

This appendix describes the Management Information Base (MIB) objects that are supported by the DSU/CSU and provides a correlation between front panel commands and MIB objects (Table E-1).

The DSU/CSU supports the following MIBs:

- MIB II – Defines the general objects for use in Transmission Control Protocol/Internet Protocol (TCP/IP) internets and provides general information about the DSU/CSU.
- DS1/E1 MIB – Defines objects for managing DS1 interfaces and supports the network and DTE Drop/Insert (DSX-1) interfaces on the DSU/CSU.
- RS-232-like MIB – Defines objects for managing RS-232-type interfaces and supports synchronous data ports (PORTs 1– 4) and management communication ports (AUX, MODEM, and COM ports) on the DSU/CSU.
- Generic-Interface Extension MIB – An extension to MIB II that defines additional objects for control of generic interfaces in MIB II. It supports control of tests on the DTE Drop/Insert (DSX-1) and synchronous data interfaces that are not supported by other MIBs.
- Enterprise MIB – Defines objects that are unique to devices such as Model 316x DSU/CSUs.

MIB II (RFC 1213)

The objects defined by MIB II are organized into 10 different groups. The DSU/CSU implements only those groups where the semantics of the group are applicable to the implementation of a DSU/CSU. The MIB II object groups supported or not supported by the 3100 Series devices are as follows:

System Group	Supported.
Interface Group	Supported for the network interface, the DTE Drop/Insert (DSX-1) interface, the synchronous data ports, the COM port, the AUX port, and the MODEM port. Interface statistics (counters) apply to any port (COM, AUX, or MODEM), whichever is defined as the SNMP management link.
Address Translation Group	Not supported since this group is not supported in MIB II.
IP Group	Supported.
ICMP Group	Supported.
TCP Group	Supported.
UDP Group	Supported.
EGP Group	Not supported since the EGP protocol is not supported by the DSU/CSU.
Transmission Group	Supported on the T1 interfaces using the DS1/E1 MIB. Supported on the synchronous data ports using the RS-232-like MIB. Supported on the COM, AUX, and MODEM ports using the RS-232-like MIB.
SNMP Group	Supported.

System Group, MIB II

The System Group objects are fully supported by the DSU/CSU. The following sections provide clarification for objects contained in the System Group where it is not otherwise clear how the object definition in MIB II is related to the DSU/CSU. Objects not mentioned are supported as stated in the MIB.

System Group – "sysDescr" Object (system 1)

This object provides the full name and version identification for the system hardware and software. This object displays the following string:

[*Company Name*] T1 DSU/CSU; model *xxxx-xx-xxx*; S/W Release: *yy.yy.yy*; H/W CCA1: *zzzz-zzz;* H/W CCA2: *zzzz-zzz*; Serial number: *ssssssss*.

Where: *xxxx-xx-xxx* represents the full model number of the unit.

yy.yy.yy represents the software revision number of the unit.

zzzz-zzz represents the hardware revision number of the unit.

ssssssss represents the serial number of the unit.

System Group – "sysObjectID" Object (system 2)

This object provides the authoritative identification of the network management subsystem contained in the unit.

This object displays the following object identifier:

3160	[*Company OID*].1.14.2.2.1
3164	[*Company OID*].1.14.2.2.2
3165	[*Company OID*].1.14.2.2.3
3161	[*Company OID*].1.14.2.2.4

System group –"sysContact" Object (system 4)

This object provides a textual identification of the contact person for this managed node.

System Group – "sysName" Object (system 5)

This object provides an administratively-assigned name for this managed node.

System Group – "sysLocation" Object (system 6)

This object provides the physical location of this node.

System Group – "sysServices" Object (system 7)

This object provides a value which indicates the set of services that are potentially offered by the DSU/CSU. Only the following values are supported.

- physical(1) – Layer 1 functionality for all interfaces.
- datalink/subnetwork(2) – Layer 2 functionality (SLIP, PPP) for the COM, AUX, and MODEM ports.
- internet(4) – Layer 3 functionality (IP) for all management links.
- end-to-end(8) – Layer 4 functionality (UDP) for all management links.

Therefore, set this object to 15 (the sum of 1 + 2 + 4 + 8).

Interface Group, MIB II

The Interfaces Group consists of an object indicating the number of interfaces supported by the unit and an interface table containing an entry for each interface. The DSU/CSU provides an entry in the interface table for the network interface, the DTE Drop/Insert (DSX-1) interface, each of the synchronous data ports (1, 2, or 4 depending on the model), the COM port, the AUX port, and the MODEM port, if they apply. The following sections provide clarification for objects contained in the Interface Group where it is not clear how the object definition in MIB II is related to the DSU/CSU.

Interface Group – "ifNumber" Object (interfaces 1)

This variable contains the maximum number of MIB II supported interfaces possible across the 31xx Series product line (9). This is different from the MIB description, which is defined as the number of interfaces on the particular device. This change allows the use of the same ifIndexes across all 31xx Series models.

Interface Group – "ifIndex" Object (ifEntry 1)

This object provides the index into the ifTable and typically into tables in other MIBs also. The values of the ifIndex object do not vary between models even though not all indexes are supported for a particular model. When an unsupported index is accessed, "noSuchName" is returned.

The following are the values of the ifIndexes for all DSU/CSU models:

- 1–Net T1
- 2–DTE T1
- 3–COM port
- 4–Modem port
- 5–Auxiliary RS-232 port
- 6–DCE port 1
- 7–DCE port 2
- 8–DCE port 3
- 9–DCE port 4

The supported ifIndexes for the 3160 DSU/CSU are:

- Net T1
- DTE T1
- COM port
- Modem port
- Auxiliary RS-232 port
- DCE port 1
- DCE port 2

The supported ifIndexes for the 3164 DSU/CSU are:

- Net T1
- DTE T1
- COM port
- Modem port
- Auxiliary RS-232 port
- DCE port 1
- DCE port 2
- DCE port 3
- DCE port 4

The supported ifIndexes for the 3165 DSU/CSU are:

- Net T1
- COM port
- Modem port
- DCE port 1

The supported ifIndexes for the 3161 DSU/CSU are:

- Net T1
- DTE T1
- COM port (if configured)
- DCE port 1
- DCE port 2 (if configured)

Interface Group – "ifDescr" Object (ifEntry 2)

This object provides information about the interface. Each interface displays a text string as shown below:

Network T1:	"Network T1. [*Company Name*] T1 DSU/CSU, Hardware Version: [CCA number for the CSU board]".
DTE T1:	"DTE T1. [*Company Name*] T1 DSU/CSU, Hardware Version: [CCA number for the CSU board]".
COM:	"COM port. [*Company Name*] T1 DSU/CSU, Hardware Version: [CCA number for the CSU board for the standalone, or the CCA number for the DSU board for the carrier]".
Modem:	"MODEM port. [*Company Name*] T1 DSU/CSU, Hardware Version: [CCA number for the CSU board]".
AUX:	"AUX port. [*Company Name*] T1 DSU/CSU, Hardware Version: [CCA number for the CSU board]".
Data Ports:	"Data Port n. [*Company Name*] T1 DSU/CSU, Hardware Version: [CCA number for the DSU board]" (where *n* is 1 to 4).

Interface Group – "ifType" Object (ifEntry 3)

This object identifies the type of the interface based on the physical/link protocol(s) immediately below the network layer. Only the following values are supported by the DSU/CSU:

- ds1 – Used for the network and DTE Drop/Insert (DSX-1) interfaces.
- propPointToPointSerial(22) – Used for the synchronous data ports. Used for the MODEM or COM port when the port is not configured as the SNMP management interface.
- ppp(23) – Used for the MODEM, AUX, or COM port when the port is configured for PPP.
- slip(28) – Used for the MODEM or COM port when the port is configured for SLIP.

Interface Group – "ifMtu" Object (ifEntry 4)

This object identifies the largest datagram that can be sent or received on the interface. It is applicable only to the interface configured as the SNMP management link. This object is zero for all other interfaces.

Interface Group – "ifSpeed" Object (ifEntry 5)

This object provides the interface's current bandwidth in bits per second. The value of this object for each interface is specified as follows:

T1 Interfaces:	1,544,000 bps.
COM, AUX, and MODEM:	The currently configured data rate for the port.
Data Ports:	The currently configured data rate for the port when the port is allocated to one of the T1 interfaces. If the port is not allocated the data rate is defined as zero.

Interface Group – "ifAdminStatus" Object (ifEntry 7)

This object specifies the desired state (configuration) of the interface. This object is supported only for the COM and MODEM ports. It provides the ability to switch between using the port for SNMP or ASCII operations (dial-out, front panel emulation). The value of this object will not affect the state of any of the interfaces on the DSU/CSU other than the COM or MODEM port. Only the following values are supported by the DSU/CSU:

- up(1) – The SNMP management link is active on the COM or MODEM port.
- testing(3) – The SNMP management link is inactive on the COM or MODEM port. These ports can be used for proprietary ASCII functions.

Interface Group – "ifOperStatus" Object (ifEntry 8)

This object specifies the current operational state of the interface. The value of this object for each interface is defined as follows:

Network T1:	The interface is up(1) when no alarm conditions exist. The interface is down(2) when an alarm condition is active. The interface is testing(3) when a test is active on the interface.
DTE T1:	The interface is up(1) when no alarm conditions exist and the interface is enabled. The interface is down(2) when an alarm condition is active and the interface is disabled. The interface is testing(3) when a test is active on the interface.
COM Port:	When configured as an SNMP management link, up and down are based on the current state of the link layer protocol. Otherwise, the interface is always up(1). The interface is never in the testing(3) state.
AUX Port:	When configured as an SNMP management link, up and down are based on the current state of the link layer protocol. Otherwise, the interface is always down(2). The interface is never in the testing(3) state.
MODEM Port:	When configured as an SNMP management link, up and down are based on the current state of the link layer protocol. Otherwise, the interface is always up(1) when the modem is connected and down(2) when the modem is not connected. The interface is never in the testing(3) state.
Data Ports:	The interface is up(1) when the port is assigned to a T1 interface or another data port as a backup, and both CTS and DSR are ON. The interface is down(2) when the port is unassigned, or either CTS or DSR is OFF. The interface is testing(3) when a test is active on the interface.

Interface Group – "ifLastChange" Object (ifEntry 9)

This object contains the value of "sysUpTime" at the time the interface entered its current operational state.

Interface Group – Input Counters (objects ifEntry 10 to ifEntry 15)

These objects collect statistics on the data received by the COM port, the AUX port, and the MODEM port when these ports are configured as SNMP management links. For interfaces that are not configured as an SNMP management link, these statistics are not provided and an error status is returned if access is attempted. The objects used to collect input statistics are listed below:

- ifInOctets (ifEntry 10)
- ifInUcastPkts (ifEntry 11)
- ifInNUcastPkts (ifEntry 12)
- ifInDiscards (ifEntry 13)
- ifInErrors (ifEntry 14)
- ifInUnknownProtos (ifEntry 15)

Interface Group – Output Counters (objects ifEntry 16 to ifEntry 21)

These objects collect statistics on the data received by the COM port, the AUX port, and the MODEM port when these ports are configured as SNMP management links. For interfaces that are not configured as an SNMP management link, these statistics are not provided and an error status is returned if access is attempted. The objects used to collect output statistics are listed below:

- ifOutOctets (ifEntry 16)
- ifOutUcastPkts (ifEntry 17)
- ifOutNUcastPkts (ifEntry 18)
- ifOutDiscards (ifEntry 19)
- ifOutErrors (ifEntry 20)
- ifOutQLen (ifEntry 21)

IP Group, MIB II

The IP Group objects are supported by the DSU/CSU for all data paths which currently are configured to carry IP data to or from the DSU/CSU, including the MODEM, COM, AUX, carrier SNMP bus, EDL, and FDL. All of the objects in the IP Group other than the IP Address Translation table are fully supported. The IP Address Translation table (ipNetToMediaTable) does not apply to the DSU/CSU and will be empty (i.e., have zero entries). The following sections provide clarification for objects contained in the IP Group when it is not clear how the object definition in MIB II is related to the DSU/CSU.

IP Group – "ipForwarding" Object (ip 1)

This object specifies whether the unit is acting as an IP gateway in respect to the forwarding of a datagram received by, but not addressed to, this unit. Only the following value is supported by the DSU/CSU.

- forwarding(1) – The unit is acting as a gateway.

IP Group – "ipAddrTable" Object (ip 20)

The address table is supported by the DSU/CSU.

IP Group – "ipAdEntAddr" Object (ipAddrEntry 1)

The ipAdEntAddr object is an IP address supported by the device and serves as the index to the address table. Since indexes for tables must be unique, only one ifIndex may be displayed for each IP address supported by the device. If you have configured the same IP address for multiple interfaces or for default IP addresses, you will not see all interfaces that support a particular IP address upon display of the ipAddrTable.

IP Group – "ipAdEntIfIndex" Object (ipAddrEntry 2)

For some address table entries, the ipAdEntIfIndex object may have a value greater than ifNumber. In these cases, the ipAdEntIfIndex refers to a proprietary interface which is not currently implemented by the interface group of MIB II.

IP Group – "ipRouteTable" Object (ip 21)

The routing table used by the DSU/CSU is supported as a read/write table. Entries in this table may be added, deleted, or changed. You should exercise great caution when adding or modifying routes in the ipRoutingTable. In general, it should not be necessary to add or modify routes in the DSU/CSU. In those cases where it is deemed necessary, the routes should only be added to the connected device (i.e., the device closest to the destination). Internal routing mechanisms will propagate the route to the other devices.

An existing route may be effectively deleted by setting the ipRouteType object to "invalid" for the entry to be deleted. An existing route may be modified by changing fields in the desired entry (indexed by ipRouteDest) of the routing table. A new route may be added by specifying values for a table entry for which the index ("ipRouteDest") does not already exist.

To add a route using an SNMP set, you must specify a group of minimal objects. These variable bindings must be contained in a single Protocol Data Unit (PDU). The objects are described in more detail in the following sections. The minimal set consists of:

- ipRouteDest
- ipRouteIfIndex

The following objects are defaulted if not specified in the set PDU used to add a route.

- ipRouteMetric1 – Defaulted to 1 hop.
- ipRouteMetric2 – Defaulted to current slot for carrier devices and –1 for standalone devices.
- ipRouteType – Defaulted to indirect.
- ipRouteMask – Defaulted as specified in the MIB description.

The following objects are unused in the DSU/CSU and setting them will have no effect on the operation of the IP implementation.

- ipRouteMetric3, ipRouteMetric4, ipRouteMetric5 – Defaulted to –1 as specified in the MIB.
- ipRouteNextHop – Defaulted to 0.0.0.0.

The following read-only objects must not be specified in the set PDU used to add a route.

- ipRouteProto – Set to netmgmt(3) by software.
- ipRouteAge – Defaulted to 999.
- ipRouteInfo – Set to OBJECT IDENTIFIER {0, 0} since it is unused.

IP Group – "ipRouteDest" Object (ipRouteEntry 1)

The ipRouteDest object serves as the index to the routing table. Since indexes for tables must be unique, only one route per destination may appear in the table. To ensure that no duplicate destinations appear in the routing table, the ipRouteDest object of the ipRouteTable will be treated as described in RFC 1354 (IP Forwarding Table MIB):

"The destination IP address of this route. An entry with a value of 0.0.0.0 is considered a default route. This object may not take a Multicast (Class D) address value. Any assignment (implicit or otherwise) of an instance of this object to a value *x* must be rejected if the bitwise logical–AND of *x* with the value of the corresponding instance of the ipForwardMask object is not equal to *x*."

IP Group – "ipRouteIfIndex" Object (ipRouteEntry 1)

When the routing table is displayed, the ipRouteIfIndex object for some entries may have a value greater than ifNumber. In these cases, the ipRouteIfIndex refers to a proprietary interface which is not currently implemented by the interface group of MIB II. Route entries with an unrecognized ipRouteIfIndex value should not be deleted.

When setting this object via SNMP, the ipRouteIfIndex value can only assume an appropriate value of ifIndex defined for the particular device type.

IP Group – "ipRouteMetric2" Object (ipRouteEntry 4)

The following values are displayed for the ipRouteMetric2 object. For a carrier device designated as the IP Bus Master, ipRouteMetric2 is used to designate the slot number of the next hop associated with this route if the destination is not connected to the device. For carrier devices not designated as the IP Bus Master or IP Bus Master devices in which the destination is connected to the device, ipRouteMetric2 contains the slot number (0–15) of the carrier device. For standalone devices, ipRouteMetric2 is not used and contains –1.

When adding a route to the routing table using SNMP, do not specify a value for ipRouteMetric2.

IP Group – "ipRouteProto" Object (ipRouteEntry 9)

This object is a read-only object and may have the following values in the DSU/CSU.

- other(1) – Temporary route added by IP.
- local(2) – Route added or modified as a result of user configuration via the front panel.
- netmgmt(3) – Route added or modified by means of an SNMP set.
- icmp(4) – Route added or modified by Internet Control Management Protocol (ICMP).
- rip(8) – Route added or modified by Routing Information Protocol (RIP) (or similar proprietary protocol).

IP Group – "ipRouteAge" Object (ipRouteEntry 10)

This object is implemented as a read-only object in the DSU/CSU. In the DSU/CSU, it reflects the value of the route's time-to-live (in seconds). When displays, a value of 999 represents a route that is retained permanently. For temporary routes, the ipRouteAge object decrements over time. All routes added via an SNMP set of the ipRouteTable are considered permanent routes. These routes do not age, but will remain unless deleted via SNMP.

ICMP Group, MIB II

The ICMP Group objects are fully supported by the DSU/CSU.

TCP Group, MIB II

The TCP Group objects are fully supported by the DSU/CSU, with the exception of the tcpConnState object, which will be read-only.

UDP Group, MIB II

The User Datagram Protocol (UDP) Group objects are fully supported by the DSU/CSU.

Transmission Group, MIB II

Objects in the transmission group are supported on the network and DTE Drop/Insert (DSX-1) interfaces, the COM port, the MODEM port, the AUX port, and the synchronous data ports. The objects in the transmission group are not defined within MIB II, but rather through other Internet standard MIB definitions. The following two transmission group objects are supported by the DSU/CSU.

- ds1 (transmission 18) – The transmission object supported on the T1 interfaces.
- rs232 (transmission 33) – The transmission object supported on the synchronous data ports, COM port, AUX port, and MODEM port.

The "ds1" transmission object is defined by the DS1/E1 MIB. The rs232 transmission object is defined by the RS-232-like MIB.

SNMP Group, MIB II

The SNMP Group objects that apply to a management agent are fully supported by the DSU/CSU. The following objects apply only to an NMS and return a zero value if accessed.

- snmpInTooBigs (snmp 8)
- snmpInNoSuchNames (snmp 9)
- snmpInBadValues (snmp 10)
- snmpInReadOnlys (snmp 11)
- snmpInGenErrs (snmp 12)
- snmpInGetResponses (snmp 18)
- snmpInTraps (snmp19)
- snmpOutGetRequests (snmp 25)
- snmpOutGetNexts (snmp 26)
- snmpOutSetRequests (snmp 27)

DS1/E1 MIB (RFC 1406)

The "ds1" object defined by RFC 1406 is supported for both the network and DTE Drop/Insert (DSX-1) interfaces. The DS1 Near End Group and DS1 Fractional Group are supported for both interfaces. The DS1 Far End Group is not supported.

