ACCULINK® 3163 DSU/CSU

USER'S GUIDE

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PARADYNE™

ACCULINK
3163 DSU/CSU

User's Guide
3163-A2-GB20-10

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⚠ 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 3-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 3-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.

⚠ Warnings

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.

Class 1 ITE Notice for Japan

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This is a Class 1 product based on the standard of the Voluntary Control Council for interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

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4. Monitoring and Testing

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Glossary

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Preface

Overview

This user's guide contains installation, operation, and maintenance information for the ACCULINK 3163 Data Service Unit (DSU)/Channel Service Unit (CSU).

Document Summary

Section	Description
Chapter 1	*Introduction.* Describes the features of the DSU/CSU.
Chapter 2	*Installation.* Explains how to install the DSU/CSU.
Chapter 3	*Operation.* Provides instructions for using the front panel, changing configuration options, establishing security, and using the integral modem.
Chapter 4	*Maintenance.* Explains how to obtain information about the status and performance of the DSU/CSU, how to troubleshoot problems, and how to run tests.
Appendix A	*Front Panel Menu.* Contains a menu tree showing all the main front panel functions.
Appendix B	*Technical Specifications*. Contains a table with the specifications of the DSU/CSU.
Appendix C	*Configuration Options.* Lists and explains the configuration options.
Appendix D	*Pin Assignments.* Describes the pin assignments for connectors used with the DSU/CSU.
Appendix E	*IP Network Addressing Scenarios.* Shows the use of IP addressing in sample networks.
Appendix F	*Front Panel Emulation.* Explains the use of the optional front panel emulation software.
Appendix G	*Asynchronous Terminal Interface Operation.* Describes the function and use of the Asynchronous Terminal Interface (ATI).
Appendix H	*Equipment List.* Lists feature numbers for equipment related to the DSU/CSU.
Glossary	Explains terms and abbreviations used in the text.
Index	Lists major topics in the text.

Related Documents

3000-A2-GA31	*COMSPHERE 3000 Series Carrier Installation Manual*
3000-A2-GB41	*COMSPHERE –48 VDC Central Office Power Unit Installation Guide*
3160-A2-GB21	*ACCULINK 316x Data Service Unit/Channel Service Unit Operator's Guide*

Contact your sales or service representative to order additional product documentation.

Paradyne documents are also available on the World Wide Web at:

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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

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, the Model 3163 provides one synchronous data port.

Features

The Model 3163 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.
- 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.

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 3163 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 3163 DSU/CSU 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.

Asynchronous Terminal Interface Support

The 3163 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.

Physical Description

Model 3163 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)
- Two test jacks

The front panels is shown in Figure 1-1.

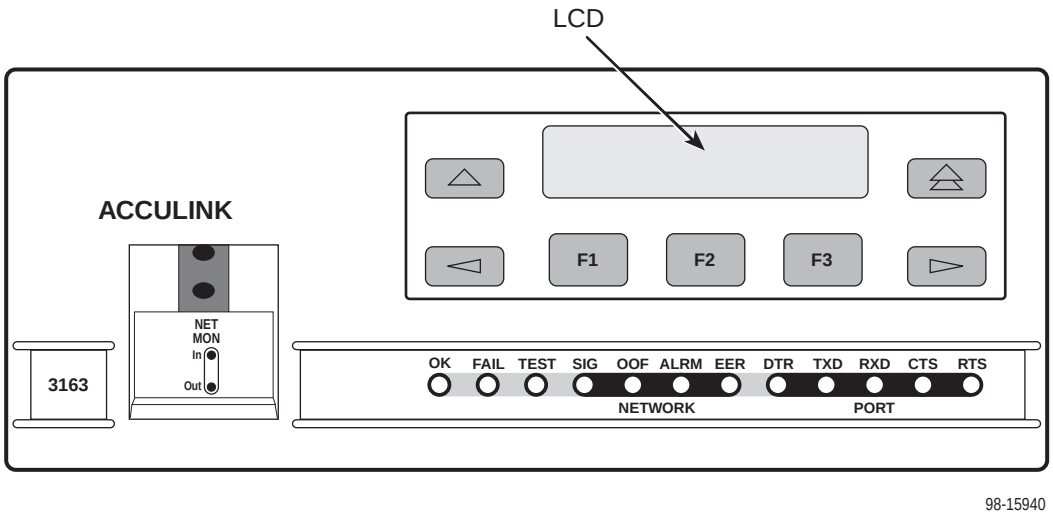


Figure 1-1. 3163 DSU/CSU Front Panel

Model 3163 DSU/CSU Rear Panel

The 3163 DSU/CSU rear panel contains the connectors required for the operation of the DSU/CSU (Figure 1-2). The connectors and their functions are listed in Table 1-1.

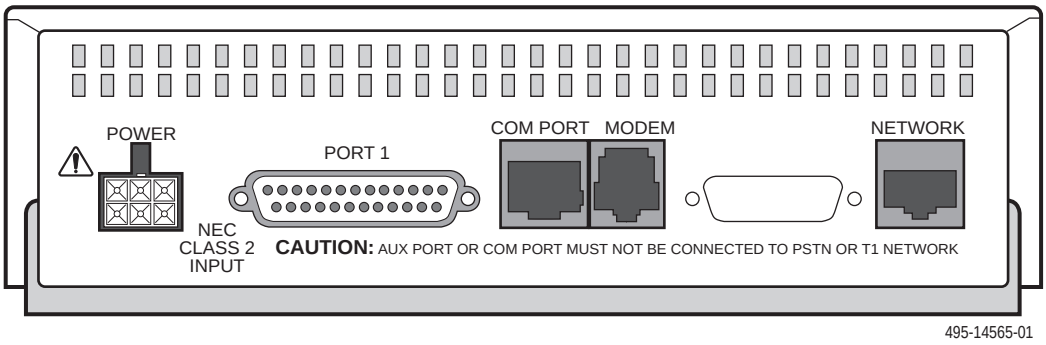


Figure 1-2. 3163 DSU/CSU Rear Panel

Table 1-1
Model 3163 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).
COM PORT	Provides access to a locally connected PC, ASCII terminal or printer, or async terminal interface.
MODEM	Provides a connection to the integral modem for access to a remotely connected PC, ASCII terminal or printer, or async terminal interface.
NETWORK	Provides access to the T1 network.
PORT 1	Used to connect the customer's synchronous data DTE to the DSU/CSU.

Installation 2

Overview

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

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 the synchronous data port (PORT 1). It is connected to the T1 digital network through the network interface. Some common applications for the DSU/CSU are:

- Point-to-Point LAN interconnection (Figure 2-1).
- Fractional T1 network applications (Figure 2-2).

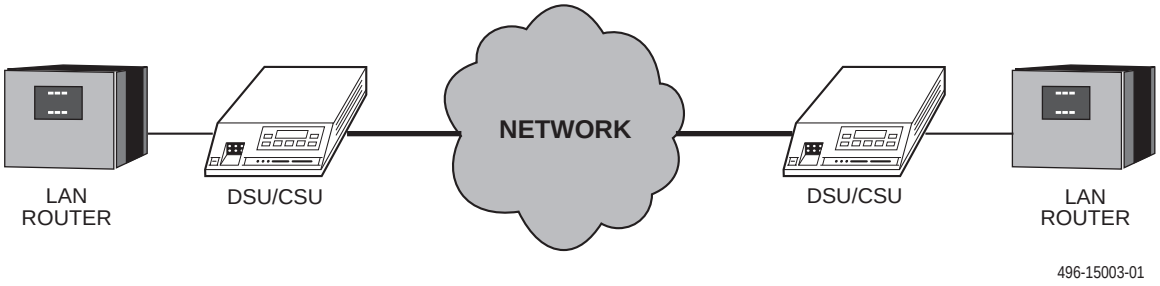


Figure 2-1. Point-to-Point Application Example

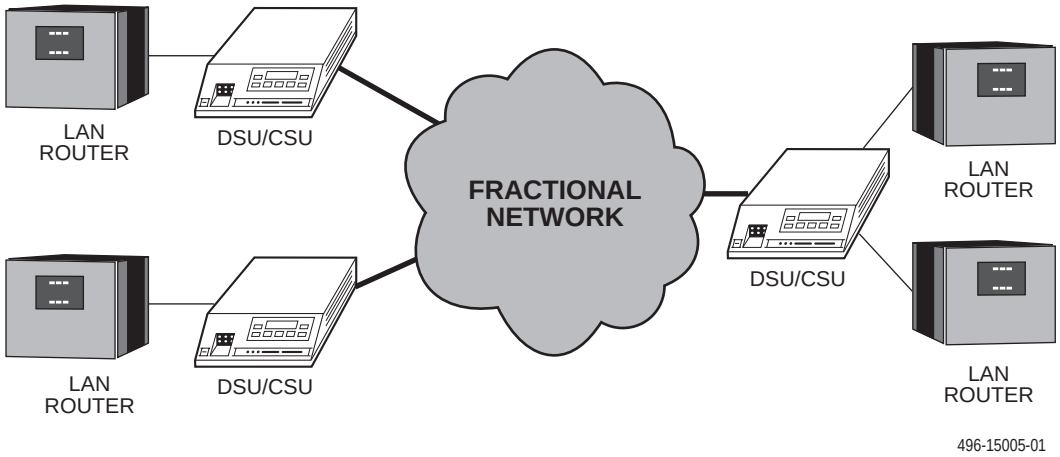


Figure 2-2. Fractional T1 Application Example

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 2-3 and use the following procedure.

▶ Procedure

To install the +24 Vdc power supply:

1. Connect the green wire to a suitable 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.

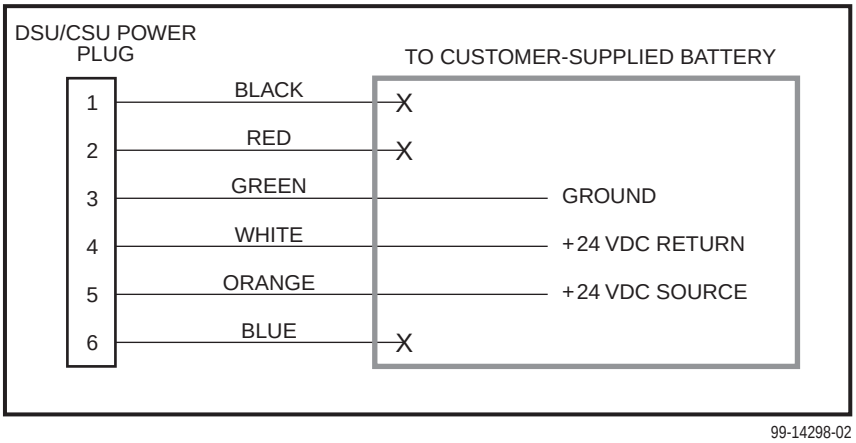


Figure 2-3. +24 Vdc Power Supply Pinouts

Installing the Single –48 Vdc Power Supply

To install the DSU/CSU using a single source –48 Vdc power supply, refer to Figure 2-4 and use the following procedure.

▶ 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 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.

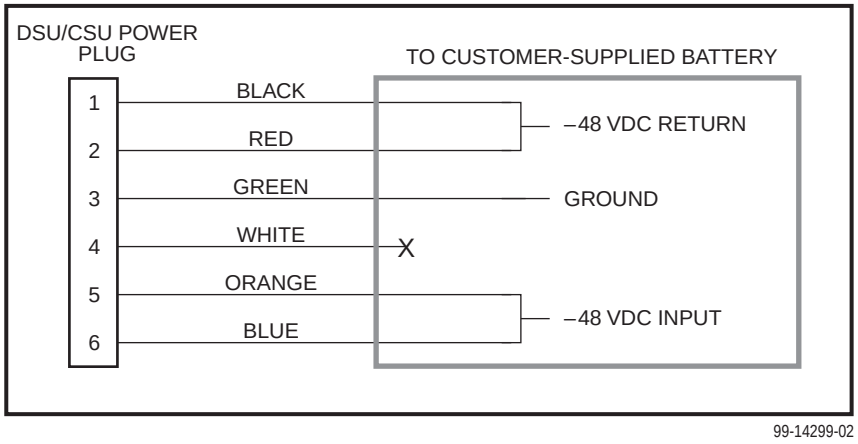


Figure 2-4. –48 Vdc Single Source Power Supply Pinouts

Installing the Redundant –48 Vdc Power Supply

To install the DSU/CSU using a redundant –48 Vdc power supply, refer to Figure 2-5 and use the following procedure.

▶ 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 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.

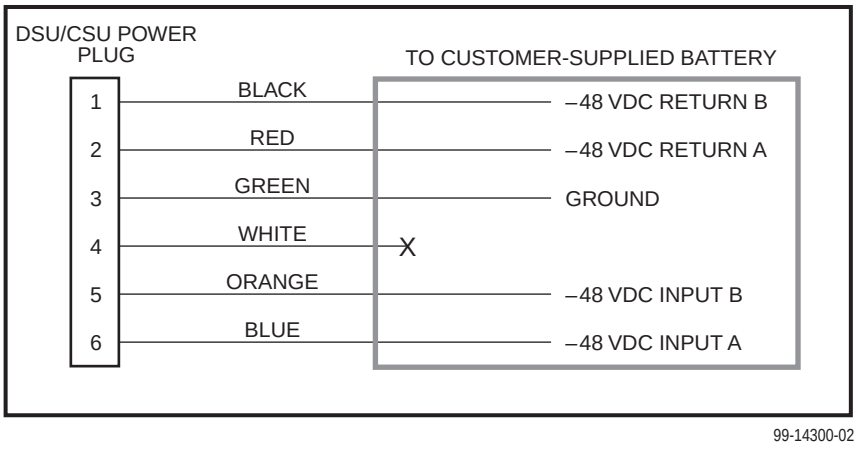


Figure 2-5. –48 Vdc Redundant Source Power Supply Pinouts

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 2-6 illustrates some cabling examples.

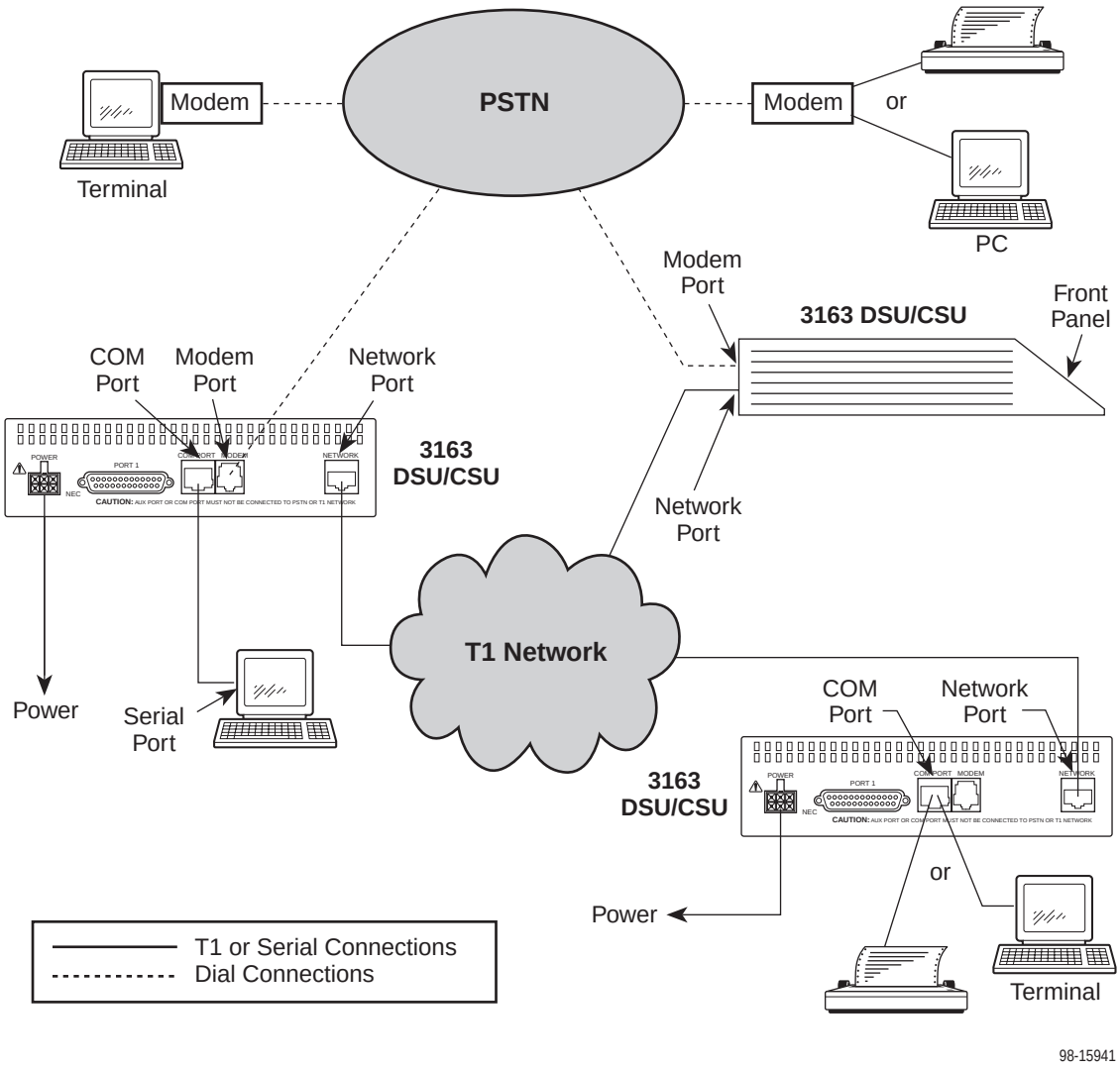


Figure 2-6. Cabling Examples

Power-Up Self-Test

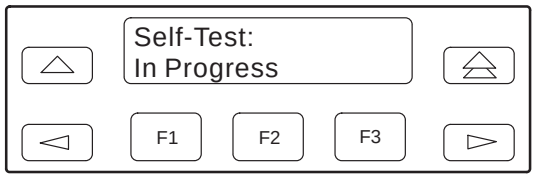
After you connect the DSU/CSU to a power source, the unit performs the power-up self-test to ensure that it is in good working order. The DSU/CSU performs this test on itself upon power-up or after a device reset, unless it has been disabled by the Self-Test configuration option (see Appendix C, *Configuration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

▶ Procedure

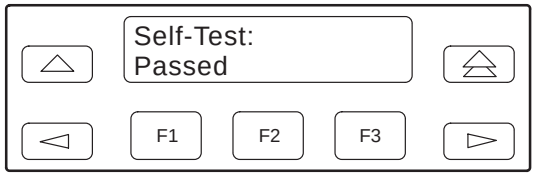
The power-up self-test consists of the following steps:

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

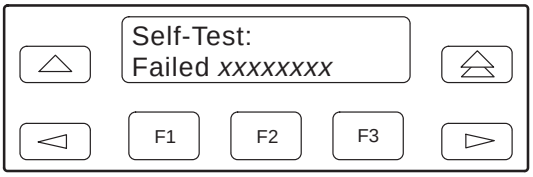


2. All the LEDs then start to flash simultaneously in the pattern twice ON, then Off. Then, the LCD begins to flash characters and numbers in the same pattern, alternating with the flashing LEDs.