Near End Group, DS1/E1 MIB

The DS1 Near End Group consists of the following four tables:

- DS1 Configuration
- DS1 Current
- DS1 Interval
- DS1 Total

All four tables are fully supported for the network interface. Since statistics are not kept for the DTE Drop/Insert (DSX-1) interface, only the DS1 Configuration table is fully supported. The "statistic" objects for the DTE Drop/Insert (DSX-1) interface entry in the DS1 Current, DS1 Interval, and DS1 Total tables are always zero (null). The following sections provide clarification for objects contained in the Near End Group when it is not clear how the object definition in the DS1/E1 MIB is related to the DSU/CSU.

Near End Group – "dsx1TimeElapsed" Object (dsx1ConfigEntry 3)

Applies to the network interface only. An error status is returned if access is attempted for the DTE Drop/Insert (DSX-1) interface.

Near End Group – "dsx1ValidIntervals" Object (dsx1ConfigEntry 4)

Applies to the network interface only. An error status is returned if access is attempted for the DTE Drop/Insert (DSX-1) interface.

Near End Group – "dsx1LineType" Object (dsx1ConfigEntry 5)

This object corresponds to the NET Framing/DTE Framing configuration options for the T1 interfaces on the DSU/CSU. Only the following values are supported by the DSU/CSU.

- dsx1ESF(2) – Indicates ESF framing.
- dsx1D4(2) – Indicates D4 framing.

Near End Group – "dsx1LineCoding" Object (dsx1ConfigEntry 6)

This object corresponds to the NET Coding/DTE Coding configuration options for the T1 interfaces on the DSU/CSU. Only the following values are supported by the DSU/CSU.

- dsx1B8ZS(2) – Indicates B8ZS line coding.
- dsx1AMI(5) – Indicates AMI line coding.

Near End Group – "dsx1SendCode" Object (dsx1ConfigEntry 7)

This object specifies the test patterns/codes being sent over the network interface. These tests are not supported on the DTE Drop/Insert (DSX-1) interface. Only the following values are supported by the DSU/CSU.

- dsx1SendNoCode(1) – Specifies that the interface is sending normal or looped data. Setting the interface to this value stops an active "send pattern" test on the interface. This is the only value supported by the DTE Drop/Insert (DSX-1) interface.
- dsx1SendLineCode(2) – Specifies that the network interface is sending a Remote Loopback (Rlpbk) LLBUP code. The code is sent for 10 seconds.
- dsx1SendResetCode(4) – Specifies that the network interface is sending Remote Loopback (Rlpbk) LLBDN code. The code is sent for 10 seconds.
- dsx1SendQRS(5) – Specifies that the network interface is sending a QRSS test pattern. The pattern is sent until the test is halted (i.e., setting to dsx1SendNoCode).
- dsx1SendOtherTestPattern(8) – Specifies that the network interface is sending a 1-in-8 test pattern. The pattern is sent until the test is halted (i.e., setting to dsx1SendNoCode).

Near End Group – "dsx1CircuitIdentifier" Object (dsx1ConfigEntry 8)

This object is only supported on the Net T1 Interface.

Near End Group – "dsx1LoopbackConfig" Object (dsx1ConfigEntry 9)

This object specifies the loopback state of the T1 interfaces. Only the following values are supported by the DSU/CSU.

- dsx1NoLoop(1) – The T1 interface is not in a loopback state.
- dsx1PayloadLoop(2) – Specifies that a Payload Loopback (PLB) is active for the network interface or a Repeater Loopback (RLB) is active for the DTE Drop/Insert (DSX-1) interface.

- dsx1LineLoop(3) – Specifies that a Line Loopback (LLB) is active for the network interface or a DTE Loopback (DLB) is active for the DTE Drop/Insert (DSX-1) interface.

Near End Group – "dsx1LineStatus" Object (dsx1ConfigEntry 10)

This object specifies the line (alarm) status of the T1 interfaces. Only the following values are supported by the DSU/CSU. More than one value may be active at a time.

- dsx1NoAlarm(1) – No alarm present.
- dsx1RcvFarEndLOF(2) – A yellow alarm signal is being received.
- dsx1RcvAIS(8) – An Alarm Indication Signal (AIS) is being received.
- dsx1LossOfFrame(32) – An Out Of Frame condition has persisted for more that 2.5 seconds (i.e., Red Alarm).
- dsx1LossOfSignal(64) – A Loss of Signal condition has persisted for more that 2.5 seconds (i.e., Red Alarm).
- dsx1LoopbackState(128) – The near end of the T1 interface is in a loopback state.
- dsx1Other Failure(4096) – An Excessive Error Rate (EER) has been detected on the network interface.

Near End Group – "dsx1SignalMode" Object (dsx1ConfigEntry 11)

This object specifies whether Robbed Bit Signaling (RBS) is being used. This object differs from the MIB definition in that it is "read-only" (not read/write) for DSU/CSUs. Only the following values are supported by the DSU/CSU.

- none(1) – No signaling is being used on this interface.
- robbedBit(2) – Robbed Bit Signaling is being used on at least one DS0 on this T1 interface.

Near End Group – "dsx1TransmitClockSource" Object (dsx1ConfigEntry 12)

This object specifies the timing source for the transmit clock for this T1 interface. This object differs from the MIB definition in that it is "read-only" (not read/write) for DSU/CSUs. Only the following values are supported by the DSU/CSU.

- loopTiming(1) – The recovered receive clock is being used as the transmit clock.
- localTiming(2) – The DSU/CSU's internal clock is used being as the transmit clock.
- ThroughTiming(3) – The recovered receive clock from another interface (e.g., T1, Port, or External) is being used as the transmit clock.

Near End Group – "dsx1Fdl" Object (dsx1ConfigEntry 13)

This object specifies how Facility Data Link is being used. Only the following values are supported by the DSU/CSU. More than one value may be active at a time.

- dsx1other(1) – SNMP data is being sent over FDL.
- dsx1Ansi-T1-403(2) – ANSI PRMs are supported on the network interface as specified by ANSI T1.403.
- dsx1Att-54016(4) – FDL supports the requirements specified by AT&T publication TR54016.
- dsx1Fdl-none(8) – Indicates that the device does not use FDL. This is the only value that applies to the DTE Drop/Insert (DSX-1) interface.

Near End Group – The DS1 Current Table Objects (dsx1CurrentEntry)

The following DS1 current table objects are provided for the network interface only. Objects in the table that are not listed are not supported and will return an error status if access is attempted.

- dsx1CurrentIndex – The index that identifies the T1 interface.
- dsx1CurrentESs – Errored Seconds for the current interval.
- dsx1Current SESs – Severely Errored Seconds for the current interval.
- dsx1CurrentUASs – Unavailable Seconds for the current interval.
- dsx1CurrentCSSs – Controlled Slip Seconds for the current interval.
- dsx1CurrentBESs – Bursty Errored Seconds for the current interval.

Near End Group – The DS1 Interval Table Objects (dsx1IntervalEntry)

The following DS1 interval table objects are provided for the network interface only. Objects in the table that are not listed are not supported and will return an error status if access is attempted.

- dsx1IntervalIndex – The index that identifies the T1 interface.
- dsx1IntervalNumber – The interval number (1 to 96).
- dsx1IntervalESs – Errored Seconds for the interval.
- dsx1Interval SESs – Severely Errored Seconds for the interval.
- dsx1IntervalUASs – Unavailable Seconds for the interval.
- dsx1IntervalCSSs – Controlled Slip Seconds for the interval.
- dsx1Interval BESs – Bursty Errored Seconds for the interval.

Near End Group – The DS1 Total Table Objects (dsx1TotalEntry)

The following DS1 total table objects are provided for the network interface only. Objects in the table that are not listed are not supported and will return an error status if access is attempted.

- dsx1TotalIndex – The index that identifies the T1 interface.
- dsx1TotalESs – The 24-hour total Errored Seconds.
- dsx1Total SESs – The 24-hour total Severely Errored Seconds.
- dsx1TotalUASs – The 24-hour total Unavailable Seconds.
- dsx1TotalCSSs – The 24-hour total Controlled Slip Seconds.
- dsx1TotalBESs – The 24-hour total Bursty Errored Seconds.

Far End Group, DS1/E1 MIB

The DS1 Far End Group consists of the following three tables:

- DS1 Far End Current
- DS1 Far End Interval
- DS1 Far End Total

These tables are not supported for either the network or DTE Drop/Insert (DSX-1) interface.

DS1 Fractional Group, DS1/E1 MIB

The DS1 Fractional Group consists of the DS1 fractional table. This table (dsx1FracTable) is fully supported by the DSU/CSU and allows channel (time slots) to be mapped between the T1 interfaces and data ports. If an invalid channel map (e.g., two interfaces mapped to a single time slot, one interface mapped to two T1s, etc.) is received, an error will be returned to the SNMP manager. The DSU/CSU will validate all channel configurations before applying them.

Operational Note: The fractional T1 group only allows specification of an entire interface to a particular time slot on another interface (i.e., a time slot on one interface cannot be mapped to a time slot on another interface). This prevents complete mapping of time slots on the DTE Drop/Insert (DSX-1) interface to time slots on the network interface. For mapping time slots between the network and DTE T1 interfaces, the following convention is used: Time slots on the T1 interface that are mapped to another T1 interface (i.e., not a data port) are connected in ascending order. For example, if the fractional table for the network interface maps time slots 1, 3 and 5 to the DTE T1 interface and the DTE T1 interface maps time slots 10, 11 and 15 to the network the following time slots will be connected: N1 to D10, N3 to D11 and N5 to D15.

RS-232-like MIB (RFC 1317)

The "rs232" object defined by RFC 1317 is supported for all of the synchronous data ports, the MODEM port, the COM port, and the AUX port. The RS-232-like MIB consists of one object and five tables, as follows:

- Number of RS-232-like ports
- The General Port Table
- The Asynchronous Port Table
- The Synchronous Port Table
- The Input Signal Table
- The Output Signal Table

The Asynchronous Port table is not supported by the DSU/CSU for the synchronous data ports. The Input Signal and Output Signal tables are not supported for the MODEM, AUX, and COM ports. The following sections provide clarification for objects contained in the RS-232-like MIB when it is not clear how the object definition in MIB is related to the DSU/CSU.

Number of Ports – "rs232Number" Object (rs232 1)

This object contains the number of ports in the RS-232-like general port table. This number is 5 for the 3160, 7 for the 3164, 3 for the 3165 and 2 for the 3161.

General Port Table, RS-232-like MIB

The general port table contains general configuration objects for the RS-232-like interfaces.

General Port Table – "rs232PortIndex" Object (rs232PortEntry 1)

This object contains a unique value for each port and is used as an index into the general port table (rs232PortTable). The values of the rs232PortIndex object vary between models and are listed below.

The values of rs232PortIndex for the 3160 DSU/CSU are:

- 1 – COM port
- 2 – Modem port
- 3 – Auxiliary RS-232 port
- 4 – DCE port 1
- 5 – DCE port 2

The values of rs232PortIndex for the 3164 DSU/CSU are:

- 1 – COM port
- 2 – Modem port
- 3 – Auxiliary RS-232 port
- 4 – DCE port 1
- 5 – DCE port 2
- 6 – DCE port 3
- 7 – DCE port 4

The values of rs232PortIndex for the 3165 DSU/CSU are:

- 1 – COM port
- 2 – Modem port
- 3 – DCE port 1

The values of rs232PortIndex for the carrier 3161 DSU/CSU are:

- 1 – DCE port 1
- 2 – DCE port 2 or COM port (depending upon configuration)

General Port Table – "rs232PortType" Object (rs232PortEntry 2)

This object is used to identify the port's hardware type. Only the following values are supported by the DSU/CSU.

- rs232(2) – Used to identify the MODEM, AUX, and COM ports.
- rs422(3) – Used to identify synchronous data ports that are configured as EIA-530A or RS-449.
- V35(5) – Used to identify synchronous data ports that are configured as V.35.

General Port Table – "rs232PortInSigNumber" Object (rs232PortEntry 3)

This object contains the number of input signals contained in the input signal table. This is the number of signals that can be detected. This number is 2 for the synchronous data ports and 0 for the MODEM, AUX, and COM ports.

General Port Table – "rs232PortOutSigNumber" Object (rs232PortEntry 4)

This object contains the number of output signals contained in the output signal table. This is the number of signals that can be asserted. This number is 2 for the synchronous data ports and 0 for the MODEM, AUX, and COM ports.

General Port Table – "rs232PortInSpeed" Object (rs232PortEntry 5)

This object contains the port's input speed in bits per second. For the DSU/CSU, the rs232PortInSpeed object has the same value as the rs232PortOutSpeed object. The input speed of a synchronous data port is determined by the channel configuration and cannot be changed through this object. Thus, for the synchronous data ports, this object is read-only. The input speed of the MODEM, AUX, or COM port is the currently configured speed. Setting of this value for the MODEM, AUX, or COM port causes the configured port speed to be changed.

General Port Table – "rs232PortOutSpeed" Object (rs232PortEntry 6)

This object contains the port's output speed in bits per second. For the DSU/CSU, the rs232PortInSpeed object has the same value as the rs232PortOutSpeed object. The input speed of a synchronous data port is determined by the channel configuration and cannot be changed through this object. Thus, for the synchronous data ports, this object is read-only. The input speed of the MODEM, AUX, or COM port is the currently configured speed. Setting of this value for the MODEM, AUX, or COM port causes the configured port speed to be changed.

Asynchronous Port Table, RS-232-like MIB

The asynchronous port table contains an entry for the MODEM, AUX, or COM port when the port is configured for asynchronous operation. For the DSU/CSU, the entries in the table that are counters (rs232AsyncPortEntry 6–8) are used to collect statistics and are not supported.

Asynchronous Port Table, "rs232AsyncPortBits" (rs232AsyncPortEntry 2)

This object specifies the number of bits in a character. Only the following values are supported by the DSU/CSU.

- 7 – 7-bit characters. Supported on the COM and MODEM ports only.
- 8 – 8-bit characters.

Asynchronous Port Table, "rs232AsyncPortStopBits" (rs232AsyncPortEntry 3)

This object specifies the number of stop bits supported. Only the following values are supported by the DSU/CSU.

- one(1) – One stop bit.
- two(2) – Two stop bits. Supported on the COM and MODEM ports only.
- one-and-half(3) – One and a half stop bits. Supported on the COM port only.

Asynchronous Port Table, "rs232AsyncPortParity" (rs232AsyncPortEntry 4)

This object specifies the parity used by the port. Only the following values are supported by the DSU/CSU.

- none(1) – No parity bit.
- odd(2) – Odd parity. Supported on the COM and MODEM ports only.
- even(3) – Even parity. Supported on the COM and MODEM ports only.

Asynchronous Port Table, "rs232AsyncPortAutoBaud" (rs232AsyncPortEntry 5)

This object specifies the ability to automatically sense the input speed of the port. Only the following value is supported by the DSU/CSU.

- disabled(2) – Autobaud is not supported.

Synchronous Port Table, RS-232-like MIB

The synchronous port table contains an entry for each of the synchronous data ports and the MODEM or COM port when the port is configured for synchronous operation. For the DSU/CSU, the entries in the table that are counters (rs232SyncPortEntry 3–7) are used to collect statistics and are not supported.

Synchronous Port Table – "rs232SyncPortClockSource" (rs232SyncPortEntry 2)

This object specifies the clock source for the port. Only the following values are supported by the DSU/CSU.

- internal(1) – The port uses an internal clock.
- external(2) – The port uses an external clock.

Input Signal Table, RS-232-like MIB

This table contains entries for the input signals that can be detected by the unit for each of the synchronous data ports.

Input Signal Table – "rs232InSigName" (rs232InSigEntry 2)

This object contains the identification of a hardware input signal. Only the following values are supported by the DSU/CSU.

- rts(1) – Request-To-Send.
- dtr(4) – Data Terminal Ready.

Input Signal Table – "rs232InSigState" (rs232InSigEntry 3)

This object contains the current signal state. Only the following values are supported by the DSU/CSU.

- on(2) – The signal is asserted.
- off(3) – The signal is not asserted.

Input Signal Table – "rs232InSigChanges" (rs232InSigEntry 4)

This object is not supported by the DSU/CSU.

Output Signal Table, RS-232-like MIB

This object contains entries for the output signals that can be asserted by the unit for each of the synchronous data ports.

Output Signal Table – "rs232OutSigName" (rs232OutSigEntry 2)

This object contains the identification of a hardware output signal. Only the following values are supported by the DSU/CSU.

- cts(1) – Clear-To-Send.
- dsr(4) – Data Set Ready.

Output Signal Table – "rs232OutSigState" (rs232OutSigEntry 3)

This object contains the current signal state. Only the following values are supported by the DSU/CSU.

- on(2) – The signal is asserted.
- off(3) – The signal is not asserted.

Output Signal Table – "rs232OutSigChanges" (rs232OutSigEntry 4)

This object is not supported by the DSU/CSU.

Generic-Interface MIB Extensions (RFC 1229)

This generic-interface MIB is an experimental MIB that provides extensions to the generic interface group defined in MIB II. This MIB describes three tables:

- Generic Interface Extension Table
- Generic Interface Test Table
- Generic Receive Address Table

Only the generic interface test table is supported by the DSU/CSU. This table is supported for the network interface only.

Generic Interface Test Table, Generic Interface MIB

The test table provides access to additional tests (loopbacks and pattern tests) that are not in the interface group of MIB II.

Generic Interface Test Table – "ifExtnsTestType" Object (ifExtnsTestEntry 4)

This object is a control variable used to start and stop operator-initiated tests on the interface. It provides the capability to:

- Start/stop the Monitor QRSS test pattern on the network interface.
- Start/stop the Send QRSS/511 test pattern on a synchronous data port.
- Start sending a V.54/FT1 UP/DOWN code to the remote unit for a synchronous data port.
- Start/stop the Monitor QRSS/511 test pattern on a synchronous data port.
- Start/stop the DCLB/DTLB loopback test on a synchronous data port.

The following object identifiers are used to control the tests on the interface.

- noTest – Stops the test in progress on the interface.
- testFullDuplexLoopBack – Initiates a DCLB on the interface. Only supported for the data ports.
- testLoopDTLB – Initiates a DTLB on the interface. Only supported for the data ports.
- testMonQRSS – Initiates a Monitor QRSS test on the interface. Supported for the data ports and the network interface.
- testMon511 – Initiates a Monitor 511 test on the interface. Only supported for the data ports.
- testSendQRSS – Initiates a Send QRSS test on the interface. Only supported for the data ports.
- testSend511 – Initiates a send 511 test on the interface. Only supported for the data ports.
- testSendV54Up – Sends a V54 up code to the remote unit. Only supported for the data ports.
- testSendV54Down – Sends a V54 down code to the remote unit. Only supported for the data ports.
- testSendFT1Up – ends a FT1 up code to the remote unit. Only supported for the data ports.
- testSendFT1Down – Sends a FT1 down code to the remote unit. Only supported for the data ports.