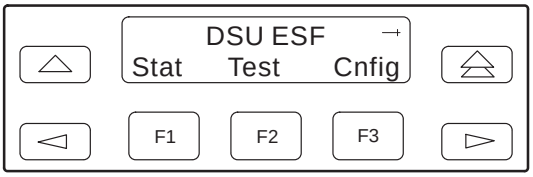
3. If the self-test is successful, the Passed screen appears for one second, the Fail LED turns Off and the OK LED lights.



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

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.

Using the Front Panel

The standalone DSU/CSU front panel (Figure 3-1) consists of an LCD, a keypad, test jacks, and 12 LEDs.

NOTE

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

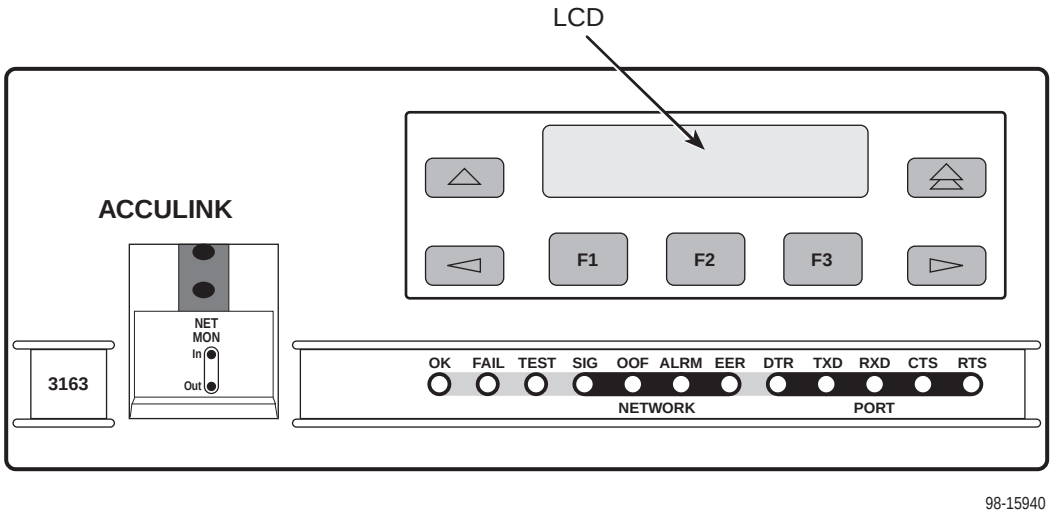


Figure 3-1. Standalone DSU/CSU Front Panel

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*)

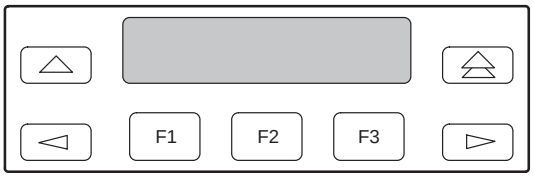


Figure 3-2. LCD

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.

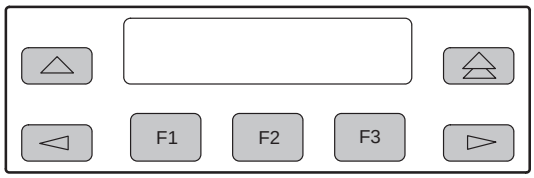
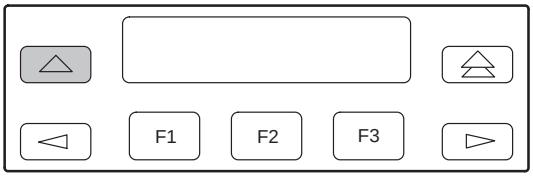
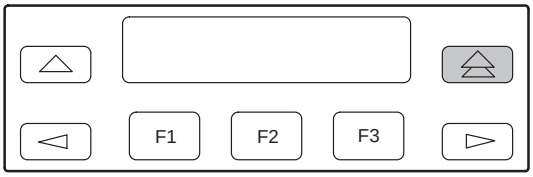


Figure 3-3. Keypad

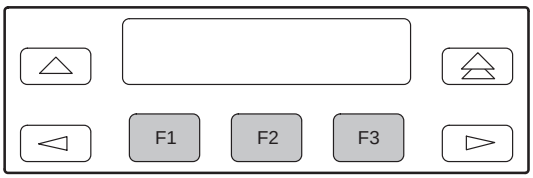
Use the △ key to move up the menu.



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*).



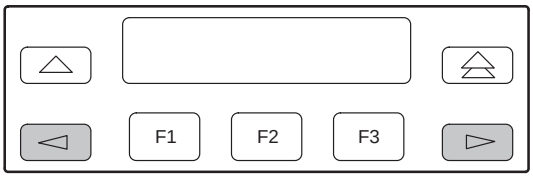
Use the Function (F1, F2, F3) keys to make selections from the choices presented on the second line of the LCD. When this line presents choices, it is generally divided into three sections, each displayed directly above one of the Function keys. When your choice appears above one of the Function keys,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

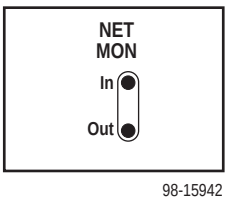


Figure 3-4. Test Jacks

LEDs

There are twelve LEDs on the DSU/CSU front panel.

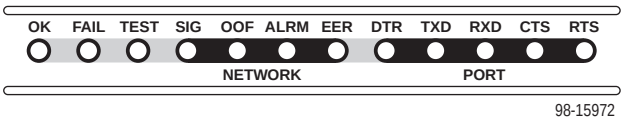


Figure 3-5. DSU/CSU LEDs

A green LED indicates normal operation. A yellow LED indicates activity for the data port. 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)
- Data Ports (Table 3-3)

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.
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.

Table 3-3
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.

Displaying Unit Identity

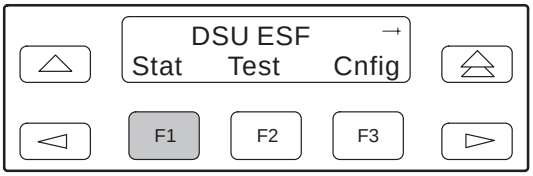
The identity of the DSU/CSU (serial number, model number, software revision level, hardware revision level, and customer identification) is available through the Status branch of the front panel menu (see Appendix A, *Front Panel Menu*).

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

▶ Procedure

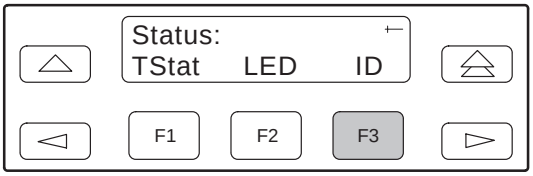
To display the DSU/CSU's identity (ID):

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

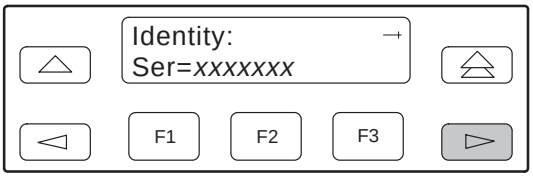


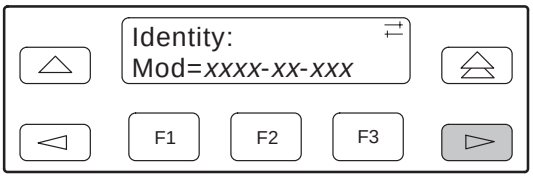
2. From the Status screen, press the ▻ key until the ID selection appears on the screen.

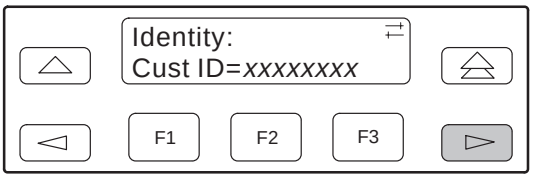
3. Select ID.

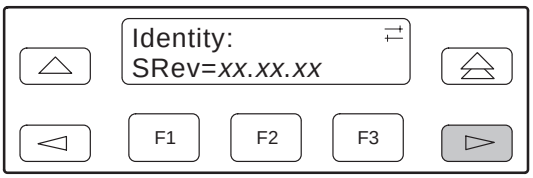


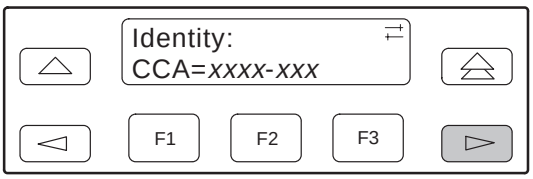
4. The following screens appear in the order listed each time you press the ▻ key.











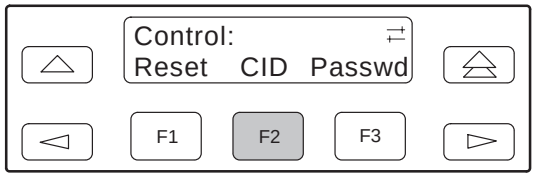
Setting Customer Identification

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

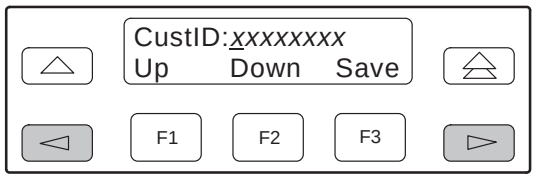
▶ Procedure

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.

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 F, *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.

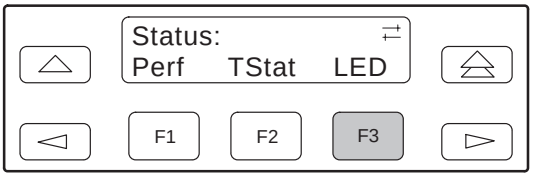
NOTE

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

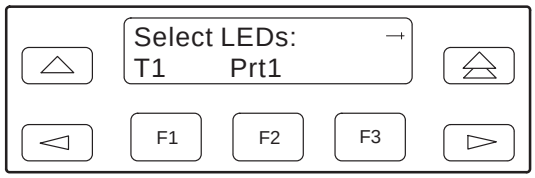
▶ Procedure

To display LED conditions on the front panel screen:

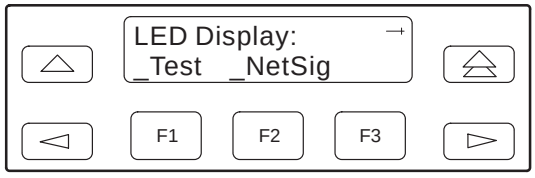
1. From the top-level menu screen, select Stat.
2. From the Status screen, press the ▻ key until the LED selection appears on the screen.
3. From the Status screen, select LED.



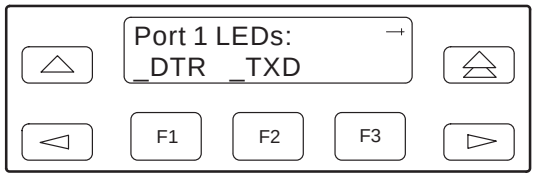
4. From the Select LEDs screen, press the Function key that corresponds to T1 interface or the data port for which you want to display LEDs. Use the scroll keys, if necessary.



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 Prt1, the Port 1 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. 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:

- Port
- Network Interface
- Channel
- General
- User Interface
- Alarm
- Management

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 the network interface. The data port is unassigned.
- **Factory 2** – D4 framing format with AMI line coding format for the network interface. The data port is unassigned.

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

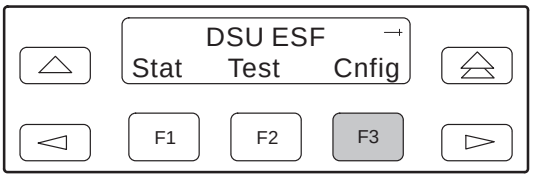
Use the Configuration (Cnfig) branch of the front panel menu tree to display or change DSU/CSU configuration options (see Appendix C, *Configuration Options*).

Displaying/Editing Configuration Options

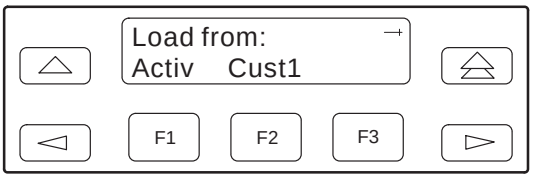
▶ Procedure

To display/edit configuration options:

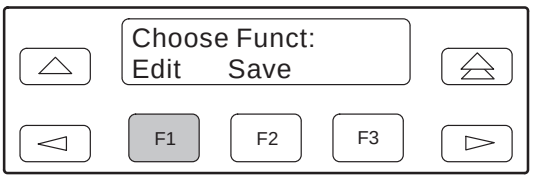
1. From the top-level menu screen, select Cnfig.



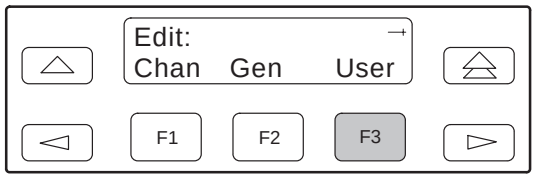
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.



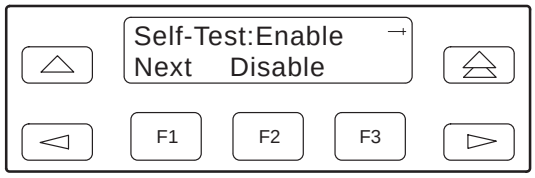
3. Select Edit.



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 User 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.

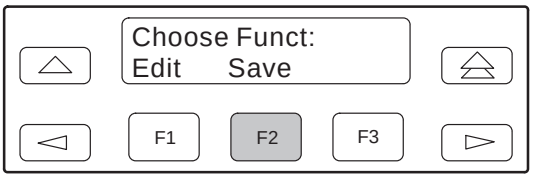
NOTE

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**.

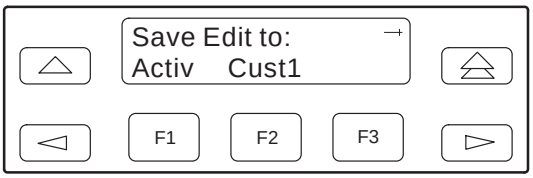
▶ Procedure

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.



Configuring the DSU/CSU for Telnet Access

To configure the DSU/CSU for Telnet access,

- Enable the Telnet server within the DSU/CSU (see Appendix C, *Configuration Options*).
- Select and configure the port that provides the link to the Telnet system.
- Set the Internet Protocol (IP) address and subnet mask needed to access the DSU/CSU (see Appendix E, *IP Network Addressing Scenarios*).
- Select the link layer protocol (PPP or SLIP) for the port that provides the link to the Telnet system.
- Specify the Telnet password, if desired (see Appendix C, *Configuration Options*).

Selecting the Port

The Telnet device or network device can be directly connected to the communications (COM) port. An external LAN Adapter can be connected to the COM port to provide Ethernet or Token Ring connectivity. Use the MODEM port when accessing the DSU/CSU through a dial-up connection.

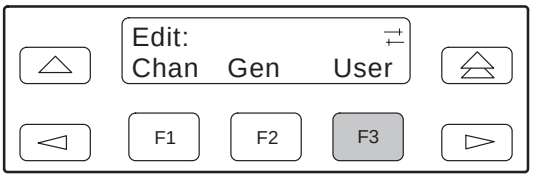
The COM port can support either synchronous or asynchronous PPP, or asynchronous SLIP at data rates of up to 38,400 bps. The MODEM port can support either synchronous or asynchronous PPP, or asynchronous SLIP at data rates of up to 2400 bps.

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

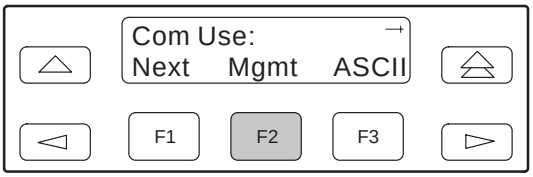
▶ Procedure

To select the COM port as the 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 Telnet link.



Setting the IP Address

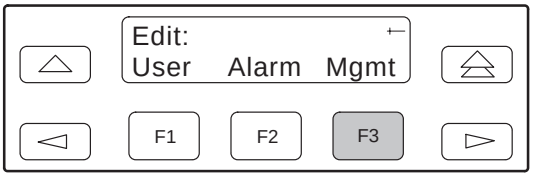
The IP address is the address used by the Telnet system to access the DSU/CSU (see Appendix E, *IP Network Addressing Scenarios*). For DSU/CSUs using PPP, the IP address can be negotiated if the network device (e.g. a router) supports such negotiation. The IP address is composed of four fields with three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

The IP address is set for the MODEM port or the COM port, depending on which one has been chosen as the 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 the modem port.

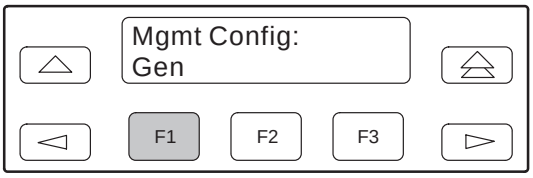
▶ Procedure

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.



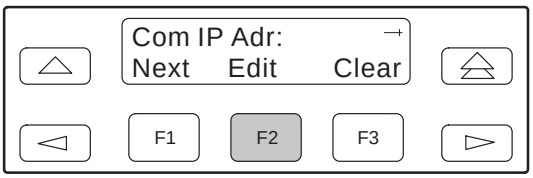
6. From the Mgmt Config screen, select Gen.



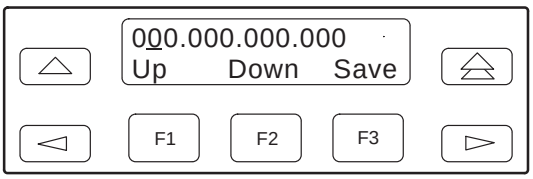
7. Press F1 (Next) until the Com IP Adr configuration option appears.

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

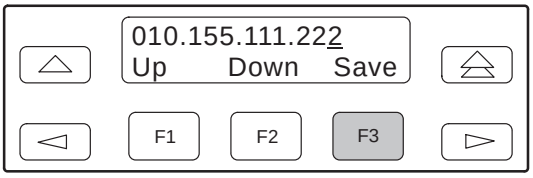
8. Press F2 (Edit) to edit the IP address. You have the option of using F3 (Clear) to reset the IP address to the factory default *000.000.000.000*.



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 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.

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).

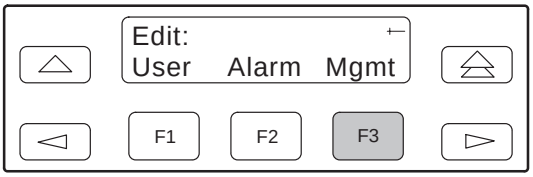
The DSU/CSU implementation of SLIP supports a fixed MRU size of 1006 bytes.

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 3-12. This example assumes that the COM port is being used as the communications link.

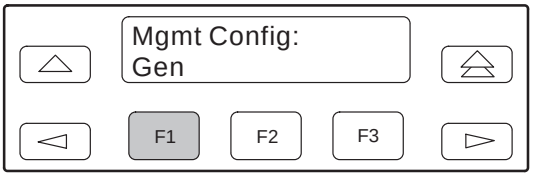
▶ Procedure

To select the link layer protocol:

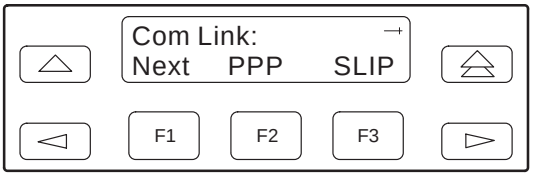
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▷ key until the Mgmt selection appears on the screen.
5.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



Configuring DS0 Channels

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

- Display the DS0 assignments for the network and data port interfaces.
- Allocate DS0 channels on the network interface to the data port.
- Clear (deallocate) all DS0 channels from the network or data port interface.

To allocate DS0 channels, begin by defining the logical channel configuration for the network interface, and then Port 1, if desired.

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

1. Using the worksheet shown in Figure 3-6, circle the configuration options needed to implement the logical channel configuration.

2. Once you have completed the worksheet, enter this information using the procedures in the *Allocating Data Ports* section on page 3-17.

Port Chan Conf	Options		Value
Port 1	Assign To		NET
	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*): 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*): 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*): 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 3-6. Port Channel Configuration Worksheet

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 3-4.

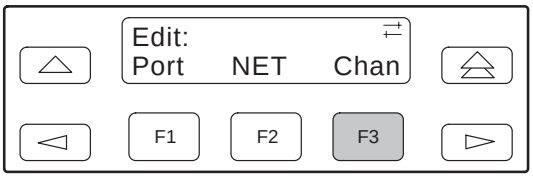
Table 3-4
Display Channel Symbols

Symbol	Meaning
–	The DS0 channel is not allocated.
Prt1	The DS0 channel is allocated to Port 1.
N*n*	The DS0 channel is allocated to the network interface DS0 channel *n*, where *n* can be any number from 1 through 24.

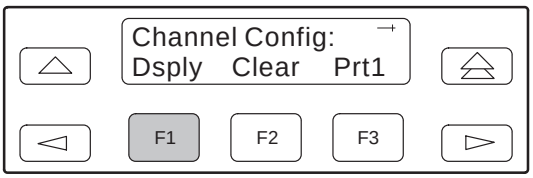
▶ Procedure

To display the DS0 channel allocation:

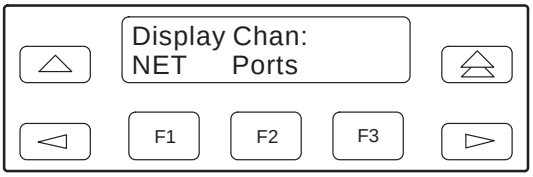
1. From the top-level menu screen, select Cnfig.
2. Select the configuration option set to be copied into the Edit area by using the appropriate Function key. Use the scroll keys, if necessary.
3. Select Edit.
4. From the Edit screen, press the ▷ key until the Chan selection appears on the screen.
5.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



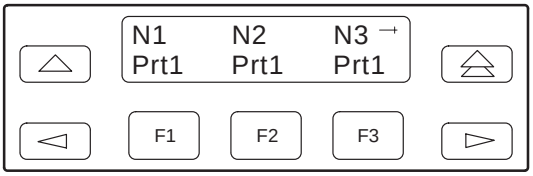
6. From the Channel Config screen, select Dsply.



7. From the Display Chan screen, select NET to display the channels allocated to the network interface.



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.



Allocating Data Ports

By using the configuration options, assign a specific port to DS0 channels on the network 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 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.

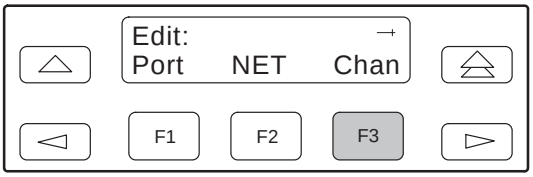
Once a port is selected, you have access to the configuration options to complete the port allocation procedure. These configuration options enable you to,

- 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).

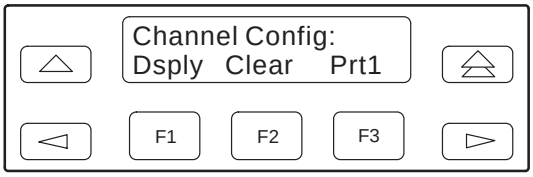
▶ Procedure

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 Assign By configuration option is displayed. Use one of the following examples, depending on whether you are assigning by block, ACAMI, or individual channel.

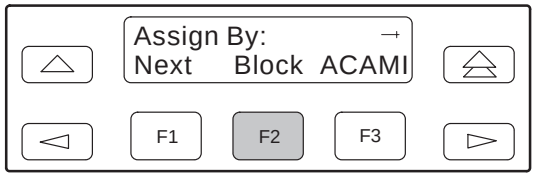
Block or ACAMI Assignment Method

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

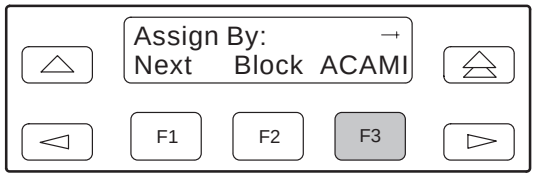
▶ Procedure

To assign by the block or ACAMI method:

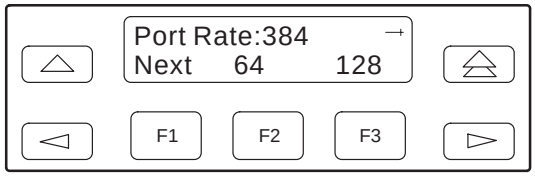
1. Press F2 for Block or F3 for ACAMI.



or

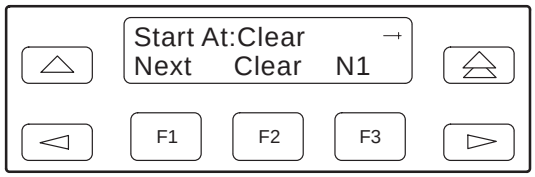


2. Press F1 (Next) to display the next configuration option (Port Rate).



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.

4. The Start At screen displays the network channels. 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.



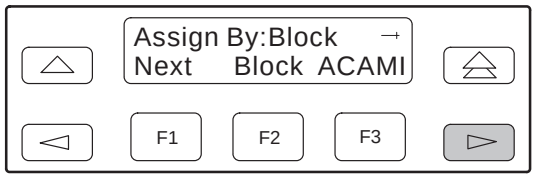
Individual Channel Assignment Method

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

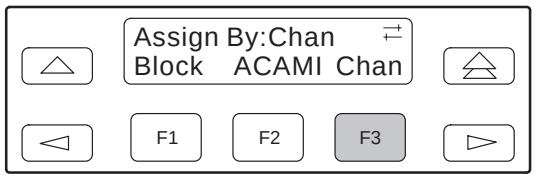
▶ Procedure

To assign by the individual channel method:

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

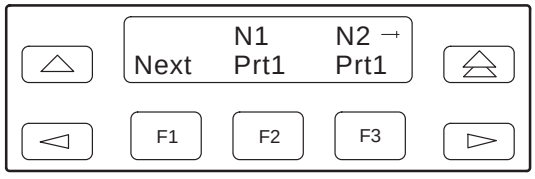


2. Press F3 (Chan).



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

4. Line 1 displays the 24 channels for the network interface. 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.



Clearing DS0 Channel Allocation

You can clear (deallocate) all the DS0 channels currently allocated to either the network interface or the synchronous data port.

▶ Procedure

To clear DS0 channel allocation:

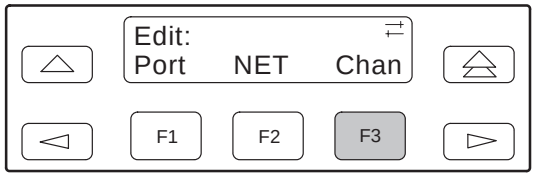
1. From the top-level menu screen, select Cnfig.

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.

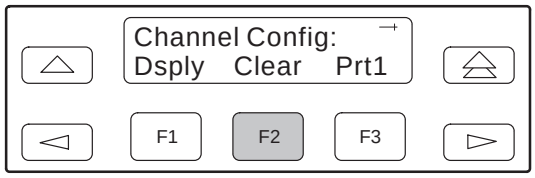
3. Select Edit.

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.



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, the synchronous data port, or the internal clock. A sample procedure for configuring timing is given in the following section, *Configuring for Network Timing*. For more information on configuration options, refer to Appendix C, *Configuration Options*.

Configuring for Network Timing

▶ Procedure

To configure for network timing:

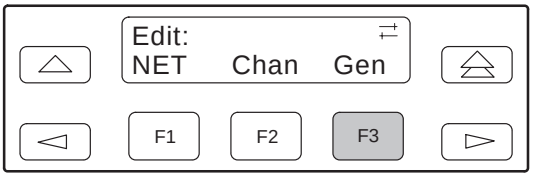
1. From the top-level menu screen, select Cnfig.

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.

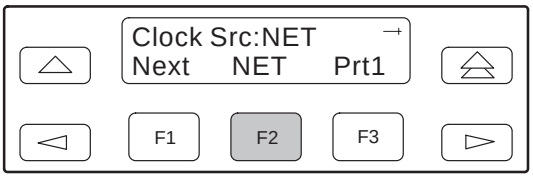
4. From the Edit screen, press the ▻ key until the Gen selection appears on the screen.

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).



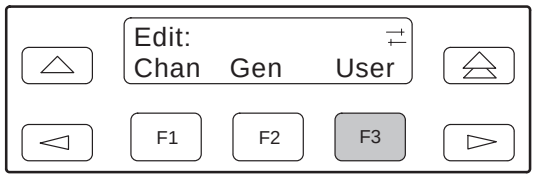
Establishing Access Security on a Port

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*).

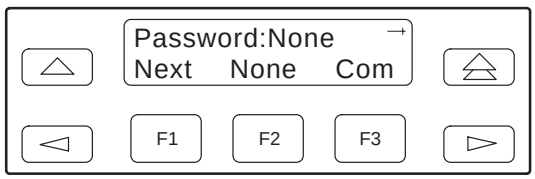
▶ Procedure

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.



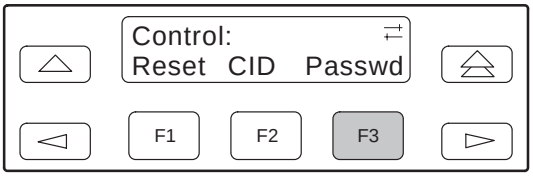
Setting a Password

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.

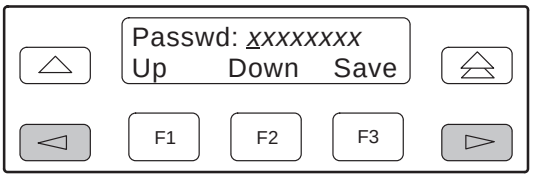
▶ Procedure

To set a password:

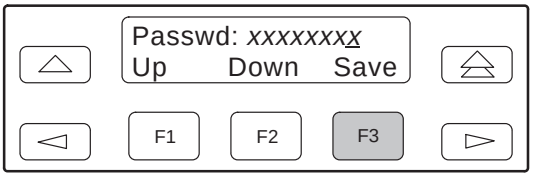
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, press the ▻ key until the Passwd selection appears on the screen.
4. Select Passwd.



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.

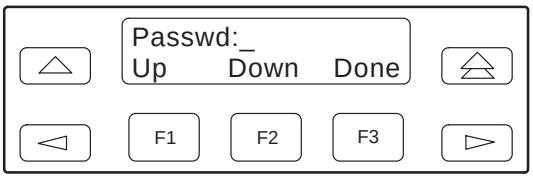


Entering a Password to Gain Access

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.

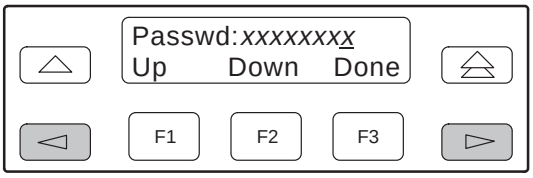
The following screen appears when you access a DSU/CSU that has a password enabled.



▶ Procedure

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, or the MODEM port. 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.

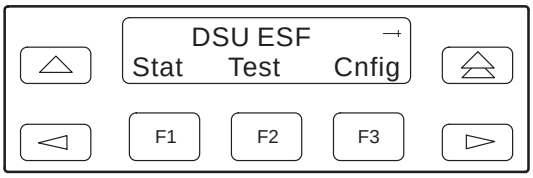
You can switch an inactive user interface to active if,

- 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.

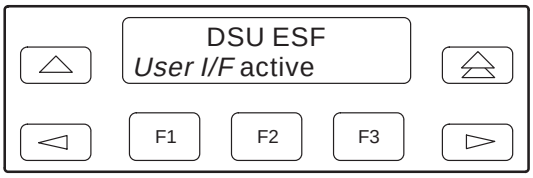
Acquiring the Active User Interface

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.

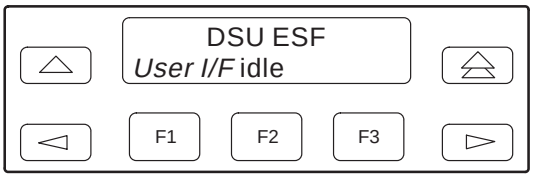
The top-level menu screen appears on the active user interface, regardless of what screen was displayed at the previous active user interface.



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, or Modem 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.



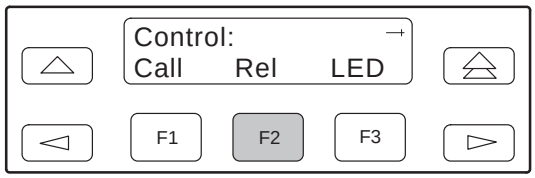
Releasing the Active User Interface

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

▶ Procedure

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**.

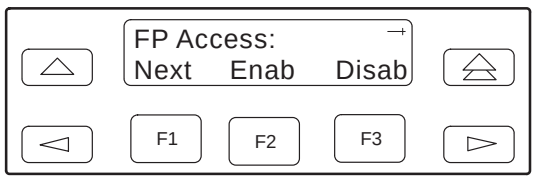
NOTE

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.

▶ Procedure

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

The 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 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, *Configuration Options*.

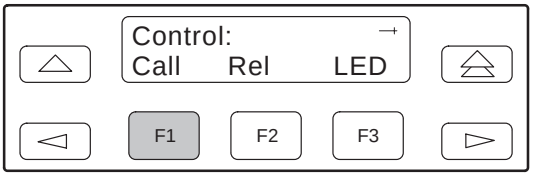
Entering Numbers in the Phone Directories

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.

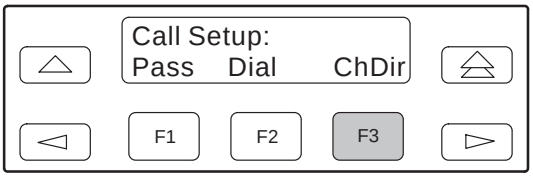
▶ Procedure

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.

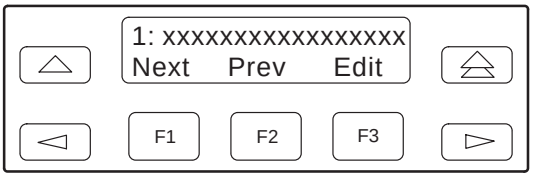


4. From the Call Setup screen, select ChDir.

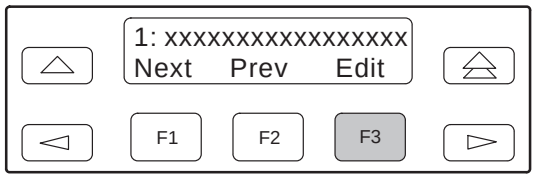


The Directory 1 displays first, along with its phone number if one has been entered.

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 3-5 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.

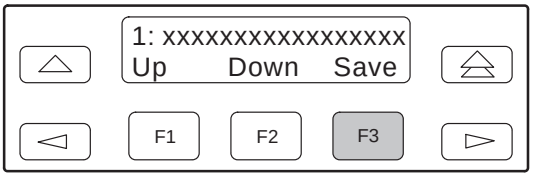


Table 3-5
Valid Phone Number Characters

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).

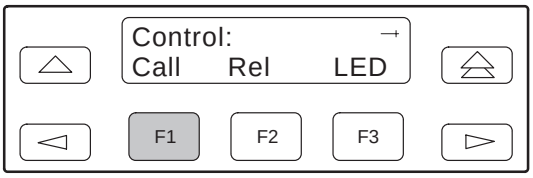
NOTE

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.

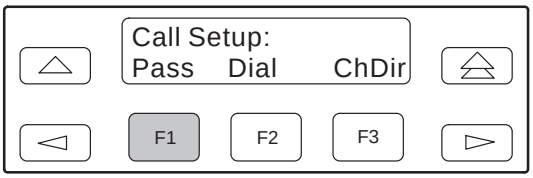
▶ Procedure

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

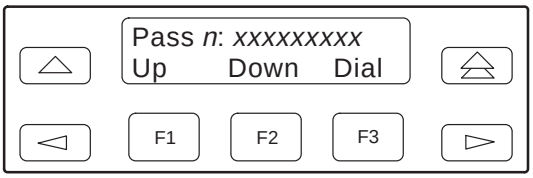
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.



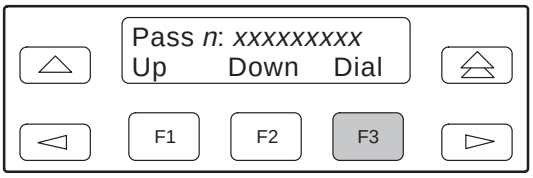
4. From the Call Setup screen, select Pass.



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.



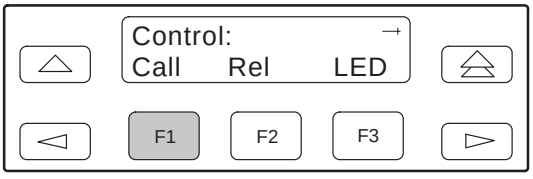
Initiating a Call for PC or ASCII Terminal/Printer Operation

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.