Where these object identifiers are defined as follows:

- testLoopDTLB – OBJECT IDENTIFIER ::= [wellKnownTests 2]
- testMonQRSS – OBJECT IDENTIFIER ::= [wellKnownTests 3]
- testMon511 – OBJECT IDENTIFIER ::= [wellKnownTests 4]
- testSendQRSS – OBJECT IDENTIFIER ::= [wellKnownTests 5]
- testSend511 – OBJECT IDENTIFIER ::= [wellKnownTests 6]
- testSendV54Up – OBJECT IDENTIFIER ::= [wellKnownTests 7]
- testSendV54Down – OBJECT IDENTIFIER ::= [wellKnownTests 8]
- testSendFT1Up – OBJECT IDENTIFIER ::= [wellKnownTests 9]
- testSendFT1Down – OBJECT IDENTIFIER ::= [wellKnownTests 10]

Generic Interface Test Table – "ifExtnsTestResult" Object (ifExtnsTestEntry 5)

This object contains the result of the most recently requested test. Only the following values are supported by the DSU/CSU.

- none(1) – No test currently active.
- inProgress(3) – A test is currently in progress.
- notSupported(4) – The requested test is not supported.
- unAbleToRun(5) – The requested test cannot run due to the state of the unit.

Generic Interface Test Table – "ifExtnsTestCode" Object (ifExtnsTestEntry 6)

This object contains a code that contains more specific information on the test result. This object is defined as an object identifier. Only the following values are supported by the DSU/CSU.

- none – No further information is available. Used for the send pattern/code and loopback tests.
- inSyncNoBitErrors – A monitor pattern (QRSS or 511) test has synchronized on the pattern and has not detected any bit errors.
- inSyncWithBitErrors – A monitor pattern (QRSS or 511) test has synchronized on the pattern and has detected bit errors.
- notInSync – A monitor pattern (QRSS or 511) test has not synchronized on the requested pattern.

Where these object identifiers are defined as follows:

- wellKnownCodes – OBJECT IDENTIFIER ::= [ifExtensions 5]
- none – OBJECT IDENTIFIER ::= [wellKnownCodes 1]
- inSyncNoBitErrors – OBJECT IDENTIFIER ::= [wellKnownCodes 2]
- inSyncWithBitErrors – OBJECT IDENTIFIER ::= [wellKnownCodes 3]
- notInSync – OBJECT IDENTIFIER ::= [wellKnownCodes 4]

Enterprise MIB

The variable devConfigAreaCopy under the devConfigAreaCopy group in the common area of the Enterprise MIB will be fully supported. This variable allows the entire contents of one configuration area to be copied into another configuration area.

Correlation between Menu Commands and SNMP Objects

Table E-1 provides a correlation between how a function is performed or status is displayed on the front panel and how the same function is accomplished using access to the SNMP database. SNMP **objects** are displayed in bold type while *values* for SNMP objects are displayed in italics.

Table E-1
(1 of 3)
SNMP MIB to Front Panel Command Cross-Reference

Front Panel Command	SNMP MIB Object
Stat–>DevHS: LOS at NET OOF at NET Yellow at NET AIS at NET EER at NET	Read the **dsx1LineStatus** object for NET T1 *dsx1LossOfSignal* *dsx1LossOfFrame* *dsx1RcvFarEnd* *dsx1RcvAIS* *dsx1OtherFailure*
Stat–>DevHS: LOS at DTE OOF at DTE Yellow at DTE AIS at DTE	Read the **dsx1LineStatus** object for DTE T1 *dsx1LossOfSignal* *dsx1LossOfFrame* *dsx1RcvFarEnd* *dsx1RcvAIS*
Stat–>Perf–>Telco–>Cur: CurTimer ES UAS SES BES CSS	Read the value in the following objects for NET T1 **dsx1TimeElapsed** **dsx1CurrentES** **dsx1CurrentUAS** **dsx1CurrentSES** **dsx1CurrentBES** **dsx1CurrentCSS**
Stat–>Perf–>Telco–>Intvl–>Dsply: ES UAS SES BES CSS VldIntvl	Select the interval number with **dsx1IntervalNumber**. Read the value in the following objects for NET T1 **dsx1IntervalES** **dsx1IntervalUAS** **dsx1IntervalSES** **dsx1IntervalBES** **dsx1IntervalCSS** **dsx1ValidIntervals**
Stat–>Perf–>Telco–>24Tot: VldIntvl ES UAS SES BES CSS	Read the value in the following objects for NET T1 **dsx1ValidIntervals** **dsx1TotalES** **dsx1TotalUAS** **dsx1TotalSES** **dsx1TotalBES** **dsx1TotalCSS**
Stat–>Tstat: LLB Test Active PLB Test Active RLB Test Active DLB Test Active DCLB on Port *n* DTLB on Port *n* 1–8 Test Active QRSS Test Active QRSS on Port *n* 511 on Port *n* Monitoring QRSS Mon QRSS, Port *n* Mon511, Port *n*	Read: *dsx1LineLoop* from ***dsx1LoopbackConfig*** for Net T1 *dsx1PayloadLoop* from ***dsx1LoopbackConfig*** for Net T1 *dsx1PayloadLoop* from ***dsx1LoopbackConfig*** for DTE T1 *dsx1LineLoop* from ***dsx1LoopbackConfig*** for DTE T1 *testFullDuplexLoopback* from ***IfExtnsTestType*** for Port *n* *testLoopDTLB* from ***IfExtnsTestType*** for Port *n* *dsx1SendOtherTestPattern* from ***dsx1SendCode*** for Net T1 *dsx1SendQRS* from ***dsx1SendCode*** for Net T1 *testSendQRSS* from ***IfExtnsTestType*** for Port *n* *testSend511* from ***IfExtnsTestType*** for Port *n* *testMonQRSS* from ***ifExtnsTestType*** for Net T1 *testMonQRSS* from ***ifExtnsTestType*** for Port *n* *testMon511* from ***ifExtnsTestType*** for Port *n*
Stat–>LED–>Prtn: DTR CTS RTS	Read: ***rs232InSigState*** from ***rs232InSigName == dtr*** ***rs232outSigState*** from ***rs232OutSigName == cts*** ***rs232InSigState*** from ***rs232InSigName == rts***

Table E-1
(2 of 3)
SNMP MIB to Front Panel Command Cross-Reference

Front Panel Command	SNMP MIB Object
Stat–>ID: Ser Mod SRev HRevCCA1 HRevCCA2	Read the **sysDescr** object from the System Group
Test–>Rlpbk–>LLBUP	Set **dsx1SendCode** to *dsx1SendLineCode*
Test–>Rlpbk–>LLBDN	Set **dsx1SendCode** to *dsx1SendResetCode*
Test–>Rlpbk–>54UP–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testSendV54Up*
Test–>Rlpbk–>54DN–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testSendV54Down*
Test–>Rlpbk–>FT1UP–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testSendFT1UP*
Test–>Rlpbk–>FT1DN–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testSendFT1Down*
Test–>Lpbk–>LLB Test–>Lpbk–>Abort–>LLB	Set **dsx1LoopbackConfig** for Net T1 to *dsx1LineLoop* Set **dsx1LoopbackConfig** for Net T1 to *dsx1NoLoop*
Test–>Lpbk–>PLB Test–>Lpbk–>Abort–>PLB	Set **dsx1LoopbackConfig** for Net T1 to *dsx1PayloadLoop* Set **dsx1LoopbackConfig** for Net T1 to *dsx1NoLoop*
Test–>Lpbk–>DLB Test–>Lpbk–>Abort–>DLB	Set **dsx1LoopbackConfig** for DTE T1 to *dsx1LineLoop* Set **dsx1LoopbackConfig** for DTE T1 to *dsx1NoLoop*
Test–>Lpbk–>RLB Test–>Lpbk–>Abort–>RLB	Set **dsx1LoopbackConfig** for DTE T1 to *dsx1PayloadLoop* Set **dsx1LoopbackConfig** for DTE T1 to *dsx1NoLoop*
Test–>Lpbk–>DCLB–>Prt*n* Test–>Lpbk–>Abort–>DCLB–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testFullDuplexLoopBack* Set **dsx1LoopbackConfig** for port *n* to *noTest*
Test–>Lpbk–>DTLB–>Prt*n* Test–>Lpbk–>Abort–>DTLB–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testLoopDTLB* Set **dsx1LoopbackConfig** for port *n* to *noTest*
Test–>Ptrns–>Send–>QRSS–>NET Test–>Ptrns–>Abort–>Send–>NET	Set **dsx1SendCode** for Net T1 to *dsx1SendQRSS* Set **dsx1SendCode** for Net T1 to *dsx1SendNoCode*
Test–>Ptrns–>Send–>QRSS–>Prt*n* Test–>Ptrns–>Abort–>Send–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testSendQRS* Set **IfExtnsTestType** for port *n* to *noTest*
Test–>Ptrns–>Send–>1in8 Test–>Ptrns–>Abort–>Send–>NET	Set **dsx1SendCode** for Net T1 to *dsx1SendOtherTestPattern* Set **dsx1SendCode** for Net T1 to *dsx1SendNoCode*
Test–>Ptrns–>Send–>511–>Prt*n* Test–>Ptrns–>Abort–>Send–>Prt*n*	Set **IfExtnsTestType** for port *n* to *testSend511* Set **IfExtnsTestType** for port *n* to *noTest*
Test–>Ptrns–>Mon–>QRSS–>NET Test–>Ptrns–>Abort–>Mon–>NET	Set **ifExtnsTestType** for Net T1 to *testMonQRSS* Set **ifExtnsTestType** for Net T1 to *noTest*
Test–>Ptrns–>Mon–>QRSS–>Prt*n* Test–>Ptrns–>Abort–>Mon–>Prt*n*	Set **ifExtnsTestType** for port *n* to *testMonQRSS* Set **ifExtnsTestType** for port *n* to *noTest*

Table E-1
(3 of 3)
SNMP MIB to Front Panel Command Cross-Reference

Front Panel Command	SNMP MIB Object
Test–>Ptrns–>Mon–>511–>Prt*n* Test–>Ptrns–>Abort–>Mon–>Prt*n*	Set **ifExtnsTestType** for port *n* to *testMon511* Set **ifExtnsTestType** for port *n* to *noTest*
Cnfig–>Load Cnfig–>Save	Set **devConfigAreaCopy** to the desired choice (Active to Customer1, etc.)
Cnfig–>Activ–>Edit–>DTE–>DTE–>Framing	Set/Display **dsx1LineType** for DTE T1 to *dsx1ESF* or *dsx1D4*
Cnfig–>Activ–>Edit–>DTE–>DTE–>Coding	Set/Display **dsx1LineCoding** for DTE T1 to *dsx1B8ZS* or *dsx1AMI*
Cnfig–>Activ–>Edit–>Port–>Prtn->Port Type	Display **rs232PortType** for port *n* to *rs422* or *v35*
Cnfig–>Activ–>Edit–>Port–>Prt*n*–>TxClock	Set/Display **rs232SyncPortClockSource** for port *n* to *internal* or *external*
Cnfig–>Activ–>Edit–>NET–>NET Framing	Set/Display **dsx1LineType** for NET T1 to *dsx1ESF* or *dsx1D4*
Cnfig–>Activ–>Edit–>NET–>NET Coding	Set/Display **dsx1LineCoding** for NET T1 to *dsx1B8ZS* or *dsx1AMI*
Cnfig–>Activ–>Edit–>NET–>ANSI PRM Cnfig–>Activ–>Edit–>NET–>Mgmt Link	Set/Display **dsx1Fdl** for NET T1 to *dsx1Ansi–T1–403* or *dsx1Att–54016* or *dsx1other*
Cnfig–>Activ–>Edit–>Chan–>DTE–>Assign	Set/Display **dsx1FracNumber** and **dsx1FracIfindex** for DTE T1
Cnfig–>Activ–>Edit–>Chan–>DTE–>Voice	Display **dsx1SignalMode** for DTE T1 to *none* or *robbedBit*
Cnfig–>Activ–>Edit–>Chan–>Prt*n*–>Assign To Cnfig–>Activ–>Edit–>Chan–>Display	Set/Display **dsx1FracNumber** and **dsx1Fracifindex** for DTE or Net T1
Cnfig–>Activ–>Edit–>Chan–>Prt*n*–>Port Rate	Display **rs232PortInSpeed** or **rs232PortOutSpeed** for port *n*
Cnfig–>Activ–>Edit–>Gen–>Clock Src	Display **dsx1TransmitClockSource** for DTE T1 or NET T1
Cnfig–>Activ–>Edit–>User–>Com Rate Cnfig–>Activ–>Edit–>User–>Aux Rate Cnfig–>Activ–>Edit–>User–>Modem Rate	Set/Display **rs232PortInSpeed** or **rs232PortOutSpeed** for COM, AUX, or MODEM port
Cnfig–>Activ–>Edit–>User–>Char Length Cnfig–>Activ–>Edit–>User–>MChar Len	Set/Display **rs232AyncPortBits** for COM or MODEM port
Cnfig–>Activ–>Edit–>User–>CParity Cnfig–>Activ–>Edit–>User–>MParity	Set/Display **rs232AyncPortParity** for COM or MODEM port
Cnfig–>Activ–>Edit–>User–>CStop Bits Cnfig–>Activ–>Edit–>User–>MStop Bits	Set/Display **rs232AyncPortStopBits** for COM or MODEM port

IP Network Addressing Scenarios F

Overview F-1
Scenario 1 . . . . . F-2
Scenario 2 . . . . . F-3
Scenario 3 . . . . . F-4
Scenario 4 . . . . . F-5
Scenario 5 . . . . . F-6

Overview

This appendix describes a means of configuring 31xx Series devices in an Internet Protocol (IP) network to provide SNMP or Telnet connectivity. Since there are many possible network addressing schemes, this appendix describes an addressing scheme for typical customer network management system (NMS) scenarios. This appendix is not intended to be an IP addressing or routing tutorial, and a basic understanding of IP and 31xx Series devices is assumed.

The following notes apply to these scenarios:

- Connections to remote devices may be via EDL (for 2-port and 4-port DSU/CSUs) or FDL; however, the FDL is only available on full T1 links (not fractional T1s). Check with the service provider to be sure that the FDL is end-to-end (i.e., not terminated at an intermediate point within the network).
- Interconnected 31xx Series devices automatically pass routing information between them; however, a static route to the subnet(s) must be set in the routing table of the NMS host. This route uses the 31xx Series device connected to the LAN (via the LAN Adapter), or the NMS (via a direct PPP or SLIP connection) as a gateway to the subnet(s). In all instances, the addressing scheme presented works for both the LAN and the direct connections.
- Although routing table entries are maintained automatically by 31xx Series devices, without the need for user configuration, only a maximum of 100 routes is supported for a given device.
- The choice of a host address within a given subnet is completely arbitrary. Choose any legal host address for a given subnet, without regard to the local or remote devices.
- Although the default route (to the NMS) is configurable for all devices, only devices that have a direct external connection to an NMS (via the COM or AUX ports) need a default route set. In the following examples, the default port (COM or AUX) is set in the device connected to the LAN Adapter.

Scenario 1

The first scenario (Figure F-1) is a series of standalone 31xx Series devices daisy chained together, with remotes connected via the FDL. In this scenario, all 31xx Series devices are on the same subnet (135.18.1.0). The subnet mask for each device is FF.FF.FF.00. A static route is set in the NMS host to subnet 135.18.1.0.

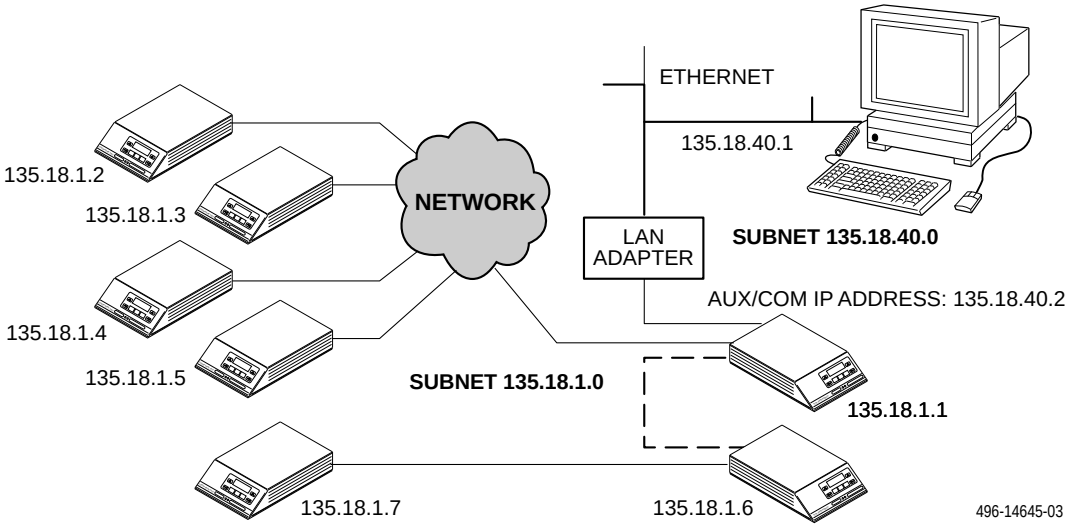


Figure F-1. Daisy-Chained Standalone at the Central Site

Scenario 2

The second scenario (Figure F-2) is a carrier communicating with standalone remotes. This scenario is similar to the previous one, treating the carrier devices as the daisy-chained devices. All devices are still on the same subnet, and the subnet mask is FF.FF.FF.00. A static route still must be set in the NMS host to subnet 135.18.2.0.

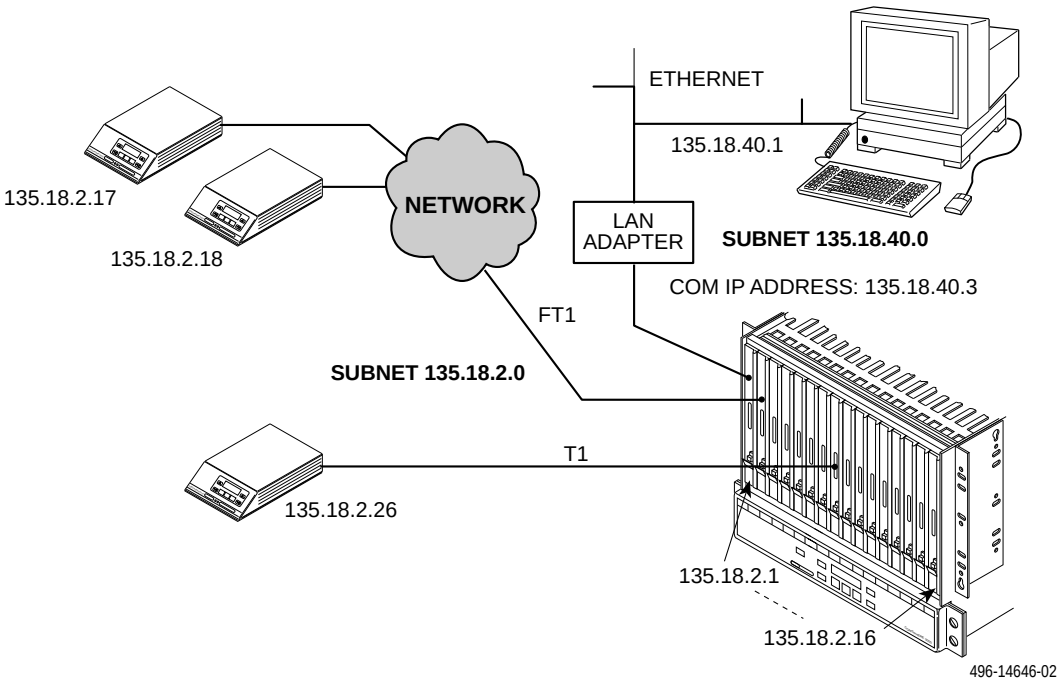


Figure F-2. Local Carrier with Remote Standalone

Scenario 3

This third scenario (Figure F-3) shows a local carrier connected to remote carriers that have remote standalones. Each carrier must be on a separate subnet but, as in the previous scenario, the carrier-remote combination can share a common subnet. Once again, the subnet mask is FF.FF.FF.00 for all devices. A static route must be set up in the NMS host for each subnet: 135.18.4.0, 135.18.6.0, 135.18.20.0.