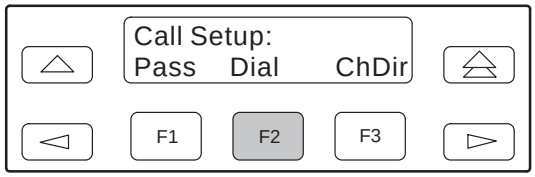
▶ Procedure

To initiate a call at the local DSU/CSU:

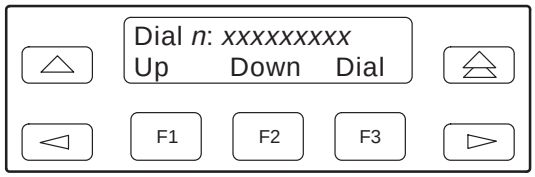
1. From the top-level menu screen, press the ▻ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.



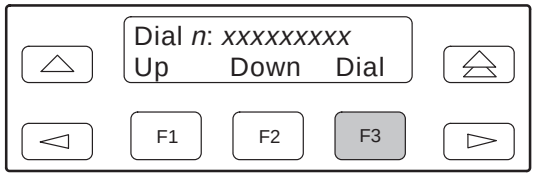
4. From the Call Setup screen, select Dial. This selection is not available if the DSU/CSU's integral modem is already in use.



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.

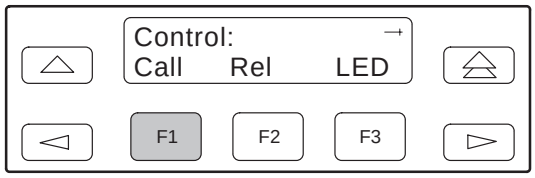
Disconnect methods include:

- 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).

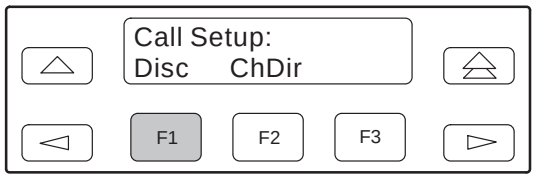
▶ Procedure

To disconnect an established modem connection using the Disconnect command:

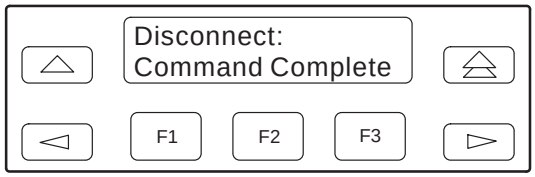
1. From the top-level menu screen, press the ▷ key until the Ctrl selection appears on the screen.
2. Select Ctrl.
3. From the Control screen, select Call.



4. From the Call Setup screen, select Disc.



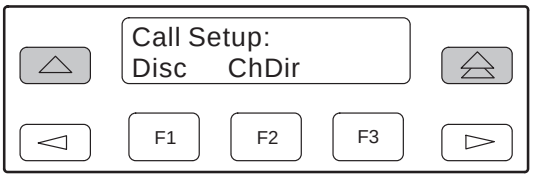
The modem call is disconnected and the Command Complete screen appears.



▶ Procedure

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.

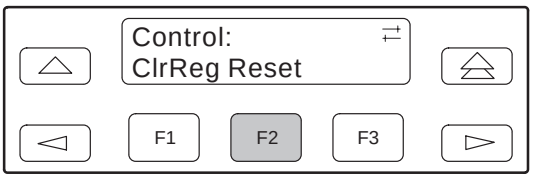
Resetting the DSU/CSU

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

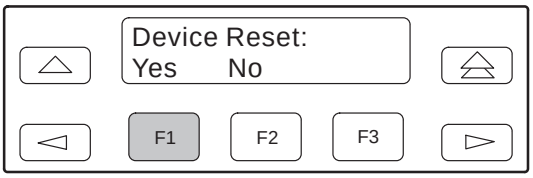
▶ Procedure

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

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.

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.

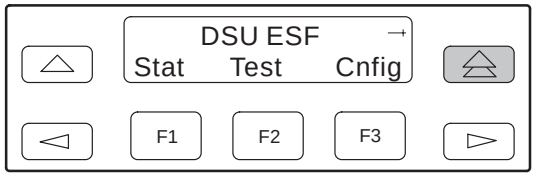
You can only reach the screen that controls security access using the front panel.

Changing User Interface Access Security

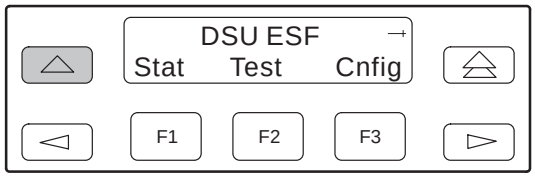
▶ Procedure

To change user interface access security:

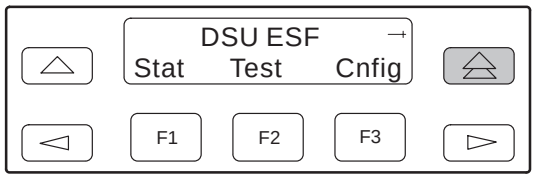
1. Press the ⏫ key two times from the top-level screen.



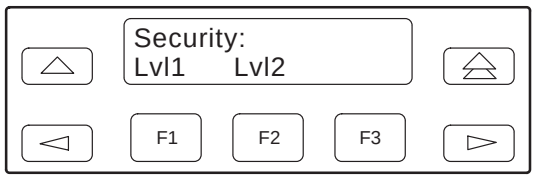
2. Press the ⏶ key three times.



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.

Monitoring and Testing 4

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.

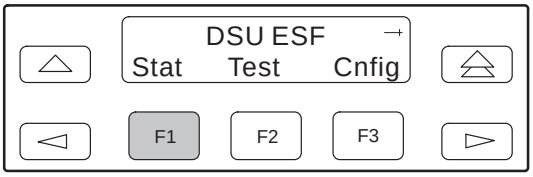
Self-Test Health

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.

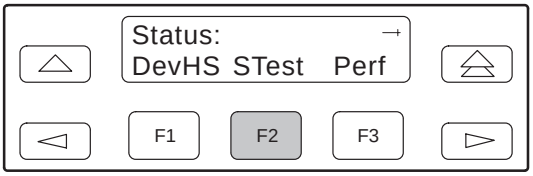
▶ Procedure

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.

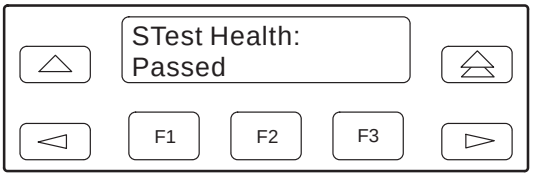


Table 4-1
Self-Test Health Messages

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.
DSU fail	The unit failed to internally loop data on the DSU.
DSU Port 1 fail	Port's integrated circuitry failed to pass device internal testing.
Modem fail	Unit failed to internally loop data through the modem circuit.
Failure *xxxxxxxx*	An 8-digit hexadecimal failure code is provided for service personnel.

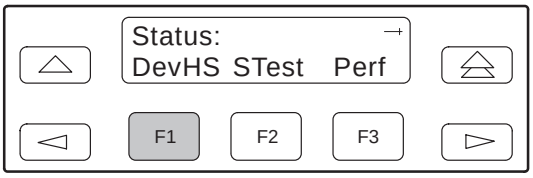
Device Health and Status

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.

▶ Procedure

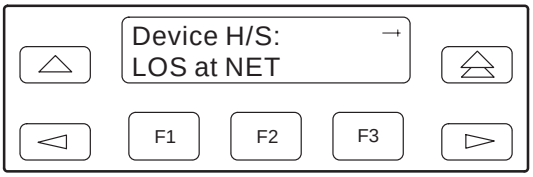
To display device health and status:

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.

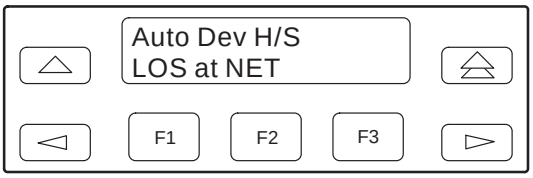


Table 4-2
Health and Status Messages

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%.
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.
AIS at Net	An Alarm Indication Signal (unframed all ones signal) is being received by the network 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.
PORT IP Down	The IP management link is in a down state for *PORT* (where *PORT* is COM or MODEM). 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.
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

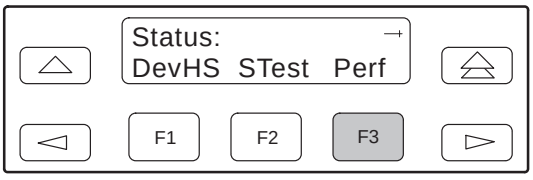
When the network interface is configured for ESF operation, network performance is continuously monitored and maintained in two sets of aggregate registers: Carrier Network Interface Registers (Telco) and User Network Interface Registers (User). The User registers contain an extra status register (Status 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.

▶ Procedure

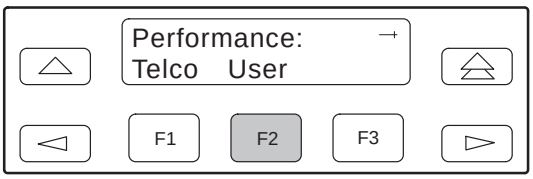
To display User Network Interface (User) performance:

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

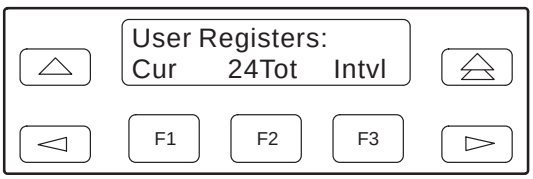
2. From the Status screen, select Perf.



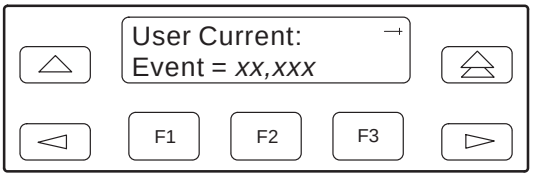
3. Select User registers.



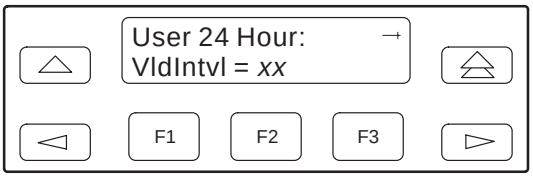
4. From the User Registers screen, press F1 to view current registers (go to Step 5), press F2 to view 24-Hour Totals (go to Step 6), or press F3 to view 15-Minute Interval Registers (go to Step 7).



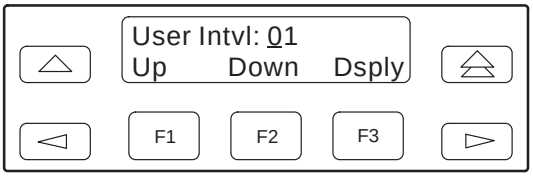
5. When you press F1 from the User Registers screen, the User registers for the current 15-minute interval appear.



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

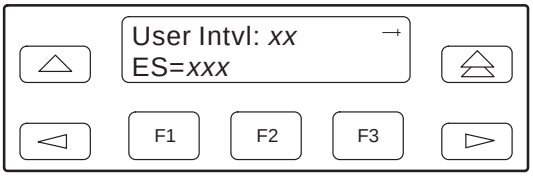


7. When you press F3 from the User Registers screen, the interval screen appears. Use this screen to choose the specific 15-minute interval.



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.

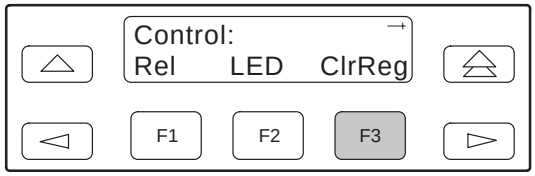


You can reset the performance registers via the ClrReg command in the Control branch of the front panel menu.

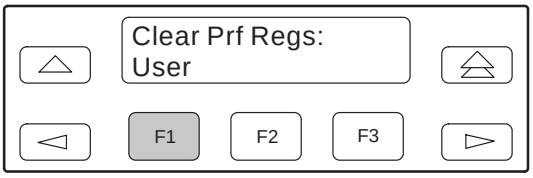
▶ Procedure

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.



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.

Table 4-3
(2 of 2)
Performance Registers

Register	Interval Description	Totals Description
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	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.
StEvnt	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. 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

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.

You can route these alarms to the MODEM port, the COM port, or both.

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 Network Interface**.
- **Alarm Cleared. Loss Of Signal condition at the Network Interface**.
- **Continuous Out Of Frame condition detected at the Network Interface**.
- **Alarm Cleared. Out Of Frame condition at the Network Interface**.
- **Alarm Indication Signal received at the Network Interface**.
- **Alarm Cleared. Alarm Indication Signal at the Network Interface**.
- **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 Network Interface**.
- **Alarm Cleared. Yellow Alarm signal at the Network Interface**.
- **Continuous Out Of Frame condition detected at synchronous data port 1**.
- **Alarm Cleared. Out Of Frame condition at synchronous data port 1**.
- **An Excessive Error Rate has been detected at synchronous data port 1**.
- **Alarm Cleared. An Excessive Error Rate at synchronous data port 1**.

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.

Troubleshooting

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

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

Table 4-4
(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.

Table 4-4
(2 of 2)
Troubleshooting

Symptom	Possible Cause	Solutions
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 **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 **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 **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.
Message **EER at Net** appears	Facility problem.	Contact your facility provider.
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.
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

Two test jacks are located on the front panel: NET MON (Network Monitor) In and NET MON Out.

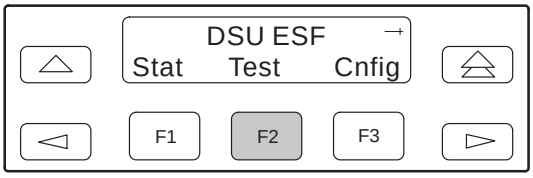
NET MON In nonintrusively monitors the signal going into the network.

NET MON Out nonintrusively 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)

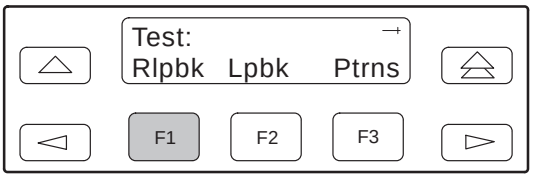
You cannot perform remote loopbacks if any of the local loopbacks are active. If you attempt to do so, the error message **Invld Test Combo** (Invalid Test Combination) appears.

Sending a Line Loopback Up or Down

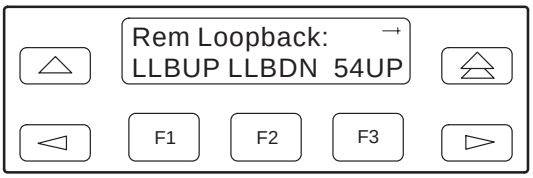
▶ Procedure

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.

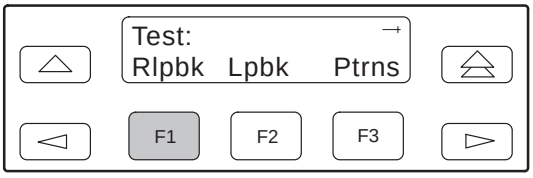
Sending a V.54/ANSI FT1 Activation/Deactivation

▶ Procedure

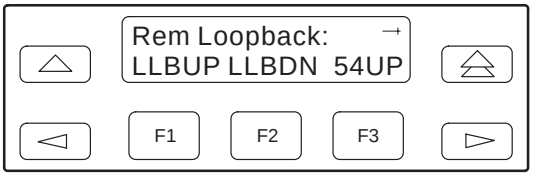
To send a V.54 or ANSI FT1 Activation or Deactivation loopback sequence to the far-end DSU/CSU:

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 54UP, 54DN, FT1UP, and FT1DN commands send the requested sequence out the network interface on the DS0 channels allocated to Port 1.

   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)
- Repeater Loopback (RLB)
- Data Channel Loopback (DCLB)
- Data Terminal Loopback (DTLB)

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.

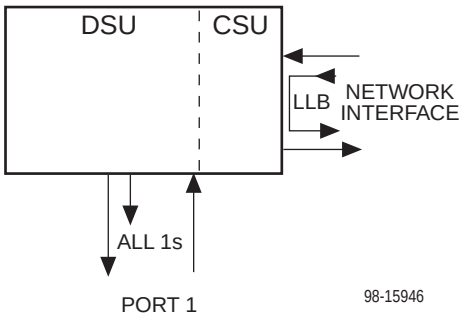
No more than two local loopbacks can be active at any one time. An additional restriction prohibits certain loopbacks from running at the same time. Valid loopback combinations listed in Table 4-5 are identified by YES.

Table 4-5
Valid Loopback Combinations

	LLB	PLB	RLB	DCLB	DTLB
LLB	N/A	NO	YES	NO	YES
PLB	NO	N/A	NO	NO	YES
RLB	YES	NO	N/A	NO	YES
DCLB	NO	NO	NO	NO	NO
DTLB	YES	YES	YES	NO	NO

Starting a Line Loopback

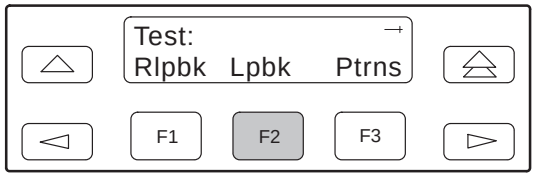
The Line Loopback command (LLB) loops the received signal on the network interface back to the network without change.



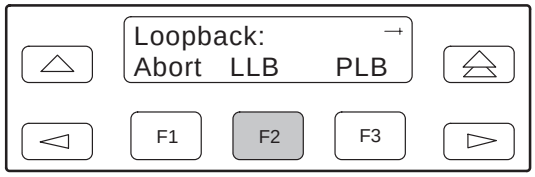
Procedure

To perform a Line loopback:

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



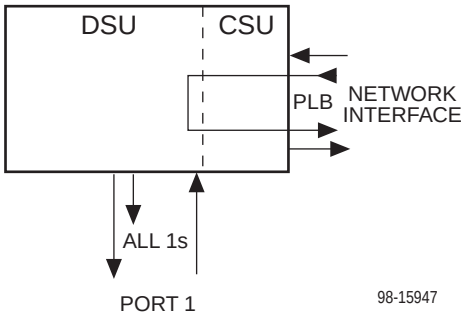
3. From the Loopback screen, select LLB.



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 4-5 for valid loopback test combinations).

Starting a Payload Loopback

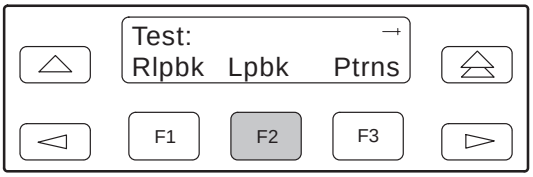
The Payload Loopback command (PLB) loops the received signal on the network interface back to the network after it has passed through the framing circuitry of the DSU/CSU. Framing CRCs and BPVs are corrected.



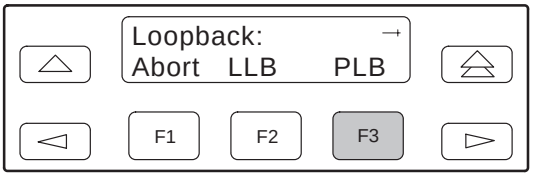
Procedure

To perform a Payload loopback:

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



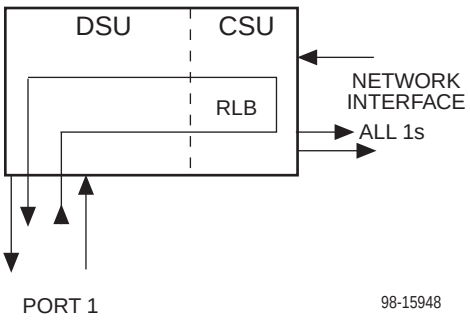
3. From the Loopback screen, select PLB.



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 4-5 for valid loopback test combinations).

Starting a Repeater Loopback

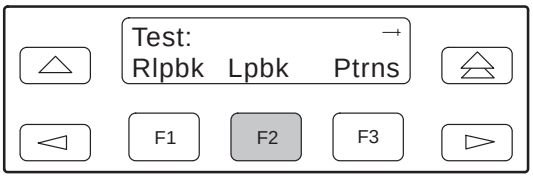
The Repeater Loopback command (RLB) loops the signal being sent to the network back to the data port. The signal is looped back as close to the network interface as possible (after it has passed through the framing circuitry of the DSU/CSU). Framing CRCs and BPVs are corrected.



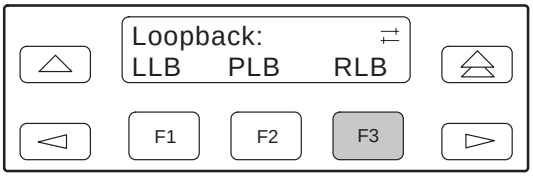
▶ Procedure

To perform a Repeater loopback:

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



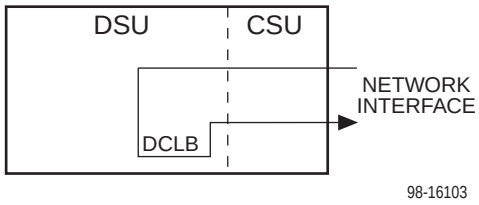
3. From the Loopback screen, press the ▷ key until the RLB selection appears on the screen.
4. Select RLB.



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 4-5 for valid loopback test combinations).

Starting a Data Channel Loopback

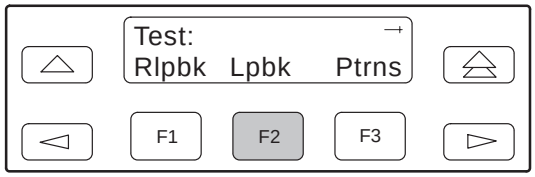
The Data Channel Loopback command (DCLB) loops the data received from the network interface, for all DS0 channels allocated to the data port, back to the network. The loopback occurs after the data passes through the port circuitry but before it is sent out the data port.



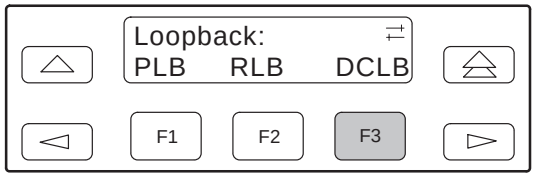
▶ Procedure

To perform a Data Channel loopback:

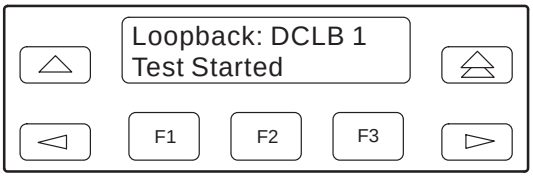
1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



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

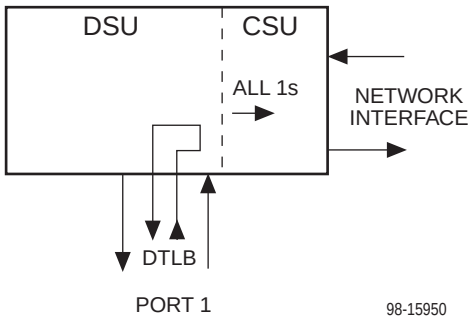


Test Started appears on Line 2. If a Data Channel loopback is already in progress, the **Already Active** message appears. If an invalid combination of loopbacks is in progress, the error message **Invld Test Combo** appears (see Table 4-5 for valid loopback test combinations).



Starting a Data Terminal Loopback

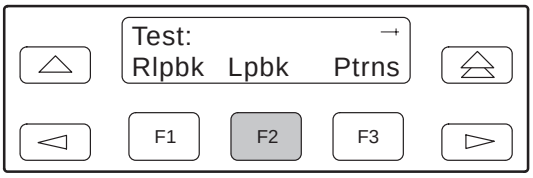
The Data Terminal Loopback command (DTLB) loops the data received from the selected port, for all DS0 channels allocated to the port, back out of the port. This loopback occurs after the data passes through the port circuitry but before it reaches the T1 framer.



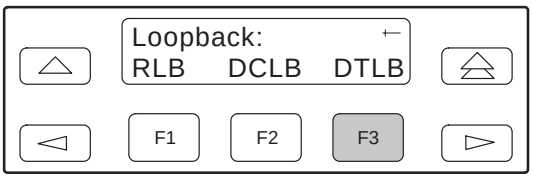
▶ Procedure

To perform a Data Terminal loopback:

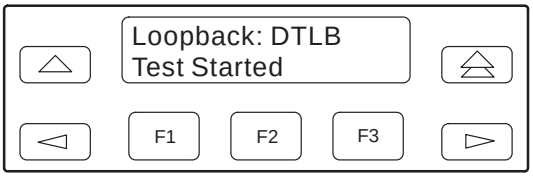
1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



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



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 4-5 for valid loopback test combinations).



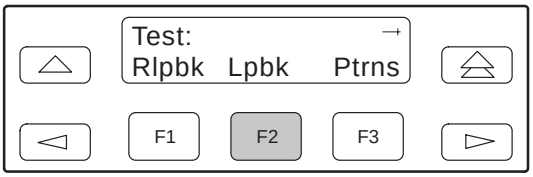
Aborting Loopbacks

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

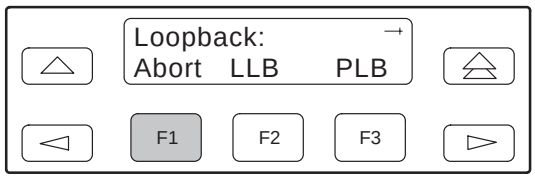
▶ Procedure

To abort one or more loopback tests:

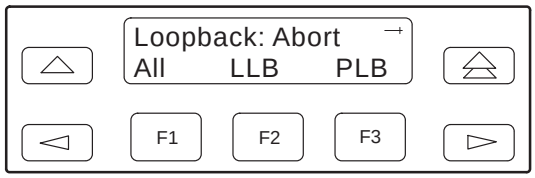
1. From the top-level menu screen, select Test.
2. From the Test screen, select Lpbk.



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.



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 port).
- **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

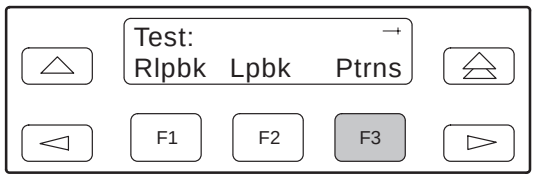
Use the Send command to start transmission of a test pattern.

Only one test pattern can be active at a time.

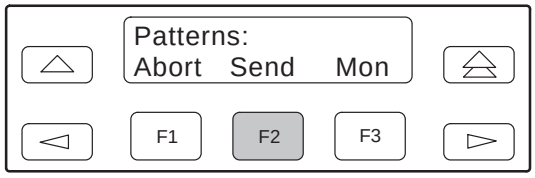
▶ Procedure

To send a test pattern:

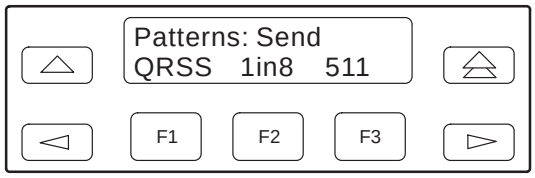
1. From the top-level menu screen, select Test.
2. From the Test screen, select Ptrns.



3. From the Patterns screen, select Send.

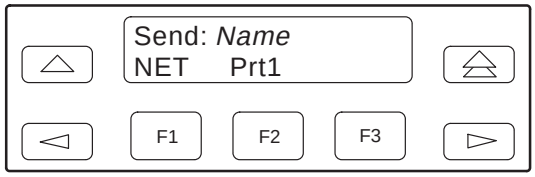


4. From the Patterns Send screen, press F1 to send a QRSS pattern, F2 to send a 1-in-8 pattern, F3 to send a 511 pattern.

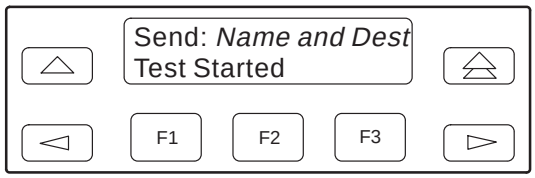


If you send a 1-in-8 pattern, skip Step 5.

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 attempt to start a different pattern test while one is active, the message **Invld Test Combo** appears.

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.

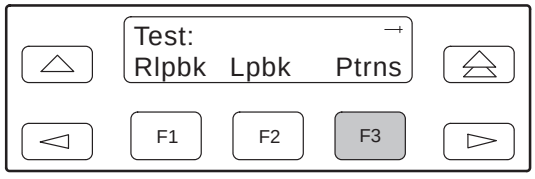
This command provides the number of errors detected in the test pattern (5 digits, maximum 99999).

▶ Procedure

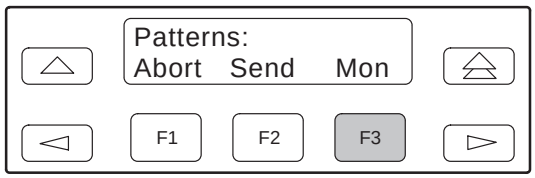
To monitor a QRSS or 511 test pattern:

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

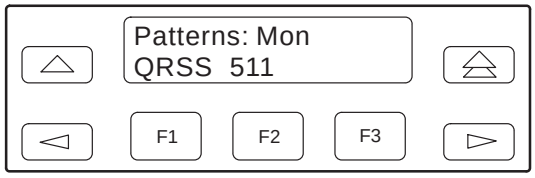
2. From the Test screen, select Ptrns.



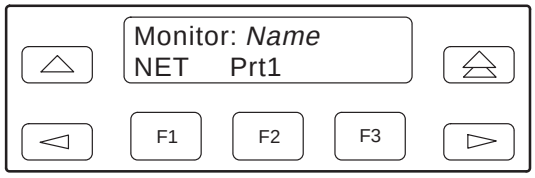
3. From the Patterns screen, select Mon.



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.

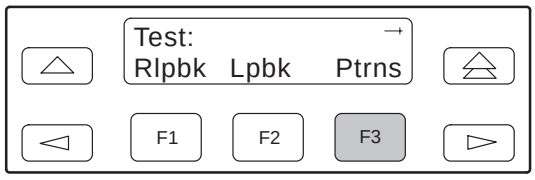
Aborting Test Patterns

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

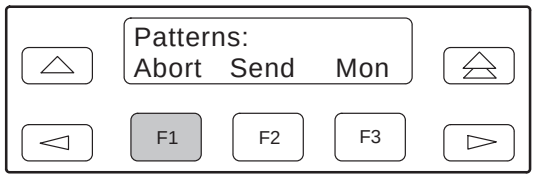
▶ Procedure

To abort test patterns:

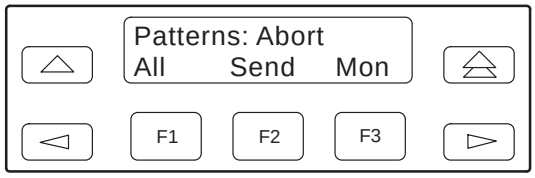
1. From the top-level menu screen, select Test.
2. From the Test screen, select Ptrns.



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.

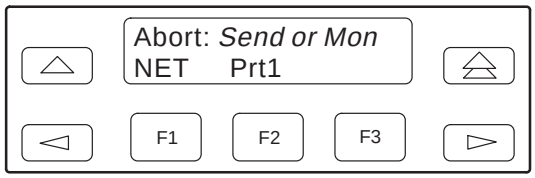


If you select All, the DSU/CSU terminates all active test patterns and displays the message **Command Complete**. Skip Step 5.

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

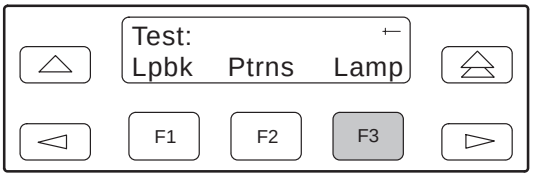
Use the Lamp Test commands to start and stop a test of the DSU/CSU front panel LCD and LEDs.

Starting a Lamp Test

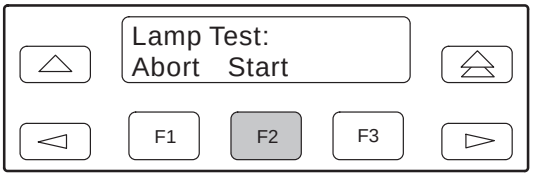
▶ Procedure

To start a Lamp test:

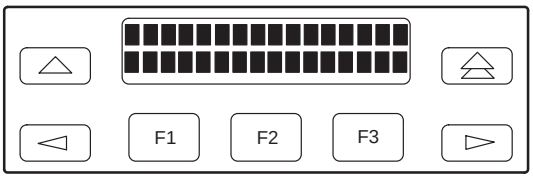
1. From the top-level menu screen, select Test.
2. From the Test screen, press the ▻ key until the Lamp selection appears on the screen.
3. From the Test screen, select Lamp.

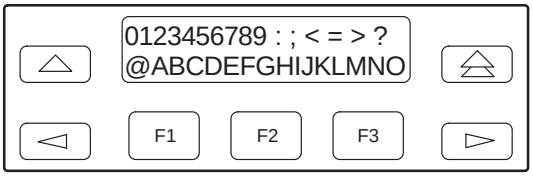


4. From the Lamp Test screen, select Start.



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.





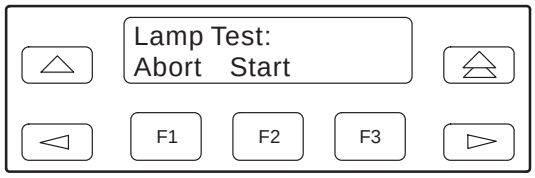
6. When you are satisfied that all LEDs are lighting and the LCD is functioning properly, abort the Lamp test from the Lamp Test screen. If there is no activity on the DSU/CSU front panel for five minutes, the Device Health and Status screen appears automatically. However, the Lamp test remains active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

Aborting a Lamp Test

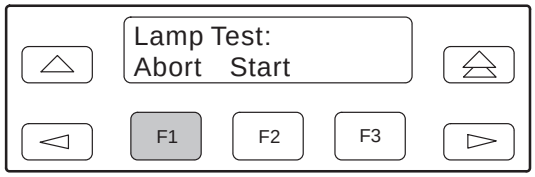
▶ Procedure

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.



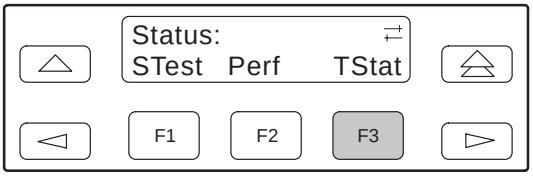
Displaying DSU/CSU Test Status

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 4-6.

▶ Procedure

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.

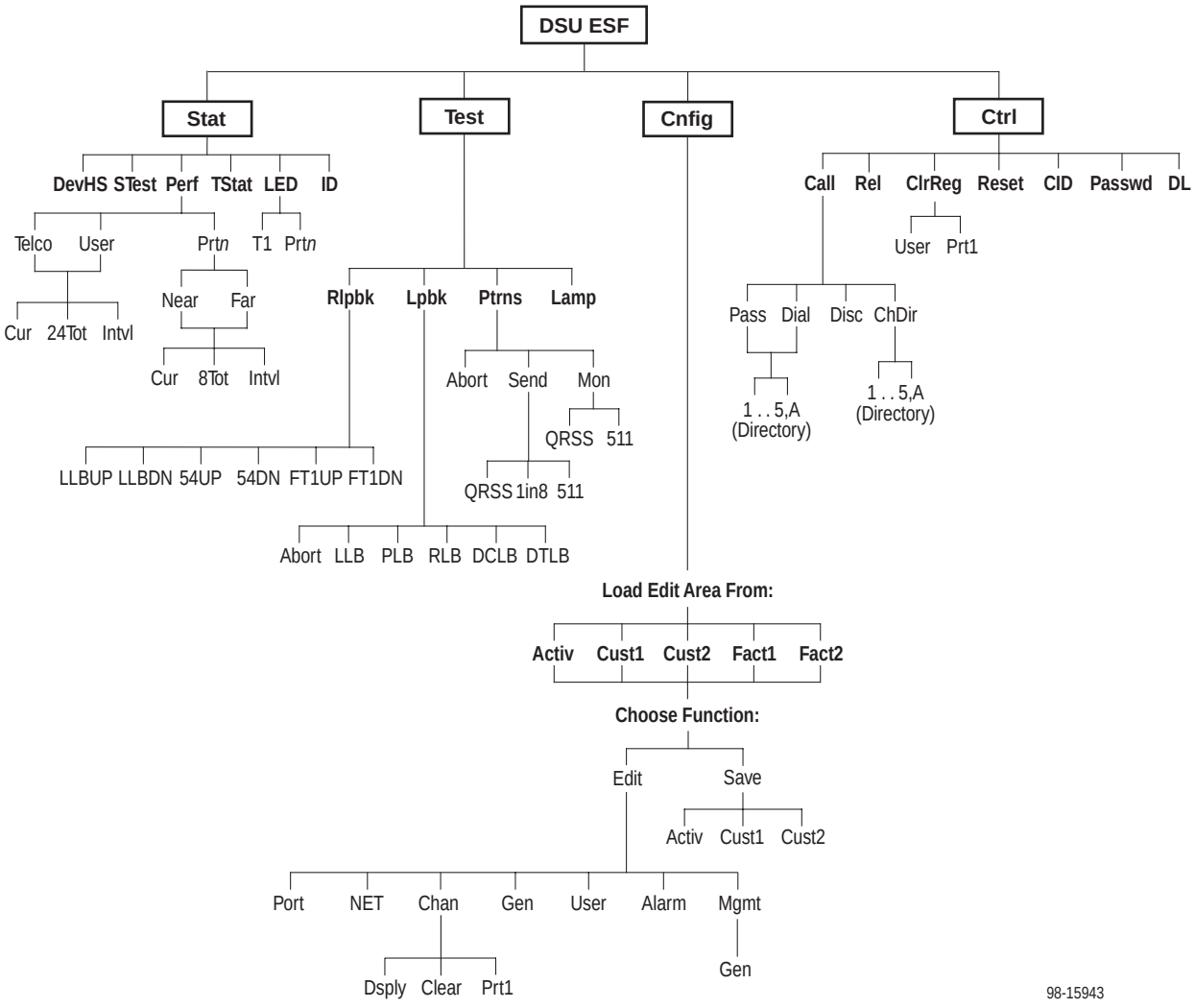


The Test Status screen appears showing you what tests are active for the DSU/CSU.