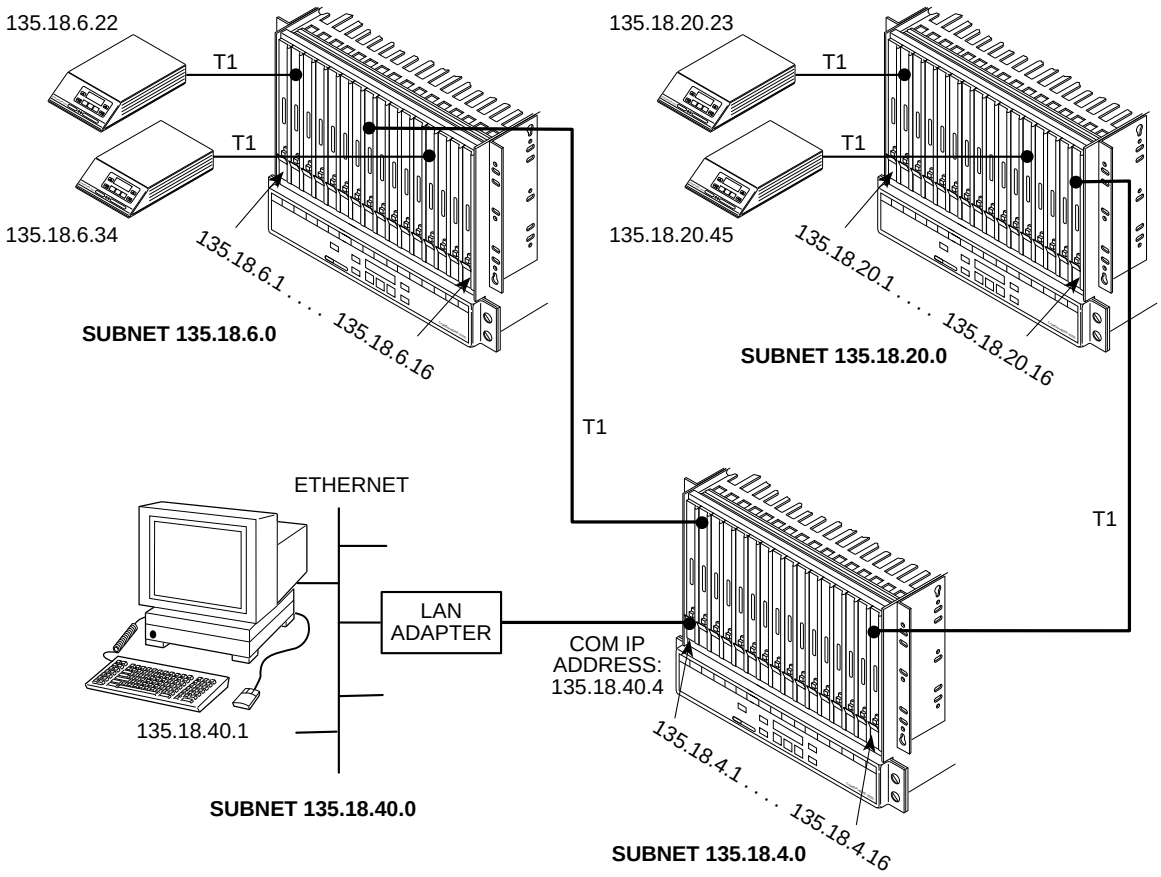


Figure F-3. Local Carrier Connection to Remote Carriers

Scenario 4

An alternative addressing scheme, for the network is shown in Figure F-4. This example uses a subnet mask of FF.FF.00.00 for the COM port in the central-site carrier (only), with all of the remaining subnet masks set to FF.FF.FF.00. The advantage to this scheme is that only one route must be added to the NMS host (135.18.0.0).

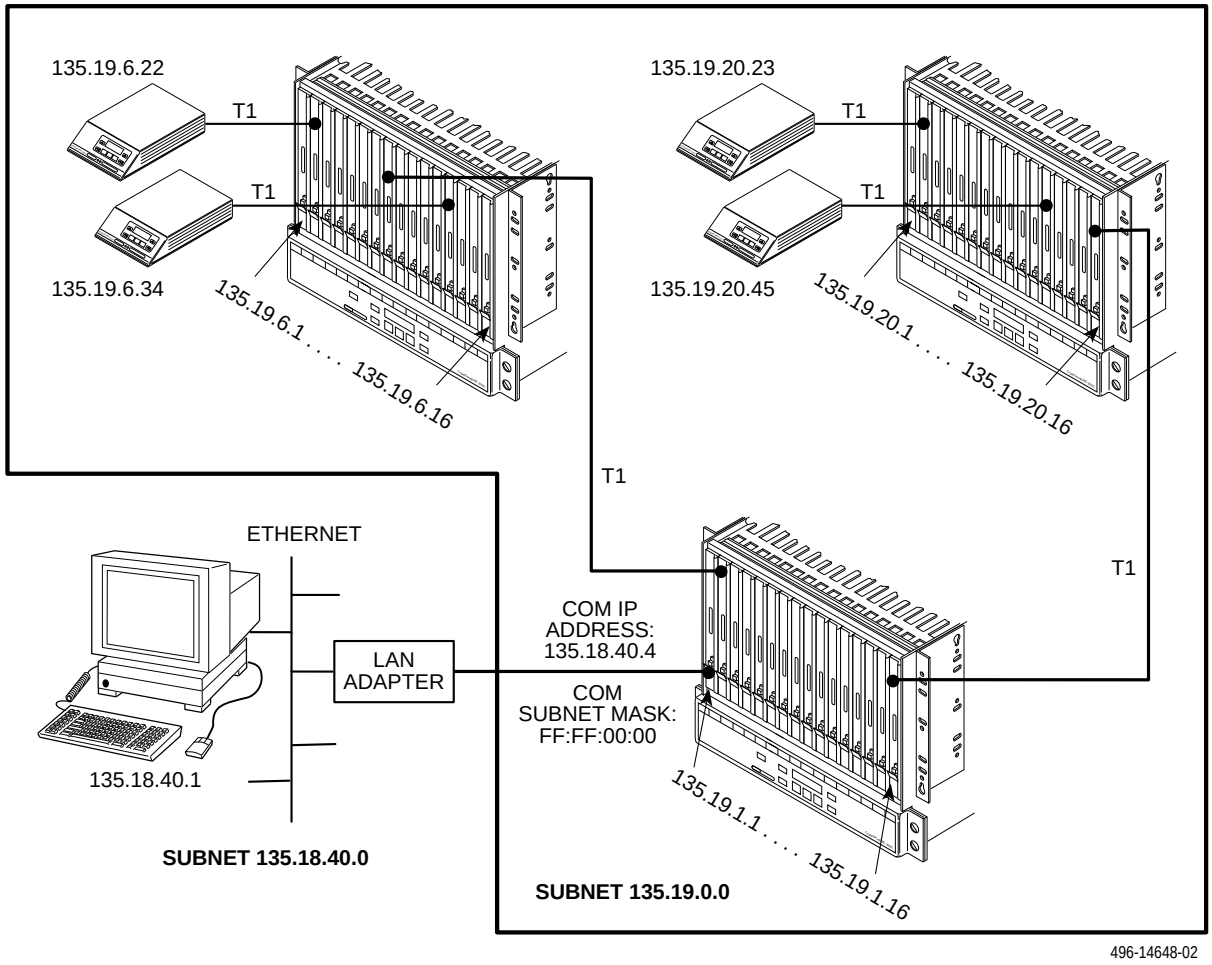


Figure F-4. Local Carrier Connected to Remote Carriers – an Alternative

Scenario 5

Figure F-5 illustrates multiple COM ports on the same carrier connected to different NMSs. This might be used in service-provider applications, where some of the carrier's circuit cards (and their remotes) are managed by one NMS and other cards are managed by a different NMS. In this example, each card and remote is on a separate subnet. Also, note that each LAN Adapter connection is on a different subnet. The subnet mask is FF.FF.FF.00. The NMS hosts would only need routes added for the subnets that they are to manage.

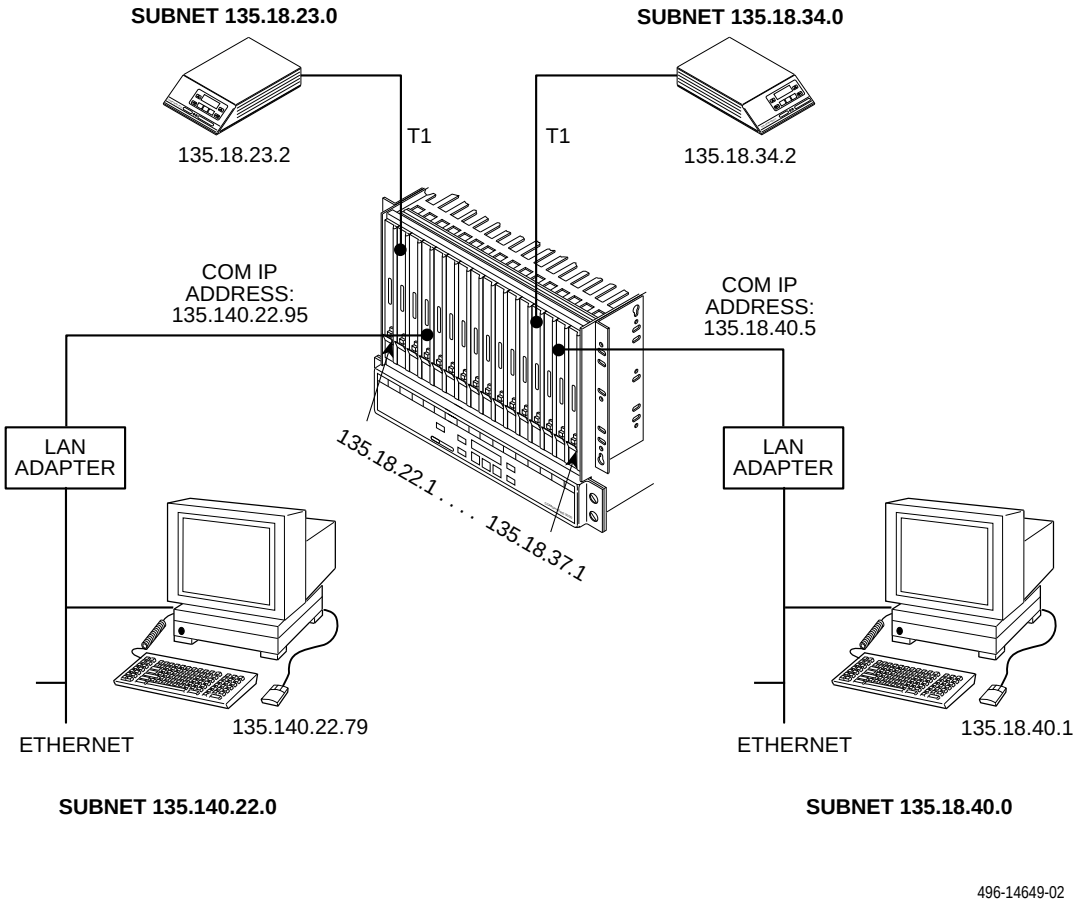


Figure F-5. Multiple COM Ports Connected to Different NMSs.

Front Panel Emulation G

Overview G-1
Installing Front Panel Emulation Software G-1
Starting Front Panel Emulation G-2

Overview

The DSU/CSU offers functionality through Front Panel Emulation software that is similar to that provided by the DSU/CSU front panel. The DSU/CSU can either be locally or remotely attached to a 386 or higher PC that has at least 4 MB of RAM. A copy of the DSU/CSU front panel appears on the PC. The functionality of the front panel is available by clicking on the Function keys with the mouse rather than by pressing keys from the actual front panel.

For carrier-mounted DSU/CSUs, a single PC is used to access all of the slots in the carrier. The PC is connected locally to a single slot containing either a 3151 CSU or 3161 DSU/CSU that has been configured to enable a shared COM port on the Auxiliary Backplane. The attached PC can access any 3151/3161 device attached to the Auxiliary Backplane. For more information about using the COM port on the carrier, refer to the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide*.

Installing Front Panel Emulation Software

The Front Panel Emulation software is supplied on a 3.5-inch, 1.44 MB, double-sided, high-density, write-protected diskette, with 15 sectors per track, 80 tracks per side, and 96 tracks per inch.

This software must be installed on a 386 or higher PC with Microsoft Windows Release 3.1 or higher, MS-DOS 3.3 or higher, and at least 4 MB of RAM. A VGA color monitor with VGA adapter (or higher resolution) is required. A mouse is also required. The following procedures must be performed in the Windows environment.

To install Front Panel Emulation software,

1. Insert the diskette into the appropriate drive.
2. Select File from Program Manager.
3. Choose Run.
4. Type `A:INSTALL` and click OK.

5. An Information screen appears. Choose Continue to continue the installation.

6. Type the letter of the destination drive, followed by a colon (default is C:), then the appropriate directory name (default is C:\FRONTPAN).

   If the selected directory already exists, the following message appears: **The specified directory already exists. Do you want to overwrite the directory?**

   If the selected directory is new, the following message appears: **The specified directory does not exist. Do you want to create the directory?**

7. Select Yes. A confirmation screen appears. Select Install to continue the installation.

8. A Setup Completed screen appears. Select Continue. The Program Manager screen appears with the Front Panel icon.

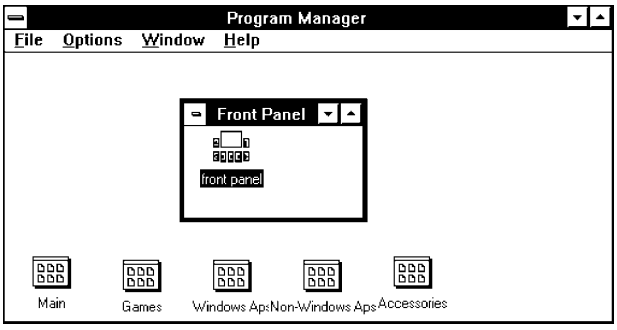
Starting Front Panel Emulation

If the DSU/CSU selected is not locally attached to the PC, you must first dial to the remote DSU/CSU before starting front panel emulation. The modem attached to the PC must support AT commands for the Front Panel Emulation software to successfully place the call.

To start front panel emulation,

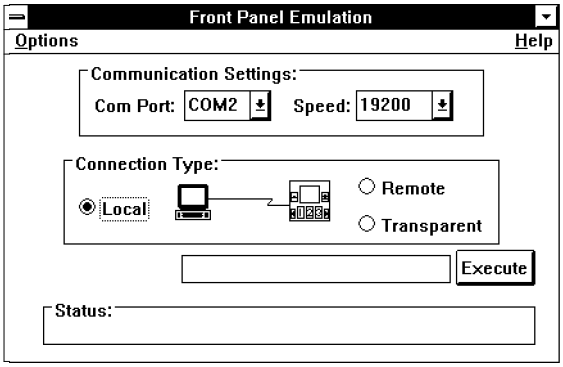
1. From the PC, open Program Manager from Windows.

2. Double click on the Front Panel icon that appears after the Front Panel Emulation program is installed on the PC. The Front Panel window opens.



3. Double click on the Front Panel icon that appears in the Front Panel window. The Front Panel Emulation screen appears.

4. Enter the Com Port and Speed from the drop-down selection list boxes.



   The **Com Port** field needs to contain the actual communications port name as recorded in the Windows information file (INI).

   The **Speed** field needs to contain one of the following communications speeds: 1200, 2400, 4800, 9600, 14400, 19200, or 38400 and should match the DSU/CSU's COM port configuration.

5. Choose either a Local (for near-end DSU/CSU) or Remote (for far-end DSU/CSU) destination.

6. If you chose a Local destination, click on the **Execute** button. If you chose a Remote destination, enter the telephone number of the far-end DSU/CSU in the **Phone Number** field, then click on the **Dial** button.

7. The front panel of the selected DSU/CSU appears on the PC.

NOTE

When using Front Panel Emulation, no LEDs are shown on the PC's screen; you must use the Stat command procedure to get LED information (see the *Displaying LED Conditions* section in Chapter 3, *Operation*).

Async Terminal Operation H

Overview H-1
Before Using the Async Terminal H-1
Initiating an Async Terminal Session H-2
Ending an Async Terminal Session H-2
Menu Organization H-3
Using Async Terminal Screens H-4
Setting Customer Identification H-5
Displaying LED Conditions H-6
Changing Configuration Options H-7
  Displaying or Editing Configuration Options H-7
  Saving Edit Changes H-9
Establishing Access Security on a Port H-10
Setting a Password H-11
Entering a Password to Gain Access H-12
Configuration Worksheets for the Async Terminal Interface H-13

Overview

You can configure and manage the DSU/CSU from an asynchronous (async) terminal that is configured for **9.6 kbps, 8 characters, no parity, and 1 stop bit**.

This appendix provides operational examples to help you become familiar with the use of the async terminal for DSU/CSU control.

By convention throughout this appendix, examples of screens are shown as they appear with the standalone 4-port DSU/CSU.

Before Using the Async Terminal

You can connect the async terminal directly to the COM port of the DSU/CSU, or you can establish a remote connection using dial-in (via the integral modem) or Telnet access.

Before using the async terminal, you may use the DSU/CSU's front panel to set certain configuration options for async terminal operation. Use the Configuration (Cnfig) branch of the front panel menu and edit the User Interface (User) configuration options for async terminal operation. Refer to the *Changing Configuration Options* section in Chapter 3, *Operation*, and Appendix C, *Configuration Options*.

To connect the async terminal to the DSU/CSU using Telnet access, refer to the *Configuring the DSU/CSU for SNMP or Telnet Access* section in Chapter 3, *Operation*.

If the DSU/CSU is misconfigured, leaving it in a state that does not support async terminal operation, the recovery procedure consists of power cycling the DSU/CSU, waiting for the completion of the power-up self-test, and then pressing the async terminal's Return key five times in succession. (Begin pressing the Return key within two seconds after the completion of power-up self-test, and do not wait longer than one second between each successive key press.) This procedure allows you to use the System Paused screen to reset the COM port configuration options or to reload all factory default configuration options.

Initiating an Async Terminal Session

Once the appropriate configuration option changes have been made and access is established, the Main Menu screen appears (unless a password is required).

Figure H-1 shows the Main Menu screen for a standalone DSU/CSU.

The carrier-mounted DSU/CSU shows the 3000 Series carrier slot number under the Customer ID. The slot number field (e.g., **Slot: 1**) is changed to access specific DSU/CSUs in the carrier. For Telnet or SNMP access to the carrier, specify the IP address of the applicable communication port (see Appendix F, *IP Network Addressing Scenarios*).

NOTE

By convention throughout this appendix, examples of screens are shown as they appear with the standalone DSU/CSU.

If a password is required, the Login screen displays the prompt for password input. (Refer to the *Entering a Password to Gain Access* section on page H-12.)

To move between the Screen area and the Screen Function Keys area (Figure H-1), press Ctrl-a (control key and a).

From the Screen area, you may select the **Status, Test, Configuration**, or **Control** branches.

Ending an Async Terminal Session

To end the async terminal session from any screen, press Ctrl-a to move from the Screen area to the Screen Function Keys area (Figure H-1), and then select **Exit**.

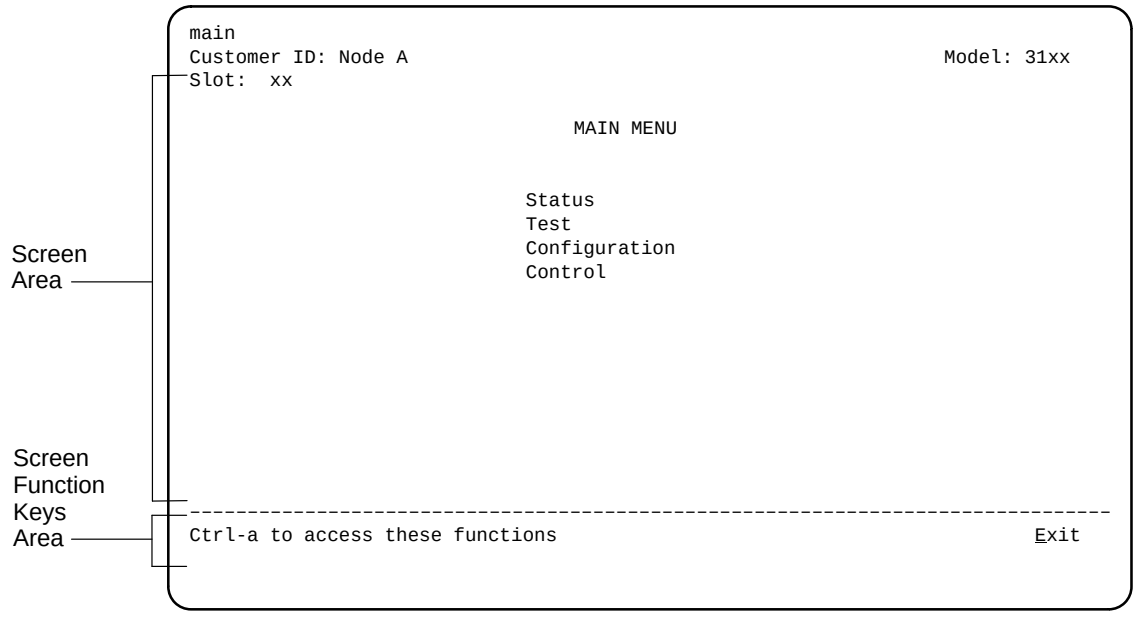


Figure H-1. Main Menu Screen

Menu Organization

Async terminal menus differ from front panel menus in that they typically do not use abbreviations and, in some cases, provide a more direct access to an option or function.

Figure H-2 shows the organization of the async terminal menu tree.

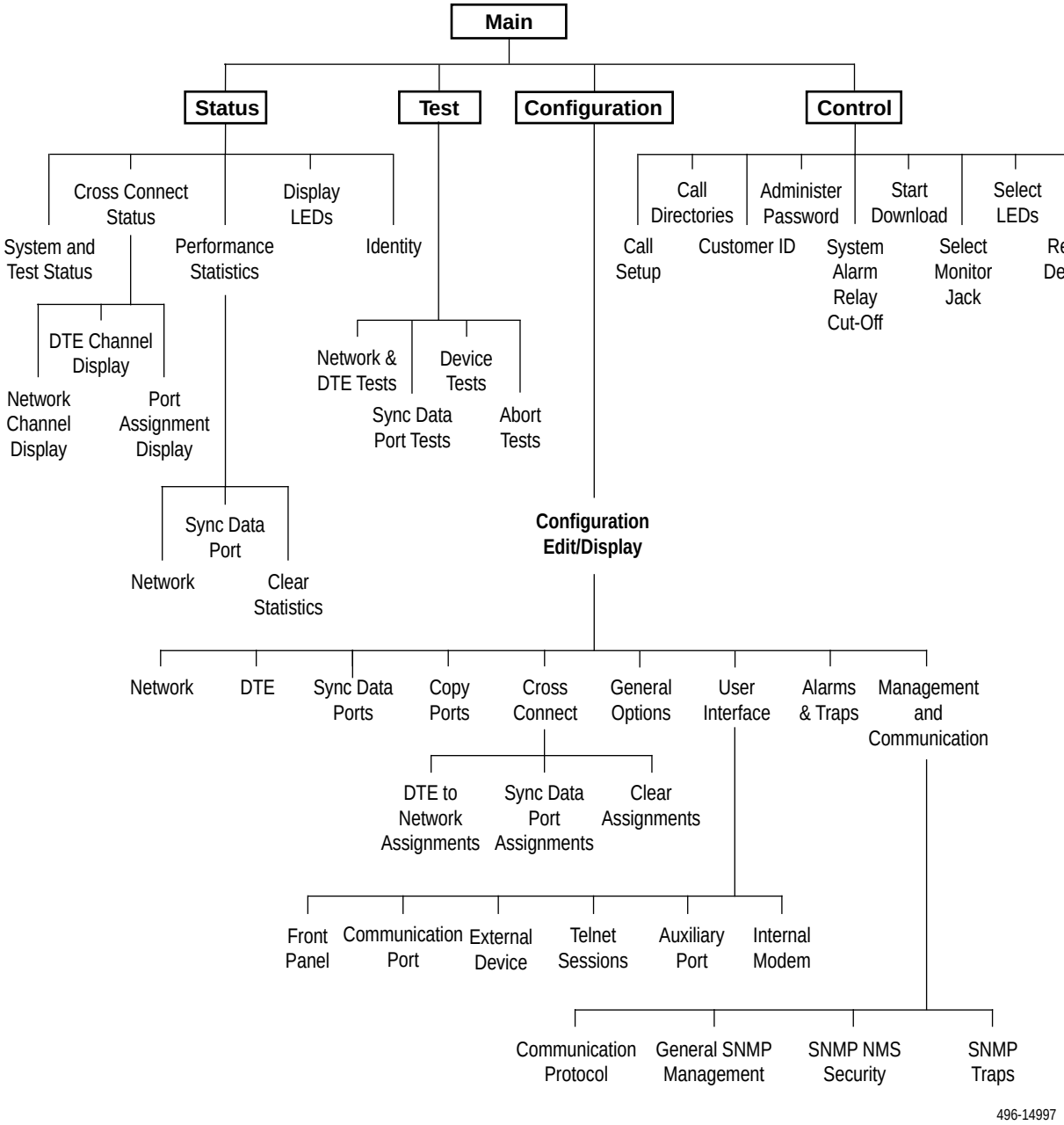


Figure H-2. Menu Organization

Using Async Terminal Screens

There are three types of async terminal screens.

- Menu screens list selections available through the menu system.
- Input screens allow you to edit or change information on a screen using screen function keys (Table H-1) or keyboard keys (Table H-2).
- Display screens show the results from a data collection operation or they display device-specific information.

The async terminal supports character matching for entering values in fields. For example, if the values for a field can be **DTE**, **NET**, or **PORT** and you enter a 'D' and press Return (Enter), then the field automatically populates with the value **DTE.**

Once an operation is initiated, status messages appear in the last row of the screen. These include **Please Wait** (when a command takes longer than five seconds) and **Command Complete.**

Table H-1
Screen Function Keys

Screen Function Key	Usage
M (MainMenu)	Returns to the Main Menu screen.
E (Exit)	Terminates the async terminal session.
R (Refresh)	Updates the screen with the current information.
U (PgUp)	Pages up to the previously displayed page of information.
D (PgDn)	Pages down to the previously displayed page of information.
S (Save)	Stores changes in nonvolatile memory.

Table H-2
Keyboard Keys

Keyboard Key	Usage
Ctrl-a	Moves the cursor between the Screen area and the Screen Function Keys area.
Esc	Returns to the previous screen.
Tab	Moves the cursor to the next field.
Back (Shift) Tab or Ctrl-k	Moves the cursor to the previous field.
Backspace	Moves the cursor one position to the left or to the last character of the previous field.
Spacebar	Selects the next valid value for the field.
Delete	Deletes the character that the cursor is on.
Up Arrow key or Ctrl-u	Moves the cursor up one field within a column on the same screen.
Down Arrow key or Ctrl-d	Moves the cursor down one field within a column on the same screen.
Right Arrow key or Ctrl-f	Moves the cursor back one character to the right.
Left Arrow key or Ctrl-b	Moves the cursor back one character to the left.
Ctrl-l	Redraws the screen display.
Return (Enter)	Accepts entry.

NOTE

Some Telnet applications may require the use of Ctrl-u, Ctrl-d, Ctrl-f, and Ctrl-b as an alternative to the use of the Up, Down, Right, and Left Arrow keys.

NOTE

The following procedures are examples only. This appendix uses examples to help you become familiar with the use of the async terminal for DSU/CSU control.

Setting Customer Identification

The customer identification is used to uniquely identify the DSU/CSU.

To change the customer identification (Customer ID),

1. From the Main Menu screen, select **Control**.

   The Control screen appears.

2. From the Control screen, select **Customer ID**.

   The Customer ID screen appears (Figure H-3).

3. Use the **Customer ID** field to set the customer identification.

   The customer identification may be up to 8 characters long.

   Select **Clear** to remove all the characters in the associated field.

4. Select **Save** to store the information in nonvolatile memory.

In addition to the customer identification, you may also enter a system name, system location, and system contact. Although only 40 characters are displayed for these fields, you may enter up to 255 characters. The fields scroll as the additional characters are added.

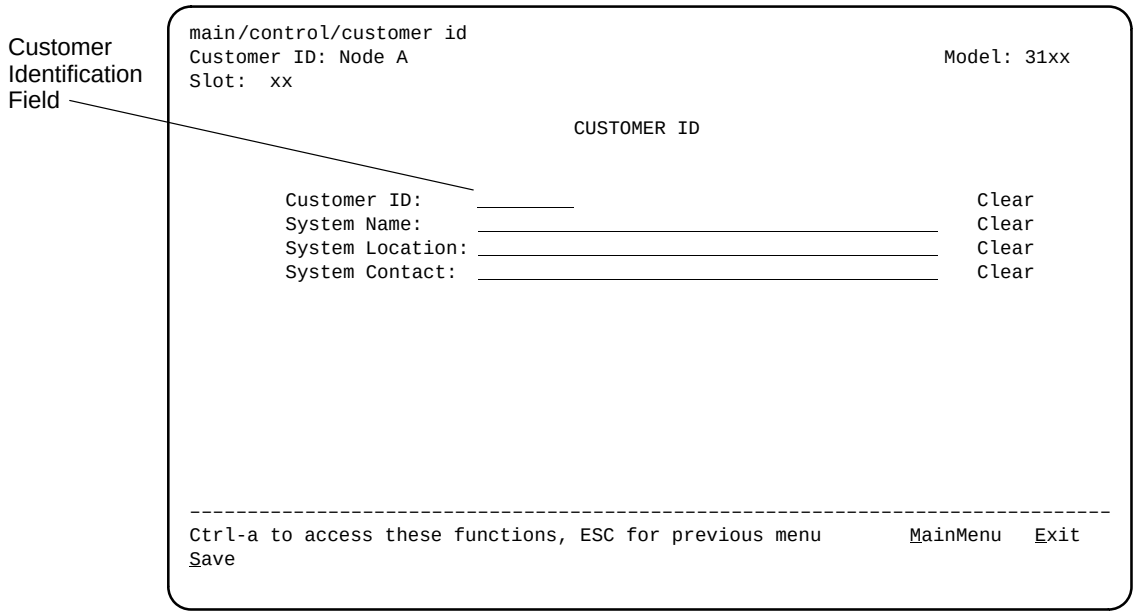


Figure H-3. Customer Identification Screen

Displaying LED Conditions

The same conditions monitored by the front panel LEDs can also be monitored by the Display LEDs screen. This screen is most useful when the DSU/CSU is being accessed remotely.

To display LED conditions,

1. From the Main Menu screen, select **Status**.

   The Status screen appears.

2. From the Status screen, select **Display LEDs**.

   The Display LEDs screen appears (Figure H-4).

The screen shows a snapshot of the LEDs every 5 seconds. LEDs that are illuminated are displayed by inverse video.

Select **Refresh** to update the screen.

```
main/status/leds
Customer ID: Node A                                          Model: 31xx
Slot:  xx

                              DISPLAY LEDs

        GENERAL     NETWORK     DTE     PORT 1   PORT 2   PORT 3   PORT 4

        OK          Sig         Sig     DTR      DTR      DTR      DTR
        Fail        OOF         OOF     TXD      TXD      TXD      TXD
        Test        Alm         Alm     RXD      RXD      RXD      RXD
                    EER         PDV     CTS      CTS      CTS      CTS
                                BPV     RTS      RTS      RTS      RTS









--------------------------------------------------------------------------------
Ctrl-a to access these functions, ESC for previous menu       MainMenu   Exit
Refresh
```

Figure H-4. Example of Display LEDs Screen

Changing Configuration Options

Use the Configuration branch of the main menu to display or change DSU/CSU configuration options. Refer to the *Changing Configuration Options* section in Chapter 3, *Operation*, and Appendix C, *Configuration Options*.

If the access level is not Level 1, the message “Access level is 2, Configuration is read-only” is displayed on line 24.

Displaying or Editing Configuration Options

To display or edit configuration options,

1. From the Main Menu screen, select **Configuration**.

   The Load Configuration From screen appears (Figure H-5).

2. From the Load Configuration From screen, select a configuration option set to load (**Current**, **Customer 1**, **Customer 2**, **Default Factory 1**, or **Default Factory 2**). You cannot edit the Default Factory configuration options, but you can display them.

```
main/config
Customer ID: Node A                                          Model: 31xx
Slot:  xx

                            LOAD CONFIGURATION FROM:

                            Current Configuration
                            Customer Configuration 1
                            Customer Configuration 2
                            Default Factory Configuration 1
                            Default Factory Configuration 2









--------------------------------------------------------------------------------
Ctrl-a to access these functions, ESC for previous menu       MainMenu   Exit
```

Figure H-5. Configuration Load Screen

After selecting the set of configuration options to load, the Configuration Edit/Display screen appears (Figure H-6).

3. Select a functional group to display or edit.

NOTE

Screen displays may vary depending on the model and configuration of the DSU/CSU. For example, DTE and Copy Ports are not displayed for the single-port DSU/CSU.

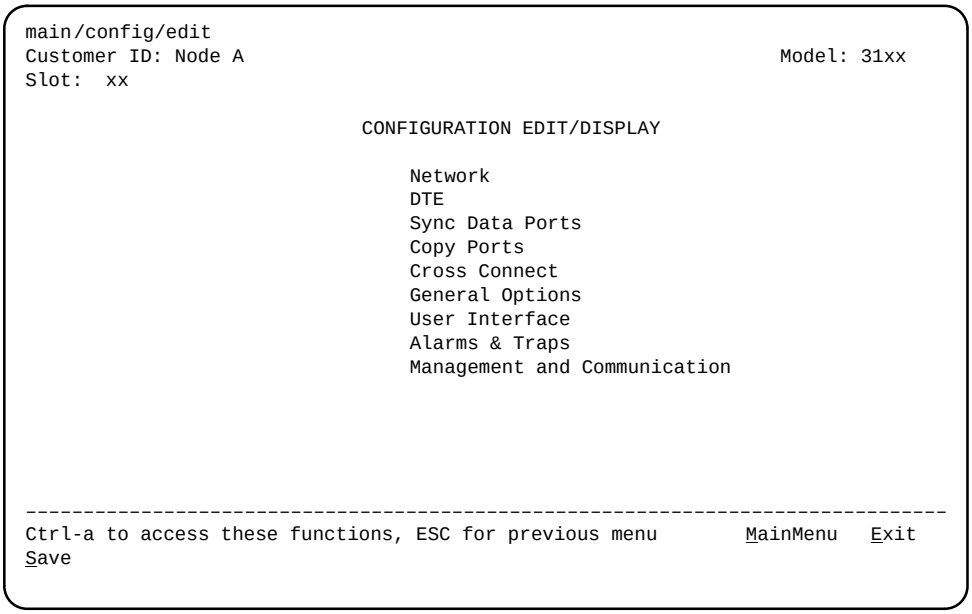


Figure H-6. Configuration Edit/Display Screen

Saving Edit Changes

To save edit changes,

1. From the last edit screen, select **Save**.

   The Save Configuration To screen appears (Figure H-7).

2. From the Save Configuration To screen, select a configuration option set (**Current**, **Customer 1**, or **Customer 2**).

Save edit changes to the Current area when you want those changes to take effect immediately. Save edit changes to the Customer area when you want to overwrite the existing Customer configuration options and store these changes for future use.

To protect you from accidentally exiting an edit session before saving your changes, the system displays the **Save Changes?** field if you select either **MainMenu** or **Exit** from an edit screen. If you respond **No**, the system exits without saving the changes. If you respond **Yes**, you are prompted to specify where the changes should be saved.

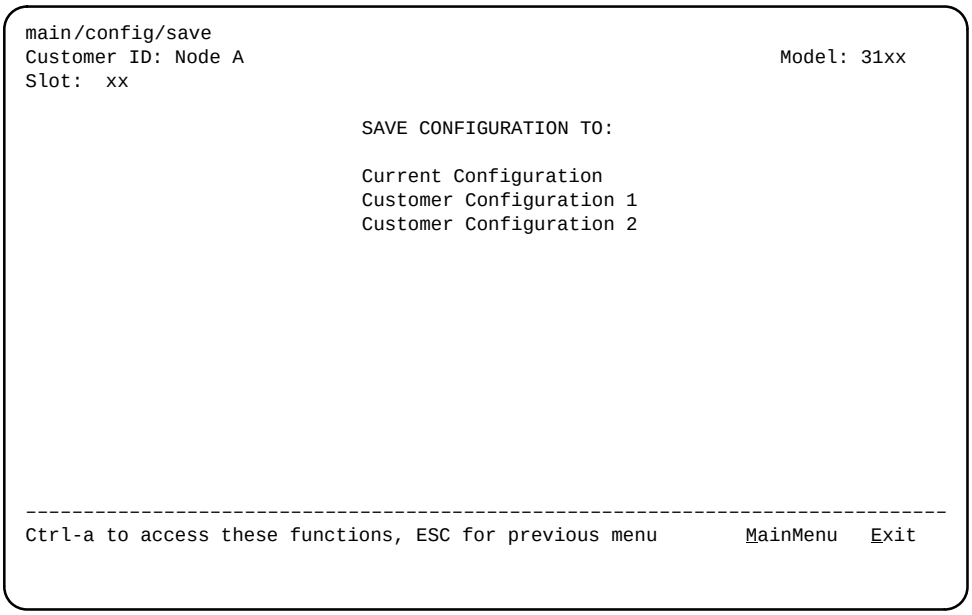


Figure H-7. Configuration Save Screen

Establishing Access Security on a Port

Although the password feature is available, it is not required. If used, it ensures access security before control is passed to a device connected to a port. The following procedure is an example only. It shows how to enable the password for the communication port. Passwords can also be enabled for the internal modem and for Telnet sessions.