Table 4-6
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.
RLB Test Active	Port 1 is in Repeater loopback.
DCLB on Port 1	Port 1 is in a Data Channel loopback.
DTLB on Port 1	Port 1 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 1	A QRSS test pattern is being sent to the network on the channels allocated to Port 1.
511 on Port 1	A 511 test pattern is being sent to the network on the channels allocated to Port 1.
Mon QRSS, Net	A QRSS test pattern is being monitored on the network interface.
Mon QRSS, Port 1	A QRSS test pattern is being monitored on the channels allocated to Port 1.
Mon 511, Port 1	A 511 test pattern is being monitored on the channels allocated to Port 1.
Lamp Test Active	The Lamp test is currently active.

Front Panel Menu A



Technical Specifications B

Overview

The technical specifications for the DSU/CSUs are listed in Table B-1.

Table B-1
(1 of 2)
Models 3163 DSU/CSU Technical Specifications

Specifications	Criteria
POWER REQUIREMENTS	
Typical:	
AC Power Module	Refer to the labeling on the ac power module for input requirements
Optional:	
+24 Vdc	+20 Vdc to +32 Vdc, 0.50A
–48 Vdc	–38 Vdc to –60 Vdc, 0.25A
–48 Vdc Redundant	–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)
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), V.54 Loop 2 and Loop 3, ANSI T1.403 Annex B Fractional T1 Loopback
PORT INTERFACE	
Standards	EIA-530-A, V.35, RS-449, X.21
Rates	Nx64 – 64K-1.536 Mb Nx56 – 56K-1.344 Mb

Table B-1
(2 of 2)
Models 3163 DSU/CSU Technical Specifications

Specifications	Criteria
APPROVALS	Refer to the product labeling
CLOCKING SOURCES	T1 network interface, Port 1, internal clock
MODEM INTERFACE Physical Interface Rate Integral Dial Modem	 RJ11C (USA), CA11A (Canada) 2400 bps V.22
PHYSICAL DIMENSIONS Height Width Depth	 2.13 inches (5.4 cm) 7.63 inches (19.4 cm) 12.13 inches (30.8 cm)
WEIGHT	2.4 pounds (1.1 kg)
ENVIRONMENT Operating Temperature Storage Temperature Relative Humidity Shock and Vibration	 32°F to 122°F (0°C to 50°C) –4°F to 158°F (–20°C to 70°C) 5%—95% (noncondensing) Withstands normal shipping and handling

Configuration Options C

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:

- **Network Interface Configuration Options**

  The Network Interface configuration options configure the network interface on the DSU/CSU (Table C-1).

- **Sync Data Port Configuration Options**

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

- **Cross Connect Configuration Options**

  The Cross Connect configuration options configure the synchronous data port channel allocations on the DSU/CSU (Table C-4).

- **General Configuration Options**

  The General configuration options configure alarms and clocks on the DSU/CSU (Table C-5).

- **User Interface Configuration Options**

  The User Interface configuration options configure and control the DSU/CSU user interfaces (Table C-6).

- **Alarm Configuration Options**

  The Alarm configuration options specify how alarm conditions are handled by the DSU/CSU (Table C-7).

- **Management and Communication Configuration Options**

  The Management and Communication configuration options configure the DSU/CSU for Telnet access (Table C-8).

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**.

Network Interface Configuration Options

Table C-1
(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 Telnet traffic to flow over the 4 kbps data link provided by FDL. Running Telnet over FDL requires an end-to-end FDL connection and cannot be terminated within the network. **Enab** – Enables the FDL management link for Telnet. **Disab** – Disables the FDL management link. NOTE: This configuration option is only available if the framing format is set to ESF. NOTE: If the local DSU/CSU's FDL is enabled, the remote DSU/CSU's FDL must also be enabled.

Table C-1
(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.

Sync Data Port Configuration Options

Table C-2
(1 of 3)
Sync Data 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-530-A compatible interface. EIA-530-A 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-530-A-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-530-A-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-530-A-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 3)
Sync Data 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 3)
Sync Data 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.

Cross Connect Configuration Options

Table C-3
(1 of 2)
Sync Data Port Assignment Options

Sync Data Port Assignment **Assign To: Network** **Network**
Network – Assigns this port to DS0 channels on the network interface. This is the only option on the single-port Model 3163 DSU/CSU.
Sync Data Port Assignments **Assign By: Block** **Block ACAMI Channel**
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. **Channel** – Allocates DS0 channels to this port by the individual channel method. NOTE: Changing this configuration option from one method to another (Block, ACAMI, or Channel) deallocates all DS0 channels assigned to the network interface.
Sync Data Port Assignments **Port Data Rate: 384** **64 128 192 256 320 384 448 512 576 640 704 768 832 896 960 1024 1088 1152 1216 1280 1344 1408 1472 1536** ***OR*** **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**
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. NOTES: This selection is not available if the individual channel allocation method (Channel) is selected using the Assign By field. Changing this selection from one rate to another deallocates all DS0 channels assigned to the network interface.

Table C-3
(2 of 2)
Sync Data Port Assignment Options

Sync Data Port Assignments									
N01	**N02**	**N03**	**N04**	**N05**	**N06**	**N07**	**N08**	**...**	**N24**
P1	**P1**	**P1**	**P1**	**P1**	**P1**	**P1**	**P1**	**...**	**P1**

Designates the DS0 channel to allocate to this port.

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 are:

Value	Meaning
N*nn*	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.
P1	This DS0 channel is allocated to Port 1.

Channel Configuration Options

Table C-4
(1 of 2)
Data Port Channel Configuration Options

Channel Config: **Dsply Clear Prt1** **NOTE: The configuration options described in this table are made available by selecting Prt1 from the Channel Config screen.**
Data Port Channel. Allows the assignment of a particular port to DS0 channels on the network 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 the network interface.
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. NOTES: This configuration option does not appear if the individual channel allocation method (Chan) is selected using the Assign By configuration option. Changing this configuration option from one rate to another deallocates all DS0 channels assigned to the network interface.

Table C-4
(2 of 2)
Data Port Channel Configuration Options

Start At:
Next Clear N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 ... N24 Prev

Data Port Channel Allocation (appears for the block and ACAMI methods only). Designates the starting DS0 channel, N1–N24 for the network 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.

NOTE: This configuration option is not available if the individual channel allocation method (Chan) is selected using the Assign By configuration option.

Assign To: NET
Next NET Prev

Data Port Channel Allocation Destination. NET is the only option on the Model 3163 DSU/CSU.

NET – Assigns this port to DS0 channels on the network interface.

	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	...	N24	
Next	–	–	–	–	–	–	–	–	–	–	–	–	...		**Prev**

Data Port Channel Allocation (appears for the individual channel method only). Designates the DS0 channel to allocate to this port.

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.
Prt1	This DS0 channel is allocated to Port 1.

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.

General Configuration Options

Table C-5
General Configuration Options

Clock Src: NET **Next NET Prt1 Int 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. **Prt1** – Configures Port 1 as the master clock source. **Int** – Configures the internal clock as the master clock source.
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 the 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

Table C-6
(1 of 5)
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.
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.
Dial-In: Disab **Next Enab Disab Prev**
Dial-in Access. Allows dial-in access to the DSU/CSU through the Modem port. **Enab** – Allows dial-in access to the DSU/CSU. **Disab** – Prevents dial-in access. Incoming calls to the DSU/CSU are not answered.
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.

Table C-6
(2 of 5)
User Interface Configuration Options

Com Use: ASCII **Next Mgmt ASCII Term Prev**
Communication Port Use. Specifies how the communication port is used. **Mgmt** – Configures the communication port as the link to a Telnet system. **ASCII** – Configures the communication port as a proprietary ASCII port supporting Front Panel Emulation software and ASCII alarm messages. **Term** – Configures the communication port as the interface to an async terminal.
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 management link. **Async** – Configures the communication port for asynchronous operation. **Sync** – Configures the communication port for synchronous operation. NOTE: This configuration option is not available if the Com Use configuration option is set to ASCII, 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 not available if the Com Type configuration option is set to Async.
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.

Table C-6
(3 of 5)
User Interface Configuration Options

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.
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 a 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.

Table C-6
(4 of 5)
User Interface Configuration Options

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 management link. 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.
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 option must be set to 8 to perform PC emulation or pass-through operations.
MParity: None **Next None Even Odd Prev**
Modem Parity. Configures the parity for the modem port. None is the factory default.
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.
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.
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.
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.

Table C-6
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User Interface Configuration Options

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

Table C-7
(1 of 2)
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. **Com** – Enables alarm messages routed to the communication port. **Both** – Enables alarm messages routed to both the modem and communication ports. 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.
DialOut: Disab **Next Enab Disab Prev**
Alarm Dial Out. Controls whether generated alarm 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 message is held until the call is completed or has been retried once. 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. **Enab** – Enables automatic call initiation (dial out) if an alarm message needs to be sent. **Disab** – Disables automatic call initiation.
Call Retry: Disab **Next Enab Disab Prev**
Call Retry on Alarm. 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 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 once per alarm message. A delay as specified by the Dial-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 once. **Disab** – Disables call retry. If a call setup cannot be completed it is not retried.
Dial Delay: 5 **Next 1 2 3 4 5 6 7 8 9 10 Prev**
Dial Out Delay Time on Alarm. Specifies the number of minutes to wait between successive dial-out alarms and between retry attempts after failed alarm dial-outs. The factory default is 5 minutes.

Table C-7
(2 of 2)
Alarm Configuration Options

AltDialDir: None **Next None 1 2 3 4 5 Prev**
Alternate Dial-Out Directory for Alarm. 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 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 once before a call attempt to the alternate number is tried. If the call is not completed at the alternate number, it too is retried once. The alternate dial-out option applies to each alarm event. Once a call for an alarm message either completes or fails all retry attempts, the next alarm 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.
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.

Management Configuration Options

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

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 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 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).
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. **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.
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. **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).

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

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. **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.
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.
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).
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 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.
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 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).

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

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.
Def Netwk: None **Next None Com Modem FDL 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. **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. **FDL** – The default network destination is FDL. This selection only appears if the FDL 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.

Configuration Worksheets

This section contains 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 worksheets before marking on them.

Port 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**

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

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

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 Use	Mgmt, **ASCII**, Term
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**
MInActTm	Enab, **Disab**
MDiscTm	1–60 (Default = **5**)
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
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

General Mgmt Options	Value (Default in **Bold**)
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
Def Netwk	**None**, Com, Modem, FDL

Pin Assignments D

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 H, *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

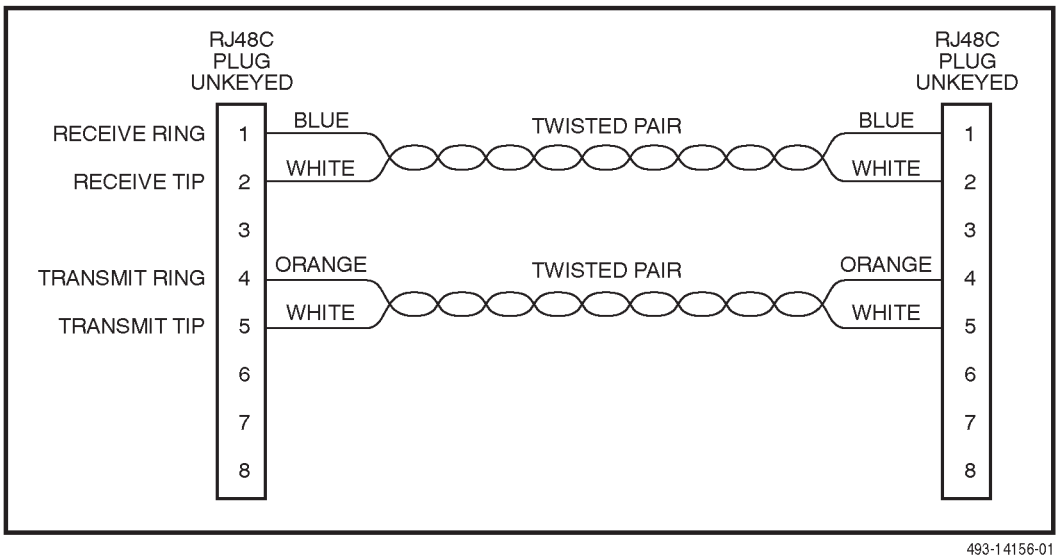


Figure D-1. T1 Line Interface Cable, RJ48C-to-RJ48C

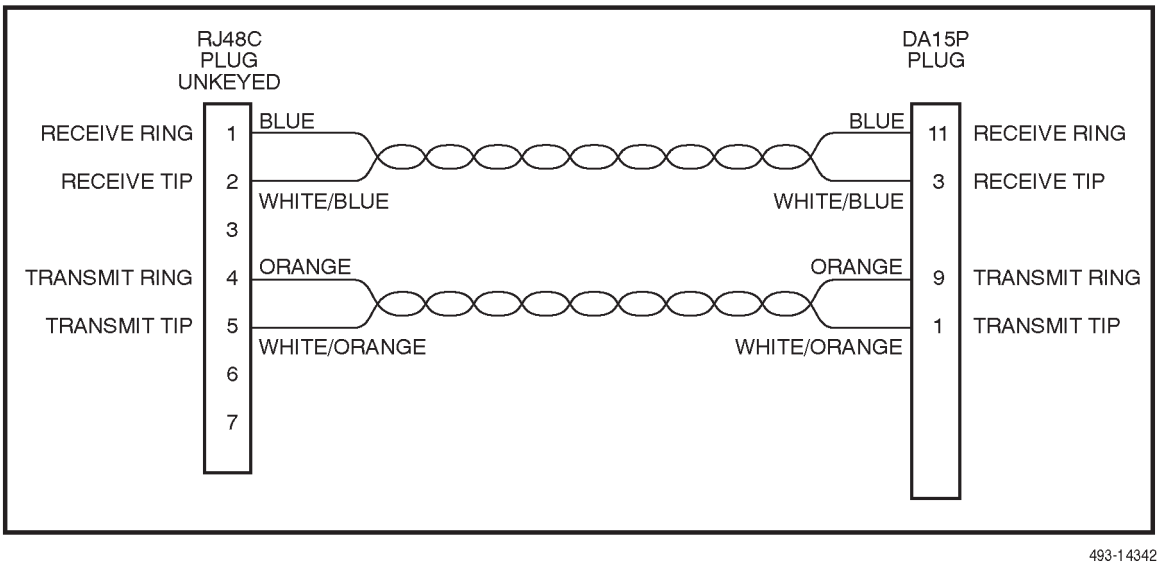


Figure D-2. T1 Line Interface Cable, RJ48C-to-DA15P

MODEM Port Interface

The integral modem port connector is a 4-position, RJ11C-like modular jack (Table D-2).

The integral modem VF cable is a 14.5-foot, 26 AWG, 4-conductor keyed cable with an RJ11C-like plug connector (Figure D-3). This cable is supplied with your standalone DSU/CSU.

Table D-2
Integral Modem Port Connector

Signal	Pin Number
VF Ring	2
VF Tip	3

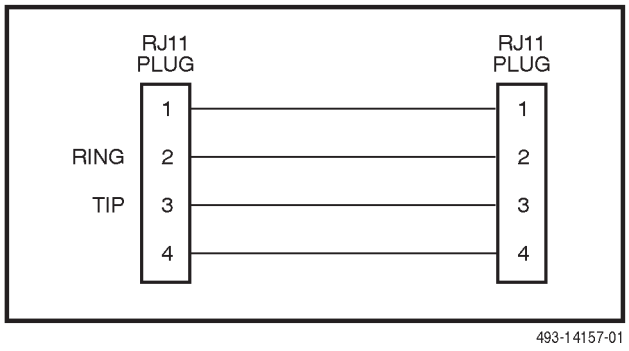


Figure D-3. Integral Modem Cable

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 Telnet applications, to the LAN Adapter for Telnet applications, or to another DSU/CSU's AUX port for daisy chain connectivity. The COM port connector is an 8-position keyed modular connector (Table D-3). The data signals on this port are referenced to a DTE interface.

The COM port-to-PC cable is shown in Figure D-4 and the COM port-to-terminal/printer cable is shown in Figure D-5.