To establish access security on the communication port,

1. From the Main Menu screen, select **Configuration**.

   The Load Configuration From screen appears.

2. From the Load Configuration From screen, select **Current**.

   The Configuration Edit/Display screen appears.

3. From the Configuration Edit/Display screen, select **User Interface**.

   The User Interface Options screen appears.

4. From the User Interface Options screen, select **Communication Port**.

   The Communication Port Options screen appears.

5. In the **Password Required** field, enter **Enable** (Figure H-8).

6. Select **Save** to store this setting in nonvolatile memory.

   The Save Configuration To screen appears.

7. From the Save Configuration To screen, select **Current**.

The password itself is set separately. Refer to the following section, *Setting a Password*.

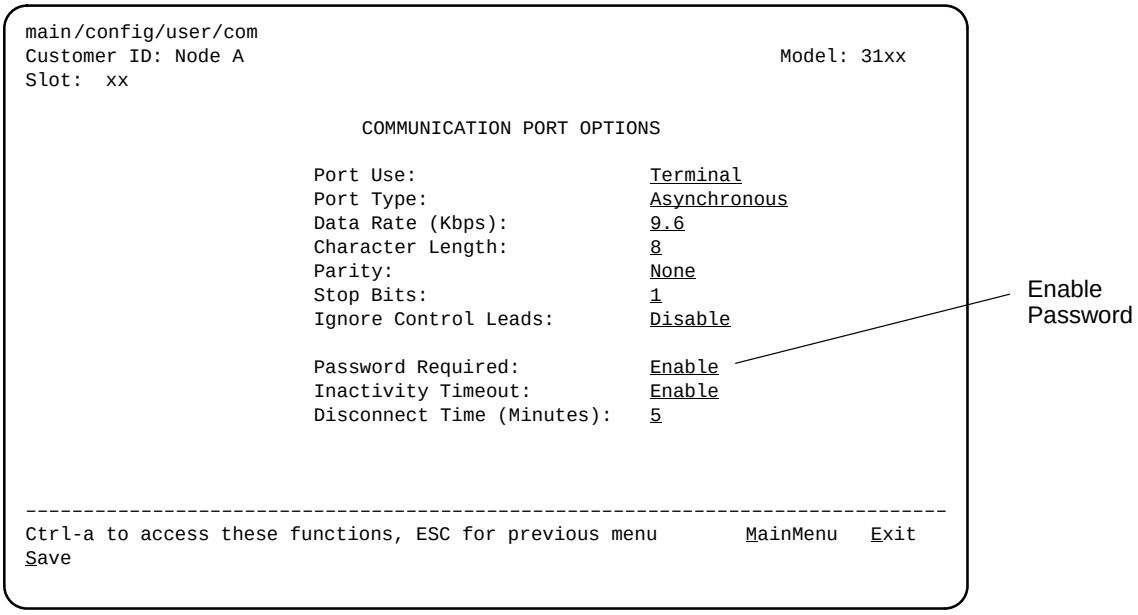


Figure H-8. Enabling a Password

Setting a Password

In addition to establishing access security on a port (refer to the previous section, *Establishing Access Security on a Port*), the password itself is set. Unless you specify otherwise, the password is null.

To set a password,

1. From the Main Menu screen, select **Control**.

   The Control screen appears.

2. From the Control screen, select **Administer Password**.

   The Password Entry screen appears (Figure H-9).

   This screen is used to add a new password or modify an existing password.

3. Enter a new password in the **Password** field.

   The password may be 1 to 8 characters long and may contain the characters **0** through **9**, **a** through **z**, and/or **A** through **Z**.

4. Use the **Re-Enter Password** field to verify the new password.

5. Select **Save**.

Once a password is saved, the **Login Records Saved** message appears at the bottom of the screen.

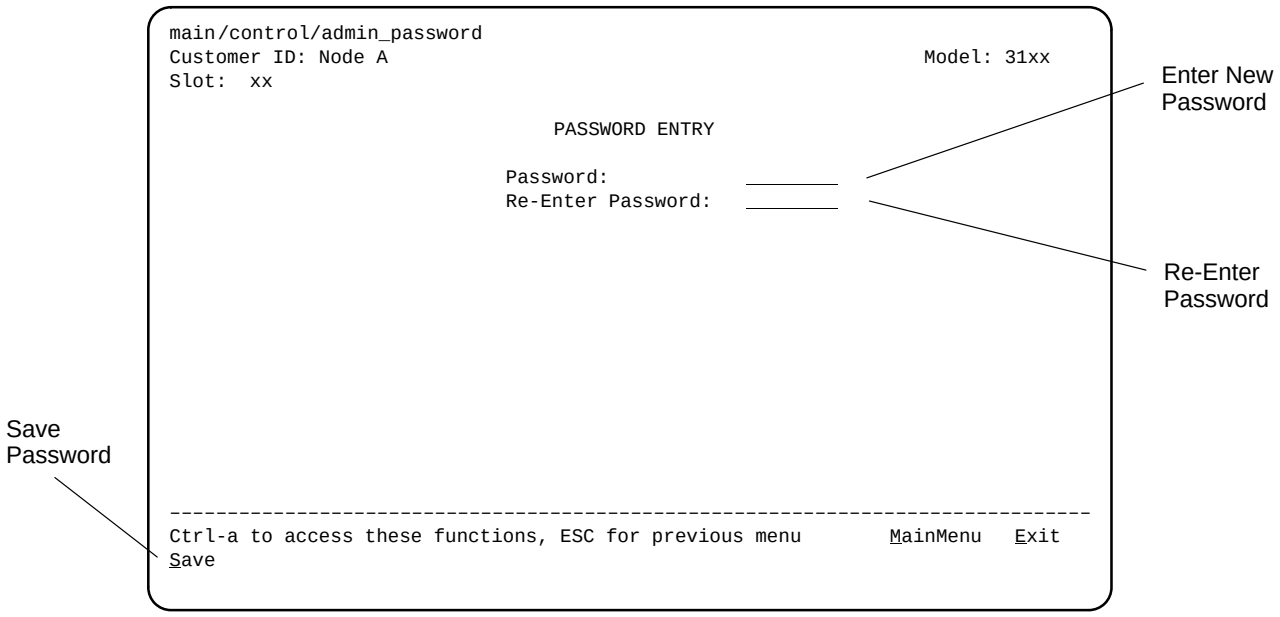


Figure H-9. Setting a Password

Entering a Password to Gain Access

When access security is required, the Login screen (Figure H-10) appears before you can access the Main Menu screen. The password must be entered.

- *If the password is valid*, the DSU/CSU's top-level menu appears.
- *If the password is invalid*, an invalid password message appears and the screen reappears and waits for password entry.
- *If an invalid password is entered three consecutive times*, the message **User Interface Idle** appears, Telnet sessions are closed, dial-in connections are disconnected, and an SNMP trap is generated.

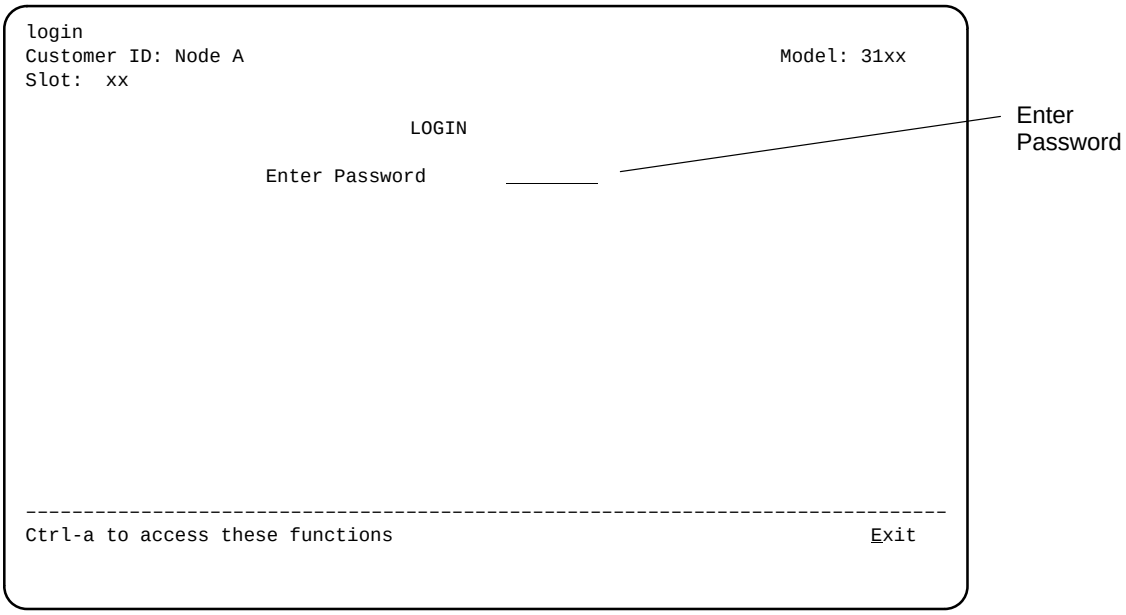


Figure H-10. Entering a Password

Configuration Worksheets for the Async Terminal Interface

This section contains one set of blank worksheets to be used when configuring your DSU/CSU using the async terminal interface. In the tables, **default settings** for Default Factory 1 are indicated by bold type. It is recommended that you copy these blank worksheets before using them.

Network Interface Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Line Framing Format	NET Framing	D4, **ESF**
Line Coding Format	NET Coding	AMI, **B8ZS**
Line Build Out (LBO)	LBO	**0.0**, –7.5, –15, –22.5
Management Link	Mgmt Link	Enable, **Disable**
Bit Stuffing	BitStuff	**62411**, Part68, Disable
Network Initiated LLB	NET LLB	**Enable**, Disable
Network Initiated PLB	NET PLB	**Enable**, Disable
ANSI Performance Report Messages	ANSI PRM	Enable, **Disable**
Circuit Identifier	Circuit Ident	***Text Field***, Clear

DTE Interface Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Interface Status	DTE Port	**Enable**, Disable
Line Framing Format	DTE Framing	D4, **ESF**
Line Coding Format	DTE Coding	AMI, **B8ZS**
Line Equalization	Equal	**0–133**, 133–266, 266–399, 399–533, 533–655
DTE LB on External Contact	Extrn DLB	Enable, **Disable**
Send All Ones on DTE Failure	Send Ones	**Enable**, Disable

Sync Data Port Options (Port 1)	Front Panel Equivalent	**Value** (Default in **Bold**)
Port Type	Port Type	**E530**, V.35, RS449, X.21
Port Base Rate	Base Rate	**Nx64**, Nx56
Transmit Clock Source	Tx Clock	**Internal**, External
Invert Transmit Clock	InvertTxC	Enable, **Disable**
Invert Transmit and Received Data	InvrtData	Enable, **Disable**
Send All Ones on Data Port Not Ready	All Ones	Disable, DTR, RTS, **Both**
Action on Network Yellow Alarm	Rcv Yellow	None, **Halt**
Network Init. Data Channel Loopback	Net DCLB	**Disable**, V.54, FT1, Both
Port (DTE) Initiated Loopbacks	Port LB	**Disable**, DTLB, DCLB, Both
Embedded Data Link	EDL	Enable, **Disable**
EDL Management Link	Mgmt Link	Enable, **Disable**
Excessive Error Rate Threshold	Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-End Performance Statistics	Near-end	**Disable**, Maintain, Send, Both
Far-End Performance Statistics	Far-end	**Disable**, Maintain

Sync Data Port Options (Port 2)	Front Panel Equivalent	**Value** (Default in **Bold**)
Port Type	Port Type	**E530**, V.35, RS449, X.21
Port Base Rate	Base Rate	**Nx64**, Nx56
Transmit Clock Source	Tx Clock	**Internal**, External
Invert Transmit Clock	InvertTxC	Enable, **Disable**
Invert Transmit and Received Data	InvrtData	Enable, **Disable**
Send All Ones on Data Port Not Ready	All Ones	Disable, DTR, RTS, **Both**
Action on Network Yellow Alarm	Rcv Yellow	None, **Halt**
Network Init. Data Channel Loopback	Net DCLB	**Disable**, V.54, FT1, Both
Port (DTE) Initiated Loopbacks	Port LB	**Disable**, DTLB, DCLB, Both
Embedded Data Link	EDL	Enable, **Disable**
EDL Management Link	Mgmt Link	Enable, **Disable**
Excessive Error Rate Threshold	Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-End Performance Statistics	Near-end	**Disable**, Maintain, Send, Both
Far-End Performance Statistics	Far-end	**Disable**, Maintain

Sync Data Port Options (Port 3)	Front Panel Equivalent	Value (Default in **Bold**)
Port Type	Port Type	**E530**, V.35, RS449, X.21
Port Base Rate	Base Rate	**Nx64**, Nx56
Transmit Clock Source	Tx Clock	**Internal**, External
Invert Transmit Clock	InvertTxC	Enable, **Disable**
Invert Transmit and Received Data	InvrtData	Enable, **Disable**
Send All Ones on Data Port Not Ready	All Ones	Disable, DTR, RTS, **Both**
Action on Network Yellow Alarm	Rcv Yellow	None, **Halt**
Network Init. Data Channel Loopback	Net DCLB	**Disable**, V.54, FT1, Both
Port (DTE) Initiated Loopbacks	Port LB	**Disable**, DTLB, DCLB, Both
Embedded Data Link	EDL	Enable, **Disable**
EDL Management Link	Mgmt Link	Enable, **Disable**
Excessive Error Rate Threshold	Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-End Performance Statistics	Near-end	**Disable**, Maintain, Send, Both
Far-End Performance Statistics	Far-end	**Disable**, Maintain

Sync Data Port Options (Port 4)	Front Panel Equivalent	Value (Default in **Bold**)
Port Type	Port Type	**E530**, V.35, RS449, X.21
Port Base Rate	Base Rate	**Nx64**, Nx56
Transmit Clock Source	Tx Clock	**Internal**, External
Invert Transmit Clock	InvertTxC	Enable, **Disable**
Invert Transmit and Received Data	InvrtData	Enable, **Disable**
Send All Ones on Data Port Not Ready	All Ones	Disable, DTR, RTS, **Both**
Action on Network Yellow Alarm	Rcv Yellow	None, **Halt**
Network Init. Data Channel Loopback	Net DCLB	**Disable**, V.54, FT1, Both
Port (DTE) Initiated Loopbacks	Port LB	**Disable**, DTLB, DCLB, Both
Embedded Data Link	EDL	Enable, **Disable**
EDL Management Link	Mgmt Link	Enable, **Disable**
Excessive Error Rate Threshold	Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
Near-End Performance Statistics	Near-end	**Disable**, Maintain, Send, Both
Far-End Performance Statistics	Far-end	**Disable**, Maintain

General Options	Front Panel Equivalent	Value (Default in **Bold**)
Generate Yellow Alarm Signals	Gen Yellow	**Enable**, Disable
Initial Self Test	Self-Test	**Enable**, Disable
Primary Clock Source	Clock Src	**Network**, DTE, Internal, External, Port 1
External Clock Rate (KHz)	Clock Rate	2048, **1544**, 8
Test Timeout	Tst Timeout	**Enable**, Disable
Test Duration	Tst Duration	1–120 (Default = **10**)

User Interface: Front Panel Options	Front Panel Equivalent	Value (Default in **Bold**)
Front Panel Access	FP Access	**Enable**, Disable
Front Panel Pass-Through	FP Pass	Enable, **Disable**

User Interface: Communication Port Options	Front Panel Equivalent	Value (Default in **Bold**)
Port Use	Com Use	Mgmt, ASCII, Daisy, **Terminal**
Port Type	Com Type	**Asynchronous**, Synchronous
Clock Source	Com Clk	**Internal**, External
Data Rate	Com Rate	1.2, 2.4, 4.8, **9.6**, 14.4, 19.2, 38.4
Character Length	Char Length	7, **8**
Parity	CParity	**None**, Even, Odd
Stop Bits	CStop Bits	**1**, 1.5, 2
Ignore Control Leads	Ignore DTR	**Disable**, DTR
Password Required	Password	Enable, **Disable**
Inactivity Timeout	CmInActTm	Enable, **Disable**
Disconnect Time	CmDiscTm	1–60 (Default = **5**)

User Interface: External Device Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Nest COM Port Access	Com Port	Enable, **Disable**
External Device Commands	ComExtDev	**Disable**, AT, Other
Dial-In Access	Dial-In	Enable, **Disable**
Connect Prefix	ComConnPrefix	***Text Field***, Clear
Connect Indication String	ComConnected	***Text Field***, Clear
Escape Sequence	ComEscapeSeq	***Text Field***, Clear
Escape Sequence Delay (Sec)	ComEscDel	**None**, 0.2, 0.4, 0.6, 0.8, 1.0
Disconnect String	ComDisconnect	***Text Field***, Clear

User Interface: Telnet Sessions Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Telnet Session	TnSession	Enable, **Disable**
Password Required	TnPaswd	Enable, **Disable**
Inactivity Timeout	TnInActTm	Enable, **Disable**
Disconnect Time	TnDiscTm	1–60 (Default = **5**)

User Interface: Internal Modem Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Modem Use	Modem Use	Terminal, Mgmt, **ASCII**
Dial-In Access	Dial-In	Enable, **Disable**
Password Required	Password	Enable, **Disable**
Inactivity Timeout	MInActTm	Enable, **Disable**
Disconnect Time	MDiscTm	1–60 (Default = **5**)
Modem Type	Modem Type	**Asynchronous**, Synchronous
Modem Rate	Modem Rate	1.2, **2.4**
Character Length	MChar L	7, **8**
Parity	MParity	**None**, Even, Odd
Stop Bits	MStop Bits	**1**, 1.5, 2
Long Space Disconnect	LSpaceDisc	Enable, **Disable**

User Interface: Auxiliary Port Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Port Use	Aux Use	**None**, Mgmt, Daisy
Data Rate (Kbps)	Aux Rate	9.6, 14.4, **19.2**, 38.4

Alarm & Trap Options	Front Panel Equivalent	**Value** (Default in **Bold**)
ASCII Alarm Messages	Alrm Msg	**Disable**, Com Port
Alarm & Trap Dial-Out	DialOut	Enable, **Disable**
Trap Disconnect	Trap Disc	**Enable**, Disable
Call Retry	Call Retry	Enable,**Disable**
Dial Out Delay Time (Min)	Dial Delay	1, 2, 3, 4, **5**, 6, 7, 8, 9, 10
Alternate Dial-Out Directory	AltDialDir	**None**, 1, 2, 3, 4, 5
Excessive Error Rate Threshold	Err Rate	**10E–4**, 10E–5, 10E–6, 10E–7, 10E–8, 10E–9
System Alarm Relay	Alrm Relay	Enable,**Disable**

Management and Communication: Communication Protocol Options	Front Panel Equivalent	**Value** (Default in **Bold**)
Node IP Address	IP Adr	***Text Field***, Clear
Node Subnet Mask	NetMask	***Text Field***, Clear
Default Net Destination	Def Netwk	**None**, Com, Aux, FDL, EDL1, EDL2
Communication Port IP Adr	Com IP Adr	***Text Field***, Clear
Communication Port Subnet Mask	Com NetMask	***Text Field***, Clear
Com Link Protocol	Com Link	**PPP**, SLIP
Modem IP Address	Modem IP Adr	***Text Field***, Clear
Modem Subnet Mask	Mdm NetMask	***Text Field***, Clear
Modem Alt IP Adr	Alt Mdm IP Adr	***Text Field***, Clear
Modem Alt Subnet Mask	Alt Mdm NetMask	***Text Field***, Clear
Modem Link Protocol	Modem Link	**PPP**, SLIP
Auxiliary Port IP Address	Aux IP Adr	***Text Field***, Clear
Auxiliary Port Subnet Mask	Aux NetMask	***Text Field***, Clear
IPBusMast	IPBusMast	Enable,**Disable**