NOTE

For daisy-chaining the AUX port of another 31xx device to the 3163's COM port, a 25-pin-to-8-pin cable is required. The AUX port of the 31xx device must be set to Daisy and the COM port of the 3163 must be set to Mgmt. 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-3
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

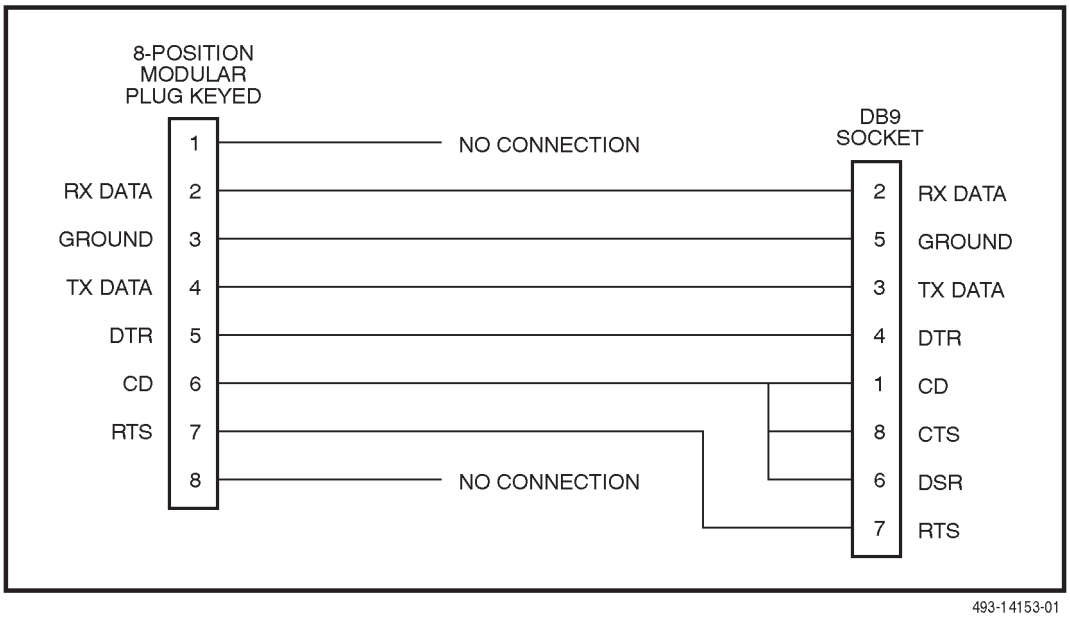


Figure D-4. COM Port-to-PC Cable

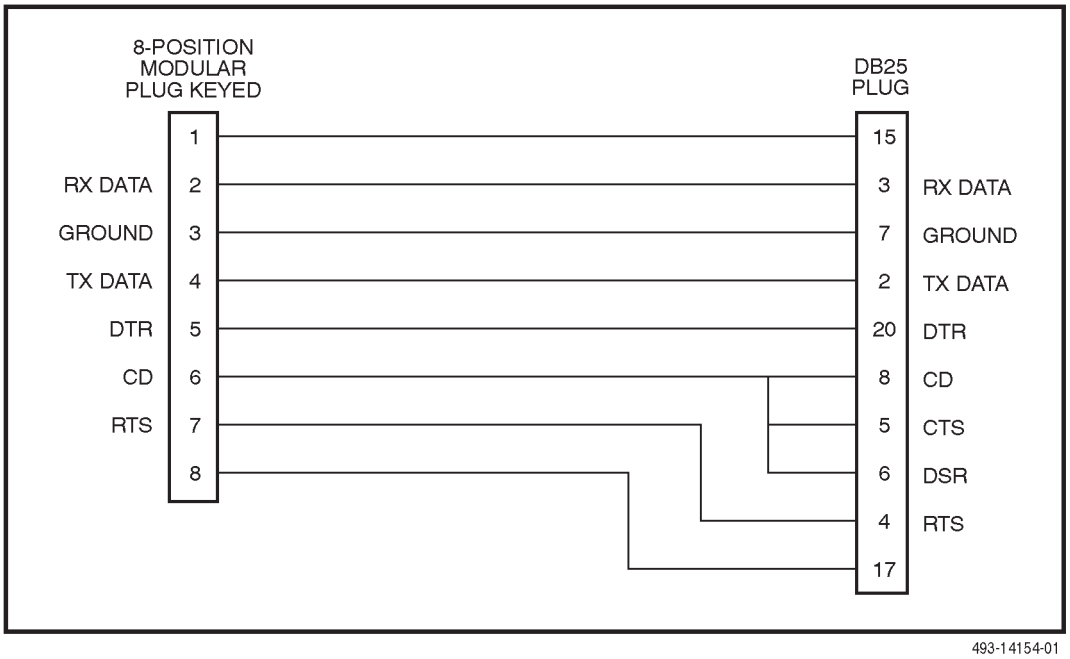


Figure D-5. COM Port-to-Terminal/Printer Cable

EIA-530-A Port Interface Connector

The EIA-530-A Port interface connector information is shown in Table D-4.

Table D-4
EIA-530-A 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-530-A-to-RS449 Adapter

The EIA-530-A-to-RS449 adapter (Figure D-6) provides the RS449 interface shown in Table D-5.

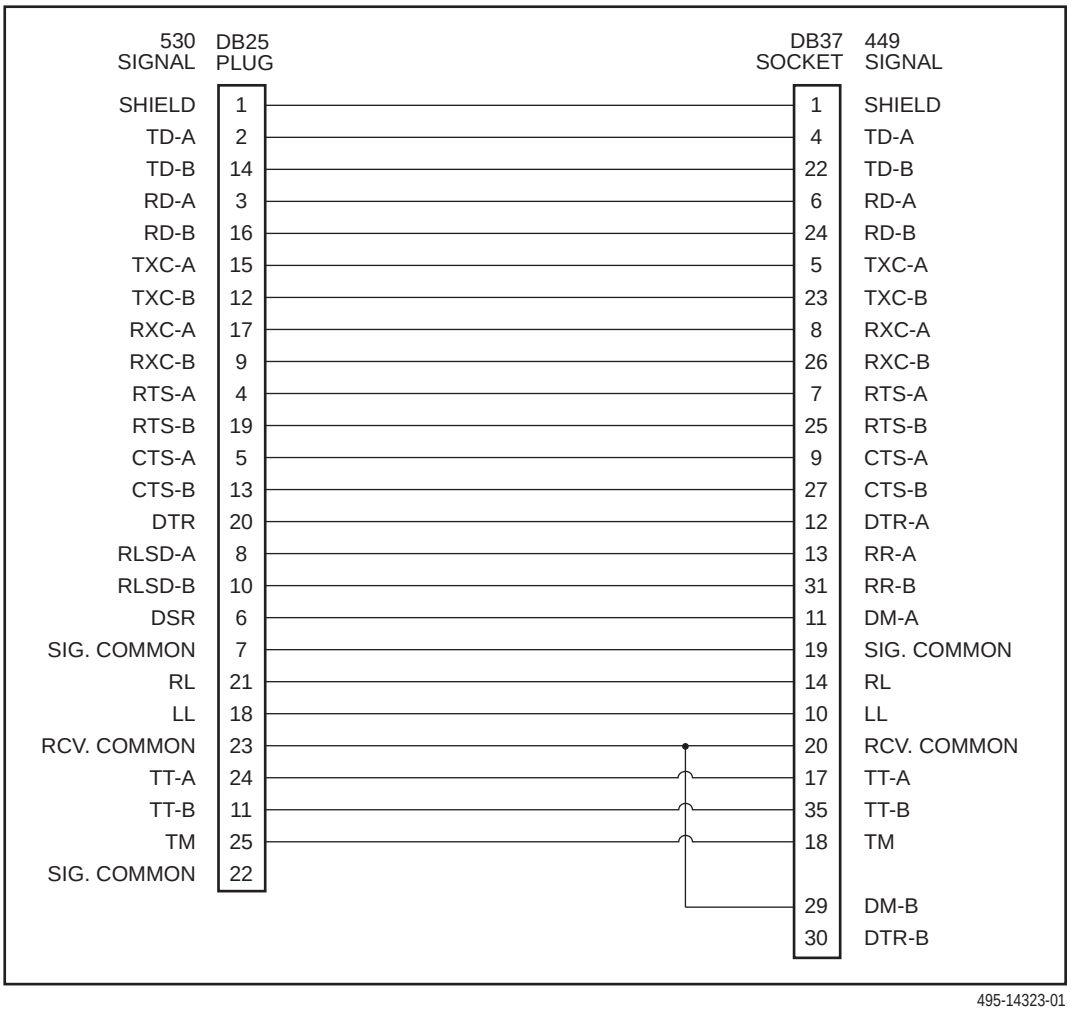


Figure D-6. EIA-530-A-to-RS449 Adapter

Table D-5
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-530-A-to-V.35 Adapter

The EIA-530-A-to-V.35 adapter (Figure D-7) provides the V.35 interface shown in Table D-6.

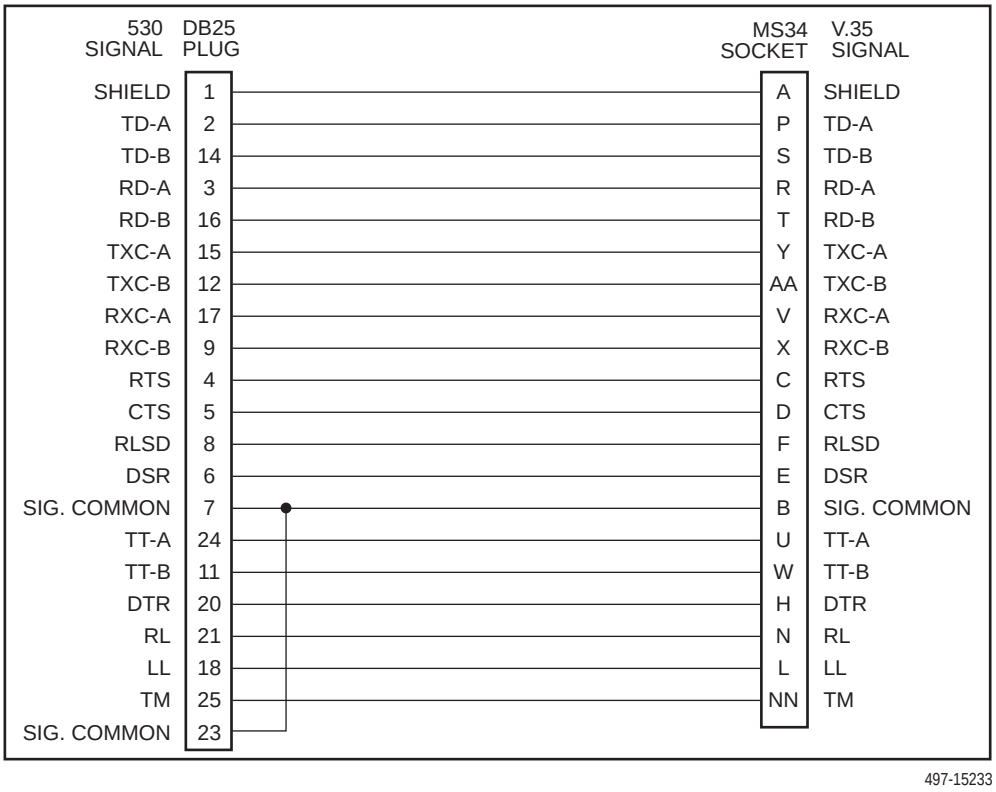


Figure D-7. EIA-530-A-to-V.35 Adapter

Table D-6
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-530-A-to-X.21 Adapter

The EIA-530-A-to-X.21 adapter (Figure D-8) provides the X.21 interface shown in Table D-7.

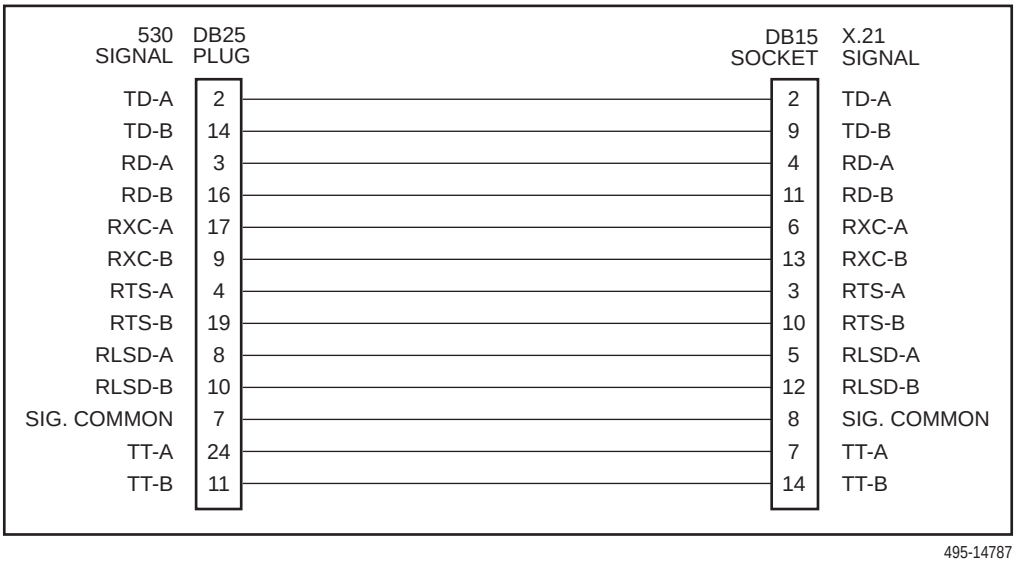


Figure D-8. EIA-530-A-to-X.21 Adapter

Table D-7
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-9 (with an adapter like that shown in Figure D-5) to connect an external modem to the DSU/CSU's COM port.

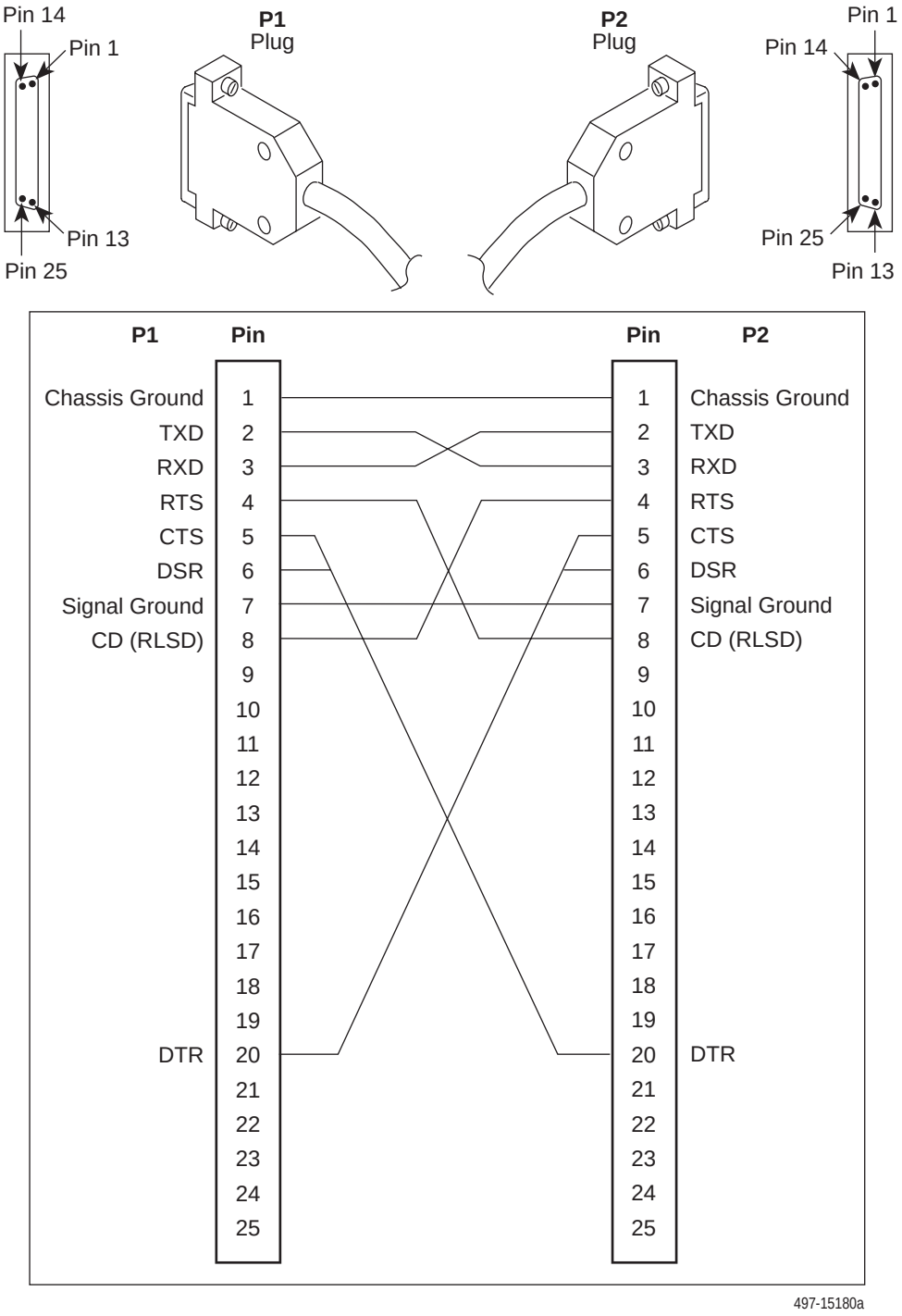


Figure D-9. Serial Crossover Cable

Power Connector

The power connector leads are shown in Table D-8. As shown in Figure D-10, Pin 1 is at the lower right of the connector and Pin 6 at the upper left as you face the back of the unit.

Table D-8
Rear Panel 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

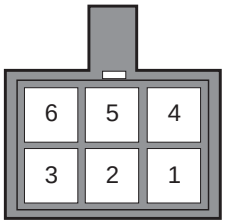


Figure D-10. Rear Panel Power Connector

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*.

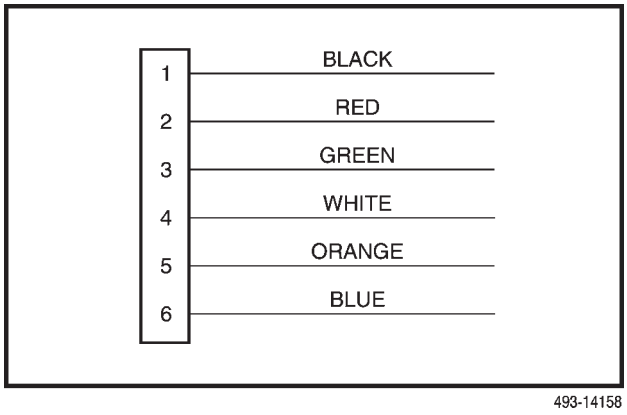


Figure D-11. DC Power Cable

IP Network Addressing Scenarios E

Overview

This appendix describes a means of configuring 31xx Series devices in an Internet Protocol (IP) network to provide 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 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 port) need a default route set. In the following examples, the default port is set in the device connected to the LAN Adapter.

Scenario 1

The first scenario (Figure E-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.

NOTE

Some 31xx Series devices have both a COM port and an AUX port. Such a device is shown here connected to the LAN adapter.

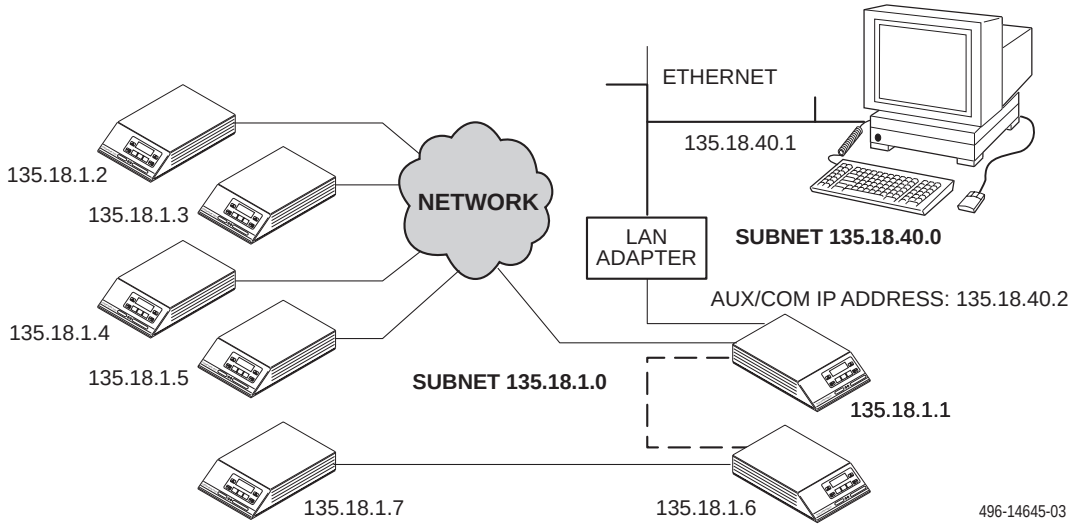


Figure E-1. Daisy-Chained Standalone at the Central Site

Scenario 2

The second scenario (Figure E-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.