Management and Communication: General SNMP Management Options	Front Panel Equivalent	**Value** (Default in **Bold**)
SNMP Management	SNMP Mgt	Enable, **Disable**
Community Name 1	CommunityName1	***Text Field***, Clear
Name 1 Access	Access 1	**Read**, R/W
Community Name 2	CommunityName2	***Text Field***, Clear
Name 2 Access	Access 2	**Read**, R/W

Management and Communication: SNMP NMS Security Options	Front Panel Equivalent	**Value** (Default in **Bold**)
NMS IP Validation	NMS Valid	Enable, **Disable**
Number of Managers	Num Sec Mgrs	**1**, 2, 3, 4, 5, 6, 7, 8, 9, 10
NMS *n* IP Address	NMS *n* IP Adr	***Text Field***, Clear
Access Level	NMS *n* Access	**Read**, R/w

Management and Communication: SNMP Traps Options	Front Panel Equivalent	**Value** (Default in **Bold**)
SNMP Traps	SNMP Trap	Enable, **Disable**
Number of Trap Managers	Num Trap Mgrs	**1**, 2, 3, 4, 5, 6
Trap *n* IP Address	Trap*n* IP Adr	***Text Field***, Clear
Trap Manager *n* Destination	Trap*n* Dst	**None**, Com, Aux, FDL, EDL1, EDL2
General Traps	Gen Trap	Disable, Warm, AuthFail, **Both**
Enterprise Specific Traps	Entp Trap	**Enable**, Disable
Link Traps	Link Trap	Disable, Up, Down, **Both**
Link Trap Interfaces	Trap I/F	Network, DTE, T1s, Ports, **All**

Equipment List

Equipment	Feature Number
Model 3160 DSU/CSU	3160-A2-210
Model 3164 DSU/CSU	3164-A2-210
Model 3165 DSU/CSU	3165-A2-210
T1 Line Interface Cable, RJ48C-to-RJ48C	3100-F1-500
T1 Line Interface Cable, RJ48C-to-DA15P (Canada)	3100-F1-510
COM Port-to-PC Cable, 8-pin modular to DB9S	3100-F1-550
COM Port-to-Terminal/Printer Cable, 8-pin modular to DB25P	3100-F1-540
DC Power Cable	3100-F1-520
115 Vac Power Module	3100-F1-100
Front Panel Emulation Software	3100-C1-010
EIA 530A-to-RS449/422 Cable	3100-F1-580
EIA 530A-to-V.35 Cable	3100-F1-570
EIA 530A-to-X.21 Cable	3100-F1-571
Wall-Mount/Rack-Mount Adapter	3100-F1-400
Model 3161 DSU/CSU	3161-B3-010
Auxiliary Backplane	3100-F1-900

NOTE

Cable numbers for the 3161 DSU/CSU are located in the *ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide* and the *COMSPHERE 3000 Series Carrier Installation Manual*.

Glossary

ACAMI allocation method	Alternate Channel Alternate Mark Inversion. A method of allocating DS0 channels as a group, so that every alternate DS0 channel does not carry data, but instead transmits and receives all ones.
ACCULINK	A product family and a registered trademark.
ACO	Alarm Cut-off command. A command for carrier-mounted DSU/CSUs that forces a deactivation of the alarm relay on the 3000 Series Carrier.
Activ	Active configuration area. The configuration option set that is currently active for the device. Before a configuration option set becomes active, you must save the set to the Active configuration area.
adapter	Hardware that provides some transitional function between two or more devices.
address	A symbol (usually numeric) that identifies the interface attached to a network.
agent (SNMP)	A software program housed within a device to provide SNMP functionality. Each agent stores management information and responds to the manager's request for this information.
aggregate	A single bit stream that combines two or more bit streams.
AIS	Alarm Indication Signal. A signal transmitted instead of the normal signal to maintain transmission continuity and to indicate to the receiving device that a transmission fault exists.
AMI	Alternate Mark Inversion. A line coding technique used to accommodate the ones density requirements of T1 lines.
ANSI	American National Standards Institute. An organization devoted to the development of voluntary standards.
application	The use to which a device is put.
ASCII	American Standard Code for Information Interchange. A 7-bit code which establishes compatibility between data services.
ASCII terminal/printer	Devices that can be attached, either locally or remotely, to the DSU/CSU to display or print alarm messages.
asynchronous data	Data transmission that is synchronized by a transmission start bit at the beginning of a character (five to eight bits) and one or more stop bits at the end.
authenticationFailure trap	An SNMP trap that indicates that the device has received an SNMP protocol message that has not passed the active security measures.
AUX port	The auxiliary communications port on the DSU/CSU.

Auxiliary Backplane	An 8-slot backplane that fits over one half of the open section of the 3000 Series Carrier. This is a passive assembly that provides interconnect capability between 3151 CSUs and 3161 DSU/CSUs and provides all interface connectors.
AWG	American Wire Gauge. An indication of wire size.
backup capability	The ability to reconfigure the DSU/CSU and restore data circuits through an external backup device.
bandwidth	The range of frequencies that a circuit can pass. The greater the bandwidth, the more information that can be sent in a given amount of time.
BES	Bursty Errored Seconds. Seconds with more than one, but less that 320 CRC6 errors.
bipolar signal	A signal in which successive “ones” (marks, pulses) are of alternating, positive and negative polarity, and in which a “zero” (space, no pulse) is of zero amplitude.
bit	Binary digit. The smallest unit of information, representing a choice between a one or a zero (sometimes called mark or space).
bit stuffing	The insertion of ones into the outgoing bit stream to enforce ones density requirements.
block allocation method	A method of allocating DS0 channels as a group rather than individually.
bps	Bits per second. Indicates the speed at which bits are transmitted across a data connection.
BPV	Bipolar Violation. In a bipolar signal, a “one” (mark, pulse) which has the same polarity as its predecessor.
byte	A small group of bits (usually 8) that is handled as a unit of data.
B8ZS	Bipolar with Eight Zero Substitution. A line coding technique used to accommodate the ones density requirement of T1 lines.
CCITT	The International Consultative Committee for Telegraphy and Telephony. (It is now renamed as the ITU.)
CD	Carrier Detect. The received line signal detector. V.24 circuit 109.
channel	An independent data path.
channel allocation	Assigning specific DS0 channels in the DSU/CSU to specific interfaces (network, DTE Drop/Insert, etc.).
CHAP	Challenge Handshake Authentication Protocol.
character	A letter, figure, number, punctuation, or other symbol.
CID branch	Customer Identification branch or the DSU/CSU menu tree.
client	A device that receives a specific service, such as database management, from a server.
CLOCK IN interface	The external clock interface on the DSU/CSU.
ClrReg branch	Clear Performance Registers branch of the DSU/CSU menu tree.
Cnfig branch	Configuration branch of the DSU/CSU menu tree.
coding	A technique used to accommodate the ones density requirements of T1 lines.
COM port	The communications port on the DSU/CSU.
community name	An identification used by SNMP to grant an SNMP server access rights to a MIB.
COMSPHERE	A product family and a registered trademark.

configuration	The arrangement of a system or network as defined by the characteristics of its functional units.
configuration option	Device firmware that establishes specific operating parameters for the device. Sometimes referred to as straps.
CPU fail	Central Processing Unit failure. A Self-Test Health message indicating a failure in the device's central processing unit.
CRC	Cyclic Redundancy Check. A mathematical method of confirming the integrity of received digital data.
CRC6	CRC using six check bits.
CSA	Canadian Standards Association.
CSU	Channel Service Unit. Protects the T1 line from damage and regenerates the T1 signal.
Ctrl branch	Control branch of the DSU/CSU menu tree.
CTS	Clear-to-Send. V.24 circuit 106.
Cust1	Customer 1 configuration area. The first of two sets of customer-defined configuration options.
Cust2	Customer 2 configuration area. The second of two sets of customer-defined configuration options.
daisy chaining	Connecting the COM port of one DSU/CSU to the AUX port of another DSU/CSU to provide SNMP connectivity.
data port	The electrical interface between the DSU/CSU and the synchronous data terminal equipment.
database	An organized compilation of computerized data.
DB15 connector	A 15-position connector used on cables or devices.
DB25 connector	A 25-position connector used on cables or devices.
DCE	Data Circuit-terminating Equipment or Data Communications Equipment. A device which provides signal conversion for communication between the DTE and the network.
DCLB	Data Channel Loopback. Loops the data received from the network interface, for all DS0 channels allocated to the selected port, back to the network.
default	A preset value that is assumed to be correct unless changed by the user.
DevFail	Device Failure. A message that indicates that an internal failure has been detected by the operating firmware. An 8-digit code appears for use by service personnel.
DevHS branch	Device Health and Status branch of the DSU/CSU menu tree.
device	A mechanical, electrical, or electronic unit with a special purpose.
digital signal	A signal composed of discrete elements (zeros and ones) instead of a great multitude of analog elements.
diskette	A thin, flexible magnetic disk enclose in a protective jacket.
DL branch	Download branch of the DSU/CSU menu tree.
DLB	DTE Loopback. Loops the received signal on the DTE Drop/Insert port back to the DTE without change.
download	A process that transfers device firmware from a locally-attached PC to a device, or allows the duplication of firmware from a local device to a remote device.

downstream device	A device that is connected farther from the host computer.
drop/insert	An interconnection point for terminals, multiplexers, and transmission facilities. Individual channels may be inserted into the aggregate stream or dropped out to accommodate specific applications.
DSR	Data Set Ready. V.24 circuit 107.
DSU	Data Service Unit. Data communications equipment which transmits digital data over a private line. Also used for limited distance communications over the local area network when a high-speed modem is not needed.
DSX-1	Digital Signal Cross Connect level 1. An interconnection point for terminals, multiplexers and transmission facilities.
DS0	Digital Signal Level 0. A 64 kbps standard signal or channel.
DS0 channel allocation	Assigning specific DS0 channels in the DSU/CSU to specific interfaces (network, DTE Drop/Insert, etc.).
DS1	Digital Signal level 1. A signal of 1.544 Mbps in North America.
DS1/E1 MIB	Defines objects for managing the network and DTE Drop/Insert interfaces on the DSU/CSU.
DTE	Data Terminal Equipment. The equipment, such as a computer or terminal, that provides data in the form of digital signals.
DTE Drop/Insert interface	The Drop/Insert (DSX-1) interface on the rear panel of the DSU/CSU.
DTLB	Data Terminal Loopback. Loops the data received from the selected port, for all DS0 channels allocated to the port, back out the port.
DTMF	Dual Tone Multifrequency. The basis of operation for a pushbutton telephone.
DTR	Data Terminal Ready. V.24 circuit 108/1, /2.
D4	The transmission standard that specifies 12 frames as a superframe that is used for frame synchronization and to locate signaling bits.
EDL	Embedded Data Link. The 8 kbps in-band performance channel that provides 4 kbps of user bandwidth for the support of an SNMP management link.
EER	Excessive Error Rate. An error rate that is greater than the threshold in the DSU/CSU.
EIA	Electronic Industries Association. An organization providing standards for the data communication industry.
EIA 530A	An EIA standard for a high-speed, 25-position, DCE/DTE interface.
Enterprise MIB	MIB objects unique to Paradyne devices.
enterprise-specific trap	A trap unique to Paradyne devices.
EON	End of Number.
error	A discrepancy between a measured or computed value or condition and the true or specified value or condition.
ES	Errored seconds. Seconds with one or more ESF error events.
ESD	Electrostatic discharge. An undesirable discharge of static electricity that can damage equipment and degrade electrical circuitry.
ESF	Extended Superframe. The T1 transmission standard that specifies 24 frames as an extended superframe to be used for frame synchronization and to locate signaling bits.
E1	A wideband digital interface operating at 2.048 Mbps.

Fact1	Factory 1 configuration area. The first of two configuration option sets that are preset at the factory (read-only options).
Fact2	Factory 2 configuration area. The second of two configuration option sets that are preset at the factory (read-only options).
failure	An uncorrected hardware error.
fault	An accidental condition that causes a functional unit to fail to perform its required function.
FCC	Federal Communications Commission. A board of commissioners that regulates electrical communication systems that originate in the United States.
FDL	Facility Data Link. The selected framing bits in a wide-area link that are used for control, monitoring, and testing.
Fractional T1	Individual DS0 channels that may be sold separately or in groups to provide bandwidth that is some fraction of the total T1 capability.
frame	One identifiable group of bits that includes a sequence of bits for control, framing, etc.
frame relay	A switching interface that is designed to get frames from one part of the network to another as quickly as possible.
framing	A technique that separates bits into identifiable groups.
Generic-Interface Extension MIB	An extension to MIB II that defines additional objects for control of generic interfaces in MIB II.
Get command (SNMP)	Read-only access to SNMP MIB objects.
ground	A physical connection to earth or other reference point.
HDLC	High-level Data Link Control. A communications protocol defined by the International Standards Organization (ISO).
host	A computer system used for application processing on a network.
Hz	Hertz. A unit of frequency that equals one cycle per second.
ICMP	Internet Control Management Protocol. The protocol that enables in-band control, diagnostic, and error messages to be passed between nodes in an IP internetwork.
ID branch	Identity branch of the DSU/CSU menu tree.
interface	A shared boundary between functional units.
Internet	The worldwide interconnected collection of networks that predominantly use the TCP/IP protocol.
internetwork	An interconnected collection of networks (also called an internet).
IP address	Internet Protocol address. The address used by the SNMP manager to access the device.
ISO	International Standards Organization.
ITU	International Telecommunications Union. The telecommunications agency of the United Nations, established to provide standardized communications procedures and practices.
kbps	Kilobits per second (thousand bits per second).
LAN	Local Area Network. A network that spans a small geographic area (e.g., a building).
LBO	Line Build-out. The amount of attenuation of the transmitted signal that is used to compensate for the length of wire between the transmitter and the receiver.

LCD	Liquid Crystal Display. Sealed glass plates containing liquid crystal material. When voltage is applied, the amount of light passing through the plates is altered so that messages may be displayed.
LCP	Link Control Protocol.
LED	Light-Emitting Diode. A status indicator that glows in response to the application of a voltage.
link	A communication path between two network nodes.
link layer protocol	The protocol that regulates the communication between two network nodes.
link trap	A trap that identifies the condition of the communications interface (linkDown or linkUp traps).
LLB	Line Loopback. Loops the received signal on the network interface back to the network without change.
LOF	Loss Of Frame. The inability to maintain frame synchronization.
LOFC	Loss Of Frame Count. A count of the number of LOFs declared.
loopback test	A test that verifies a device's operation by connecting the device's output to the device's input.
LOS	Loss Of Signal. The T1 line condition where there are no pulses.
Lpbk branch	Local Loopback branch of the DSU/CSU menu tree.
LQR	Link Quality Reports.
manager (SNMP)	The device that queries agents for management information, or receives unsolicited messages (traps) indicating the occurrence of specific events.
master clock	The master timing source used to synchronize all of the T1 and data port interfaces on the DSU/CSU.
MB	Megabytes. A unit of memory measurement equal to approximately one million bytes (typically 1,048,576 bytes).
Mbps	Megabits per second (million bits per second).
menu tree	A display of DSU/CSU functions that are accessed by selecting various branches (Status, Test, etc.).
MIB	Management Information Base. A database of managed objects used by SNMP to provide network management information.
MIB II	MIB Release 2. The current Internet-standard MIB.
module	A compact assembly functioning as a component in a larger system or unit.
MRU	Maximum Request Unit.
multiplex	To interleave or simultaneously transmit two or more messages on a single circuit.
network	A configuration of data processing devices for information exchange.
network interface	The T1 network interface connector on the rear panel of the DSU/CSU.
NMS	Network Management System. A computer system used for monitoring and controlling network devices.
node	A connection or switching point on the network.
object (SNMP)	A specific item within a Management Information Base (MIB).
OOF	Out Of Frame. An error condition in which frame synchronization bits are in error.
option	A hardware or software function that can be selected or enabled as part of a configuration process.

PAP	Password Authentication Protocol.
parity	A way of checking data accuracy by counting the number of bits that have a value of one.
payload	The information bits in a frame.
PBX	Private Branch Exchange. Telephone switching equipment dedicated to one customer. A PBX connects private telephones to each other and to the public network.
PC	Personal computer. In this document, references to a PC imply an IBM PC or an IBM-compatible PC.
PDU	Protocol Data Unit. Used when adding routes in the Internet.
PDV	Pulse Density Violation. The number of “ones” (marks, pulses) is not adequate for the line requirement.
Perf branch	Performance Report branch of the DSU/CSU menu tree.
PLB	Payload Loopback. Loops the received signal on the network interface back to the network after it has passed through the framing circuity of the DSU/CSU.
port	An access point for data entry or exit.
PORT (1–4) interface	The synchronous data port interface on the DSU/CSU.
POWER connector	The power input connector on the DSU/CSU.
power-up self-test	A test that checks most hardware components when power is applied to the device or a reset is initiated.
PPP	Point-to-Point Protocol. A link layer protocol used by SNMP.
PRBS	Psuedo-Random Bit Sequence. A test pattern containing any possible combination of digital ones and zeros for a given string length.
PRM	Performance Report Message. A message indicating performance data such as errored seconds, unavailable seconds, etc.
protocol	A set of rules that determines the behavior of functional units in achieving communication.
PSTN	Public Switched Telephone Network.
Ptrns branch	Test Patterns branch of the DSU/CSU menu tree.
pulse density	A measure of the number of “ones” (marks, pulses) in relation to the total number of bits transmitted.
QRSS Test	Quasi-Random Signal Source Test. A test pattern simulating a random pattern of digital ones and zeros used to simulate normal transmission.
RAM	Random-access memory. Read/write memory that is volatile and loses its contents when power is removed.
register	A part of the device’s memory that holds stored values.
Rel branch	Release branch of the DSU/CSU menu tree.
reset	A reinitialization of the DSU/CSU that occurs at power-up or in response to a reset command.
RFC	Request for Comments. The set of documents that describes the standard specifications for the TCP/IP protocol suite.
RIP	Routing Information Protocol. A protocol used to add routes in the Internet.
RJ48C	An 8-position modular connector.

RLB	Repeater Loopback. Loops the signal being sent to the network back to the DTE Drop/Insert and data ports after it has passed through the framing circuitry of the DSU/CSU.
Rlpbk branch	Remote Loopback branch of the DSU/CSU menu tree.
router	A device that connects LAN segments.
RS-232	An EIA standard for a low-speed, 25-position, DCE/DTE interface.
RS-232-like MIB	Defines objects for managing RS-232-type interfaces and supports synchronous data ports and management communication ports on the DSU/CSU.
RS-449	An EIA standard for a general-purpose, 37-position, DCE/DTE interface.
RTS	Request-to-Send. V.24 circuit 105.
RX	Receive. To obtain signals that have been transmitted.
RXC	Receive Clock. V.24 circuit 115.
RXD	Receive Data. V.24 circuit 104.
SDCP	Shared Diagnostic Control Panel.
self-test	A test that checks most hardware components when power is applied to the device or a reset is initiated.
server	A device that offers a specific service, such as database management, to a client.
SES	Severely Errored Seconds. For T1 data, seconds with 320 or more CRC6 errors or errored frame alignment signals.
Set command (SNMP)	Write access to SNMP MIB objects.
SLIP	Serial Line Internet Protocol. A link layer protocol used by SNMP.
SNMP	Simple Network Management Protocol. A generic network management system that allows the device to be managed by any industry-standard SNMP manager.
Stat branch	Status branch of the DSU/CSU menu tree.
STest branch	Self Test Health branch of the DSU/CSU menu tree.
StEvnt	Status Event Register. Records the occurrence of certain alarm conditions.
subnet	An IP addressing standard in which a portion of the host address can be used to create multiple network addresses that are logically a subdivision of the network address.
subnet mask	An integer used with the IP address of the host to determine which bits in the host address are used in the subnet address.
synchronous data	Data transmission that is synchronized by timing signals. Characters are sent at a fixed rate.
TCP/IP	Transmission Control Protocol/Internet Protocol. The dominant protocol in the worldwide Internet.
Telnet	A TCP/IP protocol that allows you to access a remote device as if you were connected locally to that device.
time slot	The allocated DS0 channel slot when DS0 channels are combined to form an aggregate bit stream.
trap (SNMP)	A notification message to the SNMP manager when an unusual event occurs on a network device, such as a reinitialization.
TStat branch	Test Status branch of the DSU/CSU menu tree.
TX	Transmit. To send signals from a device.

TXC	Transmit Clock. V.24 circuit 114.
TXD	Transmit Data. V.24 circuit 103.
T1	A wideband digital interface operating at 1.544 Mbps.
UAS	Unavailable Seconds. A count of 1-second intervals when service is unavailable.
UDP	User Datagram Protocol. A TCP/IP protocol describing how messages reach application programs within a destination computer.
UL	Underwriter's Laboratories, Inc. An organization which promotes product safety.
Vac	Volts alternating current.
Vdc	Volts direct current.
VF	Voice Frequency.
V.24	A CCITT standard for a low-speed, 25-position, DCE/DTE interface.
V.35	A CCITT standard for a high-speed, 34-position, DCE/DTE interface.
V.54	A CCITT standard for local and remote diagnostic loopback tests.
V.54 Loop 2	A CCITT standard for a data channel loopback (DCLB).
V.54 Loop 3	A CCITT standard for a data terminal loopback (DTLB).
WAN	Wide Area Network. A network that spans a large geographic area (e.g., a country).
warmStart trap	An SNMP trap that indicates that the device has reinitialized itself.
XTXC	External Transmit Clock. V.24 circuit 113.
Yellow Alarm	An outgoing signal transmitted when a DS1 terminal has determined that it has lost the incoming signal.
1in8 Test	A test pattern consisting of a one (1) followed by seven zeros (on the network only).
3000 Series Carrier	A rack-mounted device containing 17 slots in which to place circuit cards.
511 Test	A pseudo-random bit sequence (PRBS) that is 511 bits long (on the data ports only). This is a PRBS 2^9–1 test.

Index

A

abort
  lamp test, 4-25
  loopback, 4-21
  test patterns, 4-24
ac power module, 1-6, B-1
ACAMI method of channel allocation, 3-28
Activ (Active) configuration area
  functional description, 3-11
  in the menu tree, A-1
addressing. *See* IP (Internet Protocol) addressing
agent, SNMP, 1-2
AIS (Alarm Indication Signal) condition
  ASCII terminal/printer message, 4-9
  Device Health and Status message, 4-3
  front panel LED indication, 3-5, 3-6
  troubleshooting, 4-11
Alarm Configuration branch
  example of use, 3-19
  in the menu tree, A-1
  option table, C-25–C-27
  option worksheet, C-38
alarm messages. *See* messages, alarm
allocation, DS0 channel. *See* channel allocation
AMI (Alternate Mark Inversion), C-2
applications, 2-1–2-2
ASCII terminal/printer
  cabling example, 2-8
  used for alarm messages, 1-2
authenticationFailure trap, 4-10
AUX Port
  configuration option, C-23
  functional description, 1-6
  physical description, 1-5, 1-6
  pin assignments, D-5
  used with SNMP system, 1-2, 2-3, 3-14, F-1

B

B8ZS (Bipolar Eight Zero Substitution) coding
  configuration option, C-2, C-9
  Self-Test Health message, 4-2
backup capability, 3-31
BES (Bursty Errored Seconds) report, 4-7
block method of channel allocation, 3-28
BPV (Bipolar Violation) condition
  front panel LED indication, 3-6
  Performance Report message, 4-8
  troubleshooting, 4-12

C

cabling
  equipment list, I-1
  examples, 2-8
  pin assignments, D-1–D-16
Chan (Channel) Configuration branch
  example of use, 3-21–3-31
  in the menu tree, A-1
  option table, C-11–C-14
  option worksheet, C-40, C-42, C-43
channel allocation
  configuration options, C-11–C-14
  procedure for configuring, 3-21–3-31
CID (Customer Identification) branch
  example of use, 3-9
  in the menu tree, A-1
Circuit Identifier configuration option, C-10
CLOCK IN interface
  functional description, 1-6, 3-32
  physical description, 1-5
  pin assignments, D-16
clocking
  configuration options, C-15
  principles of operation, 3-32
  technical specifications, B-2
ClrReg (Clear Performance Registers) branch
  example of use, 4-6
  in the menu tree, A-1
Cnfig (Configuration) branch. *See* configuration options
coding, line, C-2
COM Port
  acquiring/releasing the user interface, 3-35–3-36
  cabling example, 2-8
  configuration option, C-18
  functional description, 1-6
  physical description, 1-5, 1-6
  pin assignments, D-6–D-7
  used with ASCII terminal/printer, 2-8, 4-9
  used with SNMP system, 1-2, 2-3, 3-14, F-1

community name
configuration option, C-29
procedure for configuring, 3-17–3-18
configuration options
procedure for changing, 3-11–3-14
tables
Alarm, C-25–C-27
Channel, C-11–C-14
DTE Interface, C-2–C-3
General, C-15–C-16
Network Interface, C-9–C-10
Port, C-4–C-8
SNMP, C-28–C-36
User Interface, C-17–C-24
worksheets, C-37–C-44, H-13
connectors, rear panel
cabling examples, 2-8
functional description, 1-6
physical description, 1-5, 1-6
pin assignments, D-1–D-16
CPU failure message, 4-2
crossover cable, D-15
CSS (Controlled Slip Seconds) report, 4-7
Ctrl (Control) branch
examples of use, 3-9, 3-34, 3-36, 3-37, 3-39, 3-40, 3-43, 4-6
in the menu tree, A-1
Cust1 (Customer 1) configuration area
functional description, 3-11
in the menu tree, A-1
Cust2 (Customer 2) configuration area
functional description, 3-11
in the menu tree, A-1
cyclic redundancy check (CRC), error indication, 4-7

D

daisy chaining
configuration options, C-18, C-23
connectivity, 1-6, 2-3, 2-4
data channel loopback (DCLB), 4-20, C-5
data port. *See* PORT (1–4) interface
data terminal loopback (DTLB), 4-20–4-21, C-5
database, SNMP, 1-2
dc power option, 2-5–2-7, B-1, D-16
default configuration options, C-1
DevFail (Device Failure) message, 4-4
DevHS (Device Health and Status) branch
example of use, 4-3–4-4
in the menu tree, A-1
dimensions, B-2
DL (Download) branch
in the menu tree, A-1
operation, 3-43
DS0 channel allocation. *See* channel allocation
DTE (Drop/Insert) interface. *See* DTE Drop/Insert interface
DTE Configuration branch
in the menu tree, A-1
option table, C-2–C-3
option worksheet, C-37
DTE Drop/Insert interface
channel allocation procedure, 3-21–3-26
configuration options, C-2–C-3
failure message, 4-2
front panel LED indications, 3-6
functional description, 1-2, 1-6, 2-1
managed by SNMP, E-1
physical description, 1-5
pin assignments, D-3
technical specifications, B-1
troubleshooting, 4-11
DTE loopback (DLB), 4-19
configuration option, C-3
external control interface, D-3

E

EER (Excessive Error Rate) condition
ASCII terminal/printer message, 4-9
Device Health and Status message, 4-3
front panel LED indication, 3-5, 3-6
Performance Report message, 4-8
troubleshooting, 4-12
EIA 530A interface, D-8
Embedded Data Link (EDL)
configuration option, C-6, C-8
used with SNMP system, 1-2, 2-3, 2-4, F-1
enterprise-specific trap, 4-10
environmental specifications, B-2
equalization, line, C-2
equipment list, I-1
error messages. *See* messages, alarm
ES (Errored Seconds) report, 4-7
external modem interface, D-15

F

Facility Data Link (FDL)
configuration option, C-9
used with SNMP system, 1-2, 2-3, 2-4, F-2
Facility Interface Code, D
Facility Interface Codes, D
Fact1 (Factory 1) configuration area
functional description, 3-11
in the menu tree, A-1
Fact2 (Factory 2) configuration area
functional description, 3-11
in the menu tree, A-1
failure analysis. *See* troubleshooting
failure message
during power-up self-test, 2-9, 4-4
troubleshooting, 4-12
feature numbers, I-1

features, 1-1–1-2
fractional T1, 2-1, 2-2
framing configuration option, C-2, C-9
front panel
  acquiring/releasing the user interface, 3-35–3-36
  operation, 3-2–3-8
  physical description, 1-3–1-4, 3-2
Front Panel Emulation
  cabling example, 2-8
  feature number, I-1
  functional description, 1-2, 3-2, G-1
  installation and operation, G-1–G-2

G

Gen (General) Configuration branch
  example of use, 3-33
  in the menu tree, A-1
  option table, C-15–C-16
  option worksheet, C-37
government regulations, Canada, E
government requirements, United States, D

I

ID (Identity) branch
  example of use, 3-8–3-9
  in the menu tree, A-1
indicators. *See* LEDs, front panel
integral modem, D
IP (Internet Protocol) addressing
  configuration option, C-30, C-31, C-33
  example of use, F-1–F-6
  procedure for configuring, 3-15–3-16, 3-20

K

keypad
  operation, 3-3–3-4
  physical description, 1-3, 3-2

L

lamp test, 4-25
LAN Adapter, 1-2, 1-6, 2-3, 2-4, 3-14, F-1
LED Control branch
  example of use, 3-9
  in the menu tree, A-1
LED Status branch
  example of use, 3-10
  in the menu tree, A-1
LEDs, front panel
  during power-up self-test, 2-9
  functional description, 3-4–3-8
  lamp test, 4-25
  physical description, 1-3, 3-2
line coding, C-2
line equalization, C-2
line loopback (LLB), 4-18
link layer protocol, 3-14, 3-16–3-17
link trap, 4-10
liquid crystal display (LCD)
  failure message, 4-2
  functional description, 3-3
  physical description, 1-3, 3-2
LOF (Loss Of Frame) condition, front panel LED indication, 3-5, 3-6
LOFC (Loss Of Frame Count) report, 4-7
loopback
  front panel LED indication, 3-5
  local, 4-17–4-21
    abort, 4-21
    data channel loopback (DCLB), 4-20
    data terminal loopback (DTLB), 4-20–4-21
    DTE loopback (DLB), 4-19, C-3, D-3
    line loopback (LLB), 4-18
    payload loopback (PLB), 4-18
    repeater loopback (RLB), 4-19
  remote, 4-15–4-16
LOS (Loss Of Signal) condition
  ASCII terminal/printer message, 4-9
  Device Health and Status message, 4-3
  front panel LED indication, 3-5, 3-6
  Performance Report message, 4-8
  Self-Test Health message, 4-2
  troubleshooting, 4-11
Lpbk (Local Loopback) branch
  example of use, 4-17–4-21
  in the menu tree, A-1

M

maintenance
  device health and status, 4-3–4-4
  performance reporting, 4-5–4-8
  power-up self-test, 2-9, 4-2
manager, SNMP, 1-2
master clock
  functional description, 3-32
  procedure for configuring, 3-33
menu tree, A-1–A-2
messages
  alarm
    Device Health and Status, 4-3
    Performance Report, 4-7
    Self-Test Health, 4-2
    troubleshooting, 4-11
    with ASCII terminal/printer, 1-2, 4-9
  status
    Device Health and Status, 4-3
    Performance Report, 4-7
    Self-Test Health, 2-9, 4-2
    Test Status, 4-26

MIBs, SNMP. *See* SNMP, MIBs
model numbers, I-1
modem, D
MODEM Port
  acquiring/releasing the user interface, 3-35–3-36
  configuration option, C-22
  functional description, 1-2, 1-6
  physical description, 1-5, 1-6
  pin assignments, D-4
  technical specifications, B-2
  used with ASCII terminal/printer, 4-9
  used with SNMP system, 3-14
Mon (Monitor) branch
  example of use, 4-13
  in the menu tree, A-1

N

NET (Network) Configuration branch
  example of use, 3-12
  in the menu tree, A-1
  option table, C-9–C-10
  option worksheet, C-37
network interface
  cabling example, 2-8
  channel allocation procedure, 3-21–3-26
  configuration options, C-9
  failure message, 4-2
  front panel LED indications, 3-5
  functional description, 1-6, 2-1
  physical description, 1-5, 1-6
  pin assignments, D-1–D-2
  technical specifications, B-2
  troubleshooting, 4-11

O

objects, SNMP, 1-2, E-1–E-20
OOF (Out Of Frame) condition
  ASCII terminal/printer message, 4-9
  Device Health and Status message, 4-3
  front panel LED indication, 3-5, 3-6
  Performance Report message, 4-7
  troubleshooting, 4-11
options, strap. *See* configuration options

P

part numbers, I-1
pattern tests, 4-22–4-24
payload loopback (PLB), 4-18
PBX applications, 2-2
PDV (Pulse Density Violation) condition, 3-6
Perf (Performance Report) branch
  example of use, 4-5–4-6
  in the menu tree, A-1
performance reporting, 4-5–4-8, C-7, C-8
physical description of DSU/CSU, 1-3–1-5, B-2
pin assignments, D-1–D-16
Point-to-Point Protocol (PPP)
  procedure for configuring, 3-16
  used with SNMP system, 1-2, 2-3, 2-4, 3-14, F-1
PORT (1–4) interface
  channel allocation procedure, 3-21–3-26
  configuration options, C-4–C-8
  failure message, 4-2
  front panel LED indications, 3-7
  functional description, 1-6, 2-1
  managed by SNMP, E-1
  physical description, 1-5, 1-6
  pin assignments, D-8
  technical specifications, B-2
Port Configuration branch
  example of use, 3-13–3-14
  in the menu tree, A-1
  option table, C-4–C-8
  option worksheet, C-39
power input
  cabling example, 2-8
  connector, 1-5, 1-6, D-16
  consumption, B-1
  optional power sources, 2-5–2-7, B-1, D-16
  requirement, B-1
  troubleshooting, 4-11
power module, 1-6, B-1
power-up self-test
  displaying results, 4-2
  front panel indications, 2-9, 3-5
  troubleshooting, 4-11
problem determination. *See* troubleshooting
protocol, link layer, 3-14, 3-16–3-17
Ptrns (Test Patterns) branch
  example of use, 4-22–4-24
  in the menu tree, A-1

Q

QRSS Test, 4-22

R

rate
  auxiliary port, C-24
  communications port, C-21
  external clock, C-15
  synchronous data port, C-13
rear panel
  connectors. *See* connectors, rear panel
  physical description, 1-5–1-7
Rel (Release) branch
  example of use, 3-36
  in the menu tree, A-1
remote loopback, 4-15–4-16
repeater loopback (RLB), 4-19

reset
front panel indications, 2-9
procedure, 3-43
Reset branch
example of use, 3-43
in the menu tree, A-1
Rlpbk (Remote Loopback) branch
example of use, 4-15–4-16
in the menu tree, A-1
router applications, 2-2
RS-449 interface, D-10

S

self-test
displaying results, 4-2
front panel indications, 2-9, 3-5
troubleshooting, 4-11
Send Ones configuration option, C-3, C-5
serial crossover cable, D-15
Serial Line Internet Protocol (SLIP)
procedure for configuring, 3-16
used with SNMP system, 1-2, 2-3, 3-14, F-1
SES (Severely Errored Seconds) report, 4-7
Shared Diagnostic Control Panel (SDCP)
acquiring/releasing the user interface, 3-35–3-36
physical description, 3-2
SNMP (Simple Network Management Protocol)
agent, 1-2
configuration options
examples of use, 3-14–3-18, 3-19–3-20
menu tree branches, A-1
option table, C-28–C-36
option worksheet, C-44
connection examples, 2-3–2-4, 2-8, F-1–F-6
database, 1-2
IP addressing, F-1–F-6
manager, 1-2
MIBs
functional description, E-1–E-2
list of objects, E-1–E-20
procedure for configuring access, 3-17–3-18
objects, 1-2
principles of operation, 1-2
SNMP Down message, 4-4, 4-12
traps
functional description, 1-2, 4-10
procedure for configuring, 3-19–3-20
specifications, environmental, B-1, B-2
Stat (Status) branch
examples of use, 3-8, 3-10, 4-2, 4-3, 4-5, 4-26
in the menu tree, A-1
status messages. *See* messages, status
STest (Self-Test Health) branch
example of use, 4-2
in the menu tree, A-1
StEvnt (Status Event) report, 4-8
straps. *See* configuration options
subnet, 3-14, C-30, C-31, C-33, F-2
synchronous data port. *See* PORT (1–4) interface

T

T1
line, D
network, connection, D
technical specifications, B-1
Test branch
example of use, 4-15–4-26
in the menu tree, A-1
test commands, 4-15–4-26
front panel LED indications, 3-5
lamp test, 4-25
local loopback, 4-17–4-21
abort, 4-21
data channel loopback (DCLB), 4-20
data terminal loopback (DTLB), 4-20–4-21
DTE loopback (DLB), 4-19
line loopback (LLB), 4-18
payload loopback (PLB), 4-18
repeater loopback (RLB), 4-19
remote loopback, 4-15–4-16
test messages, 4-26
test patterns, 4-22–4-24
test jacks
functional description, 4-13–4-14
physical description, 1-3, 3-2, 3-4
timing. *See* clocking
traps, SNMP. *See* SNMP, traps
troubleshooting
device health, 4-3–4-4
diagnostic table, 4-11–4-12
performance, 4-5–4-8
power-up self-test, 2-9, 4-2
TStat (Test Status) branch
example of use, 4-26
in the menu tree, A-1

U

UAS (Unavailable Seconds) report, 4-7
User Configuration branch
example of use, 3-15, 3-41–3-45
in the menu tree, A-1
option table, C-17–C-24
option worksheet, C-38
user interface, acquiring/releasing, 3-35–3-36

V

V.35 interface, D-12
V.54 Loop 2. *See* data channel loopback (DCLB)
V.54 Loop 3. *See* data terminal loopback (DTLB)

W

warmStart trap, 4-10
weight, B-2
worksheets, configuration option, C-37–C-44, H-13

X

X.21 interface, D-14

Y

Yellow Alarm condition
ASCII terminal/printer message, 4-9
Device Health and Status message, 4-3
front panel LED indication, 3-5, 3-6
Performance Report message, 4-8
troubleshooting, 4-11