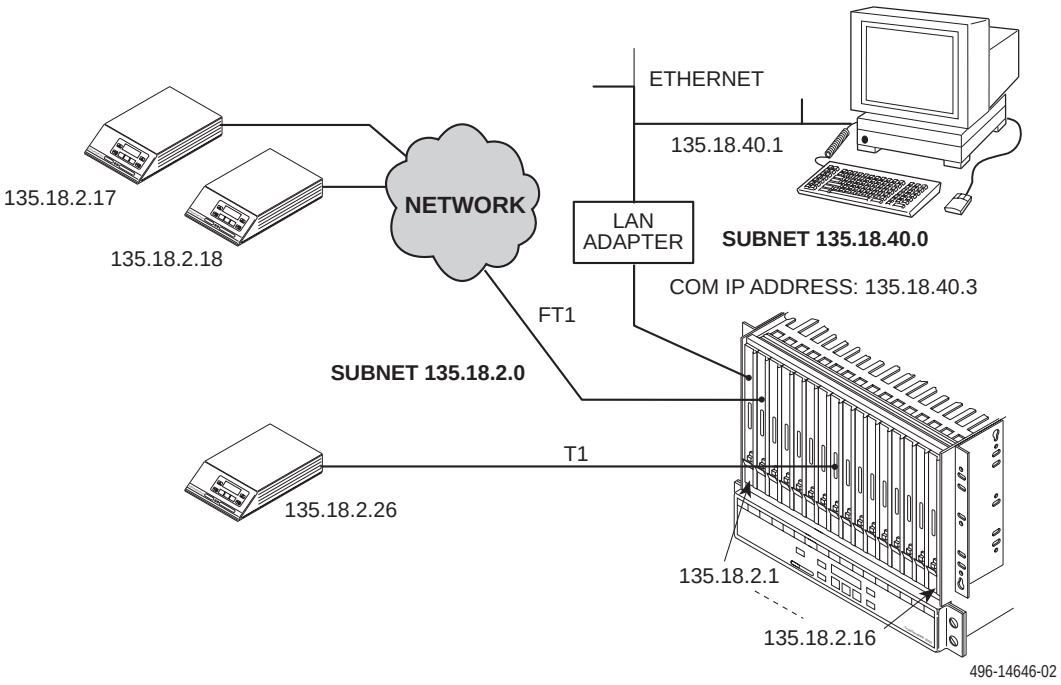


Figure E-2. Local Carrier with Remote Standalone

Scenario 3

This third scenario (Figure E-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.

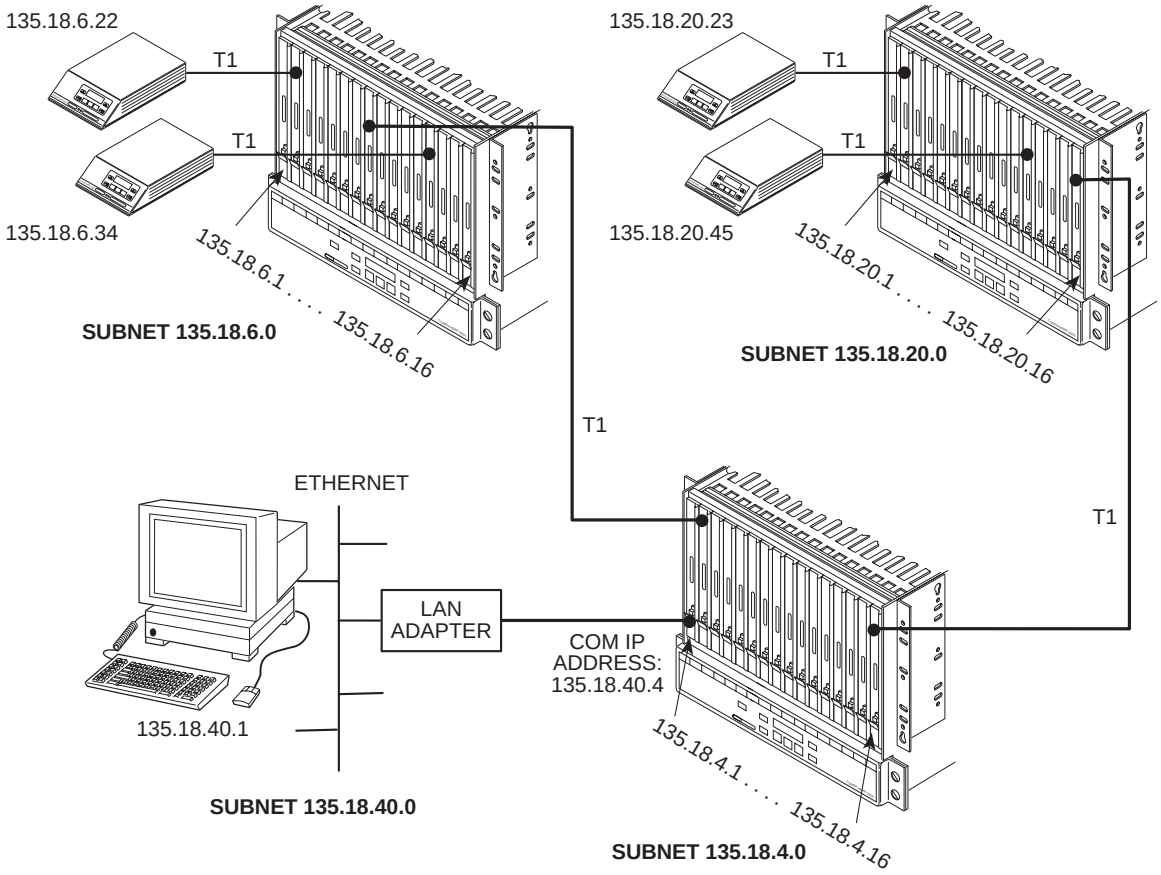


Figure E-3. Local Carrier Connection to Remote Carriers

Scenario 4

An alternative addressing scheme, for the network is shown in Figure E-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).

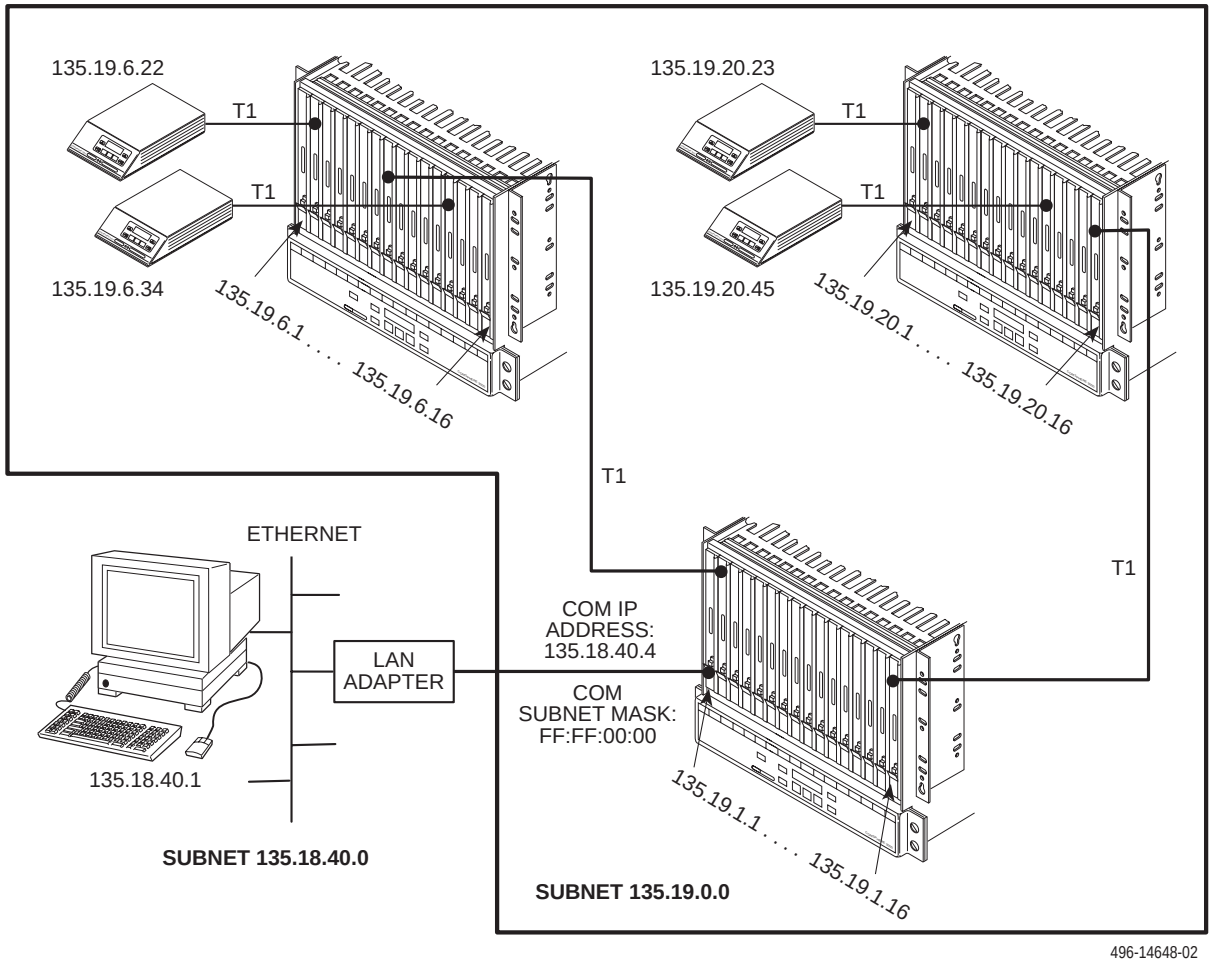


Figure E-4. Local Carrier Connected to Remote Carriers – an Alternative

Scenario 5

Figure E-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.

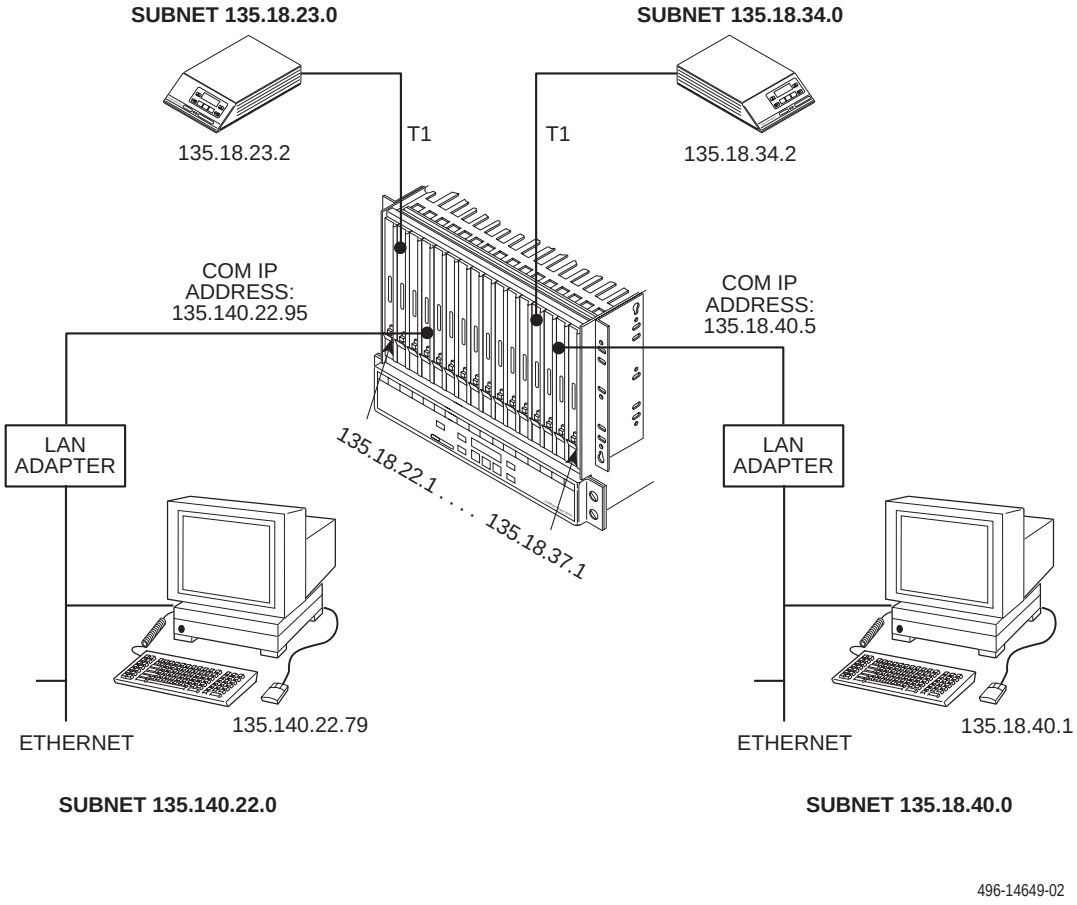


Figure E-5. Multiple COM Ports Connected to Different NMSs.

Front Panel Emulation F

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.

Installing Front Panel Emulation Software

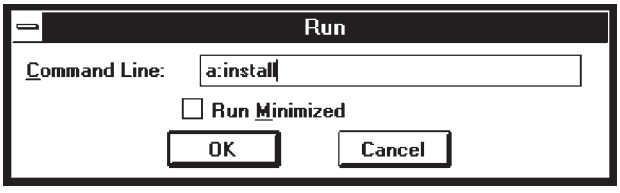
The Front Panel Emulation software is supplied on a 3.5-inch, 1.44 MB, double-sided, high-density, write-protected diskette, with 15 sectors per track, 80 tracks per side, and 96 tracks per inch.

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.

▶ Procedure

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

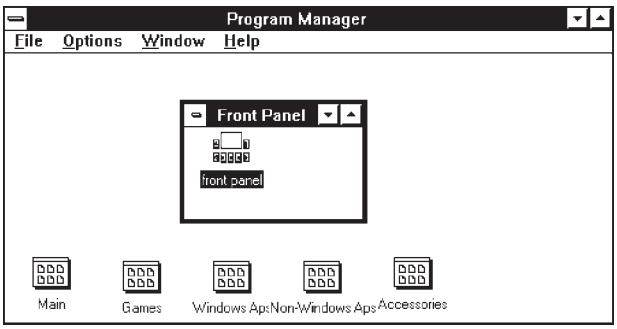
If the DSU/CSU selected is not locally attached to the PC, you must first dial to the remote DSU/CSU before starting front panel emulation. The modem attached to the PC must support AT commands for the Front Panel Emulation software to successfully place the call.

▶ Procedure

To start front panel emulation:

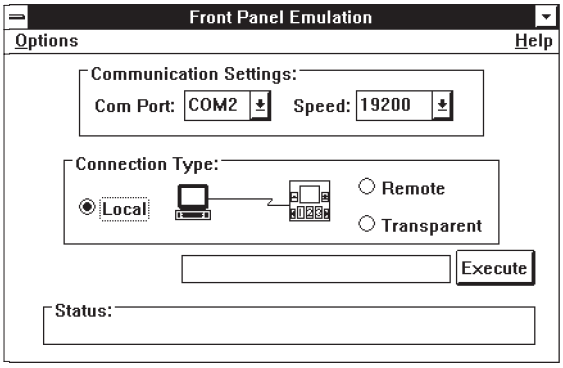
1. From the PC, open Program Manager from Windows.

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*).

Asynchronous Terminal Interface Operation G

Overview

You can configure and manage the DSU/CSU from an asynchronous 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 Asynchronous Terminal Interface (ATI) 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 Asynchronous Terminal Interface

You can connect the asynchronous 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 ATI, you may use the DSU/CSU's front panel to set certain configuration options for asynchronous terminal operation. Use the Configuration (Cnfig) branch of the front panel menu and edit the User Interface (User) configuration options for asynchronous terminal operation. Refer to the *Changing Configuration Options* section in Chapter 3, *Operation*, and Appendix C, *Configuration Options*.

To connect a terminal to the DSU/CSU using Telnet access, refer to the *Configuring the DSU/CSU for Telnet Access* section in Chapter 3, *Operation.*

Restoring ATI Access

If the DSU/CSU is misconfigured, leaving it in a state that does not support asynchronous 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 asynchronous 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 ATI 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 G-1 shows the Main Menu screen for the 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 G-12.)

To move between the Screen area and the Screen Function Keys area (Figure G-1), press Ctrl-a (control key and a).

From the Screen area, you may select the **Status, Test, Configuration**, or **Control** branches.

Ending an ATI Session

To end the ATI session from any screen, press Ctrl-a to move from the Screen area to the Screen Function Keys area (Figure G-1), and then select Exit.

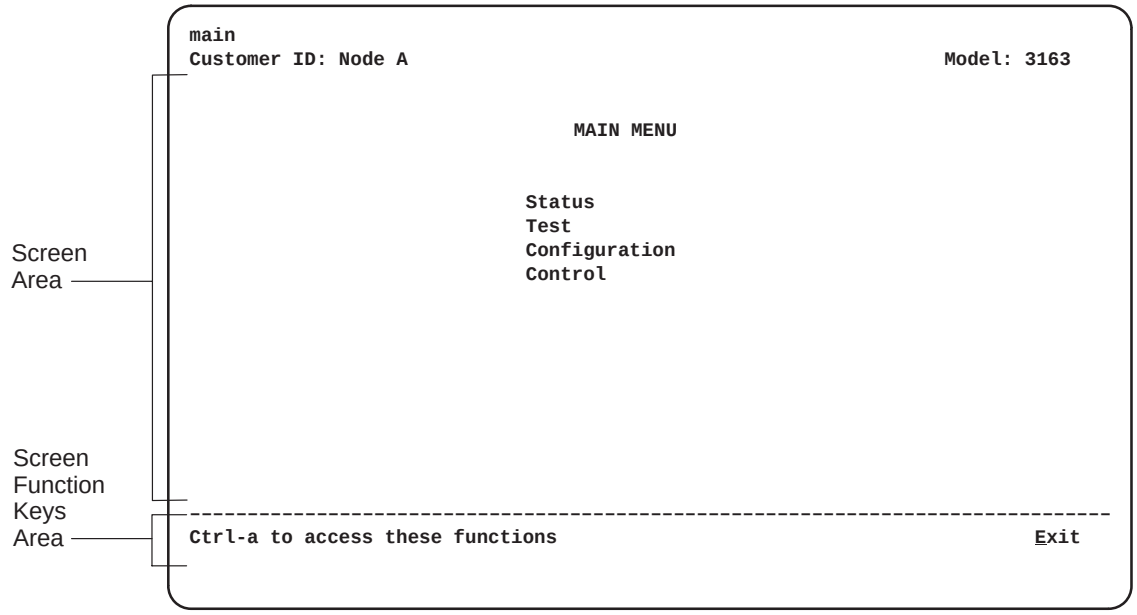


Figure G-1. Main Menu Screen

Menu Organization

ATI 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 G-2 shows the organization of the ATI menu tree.

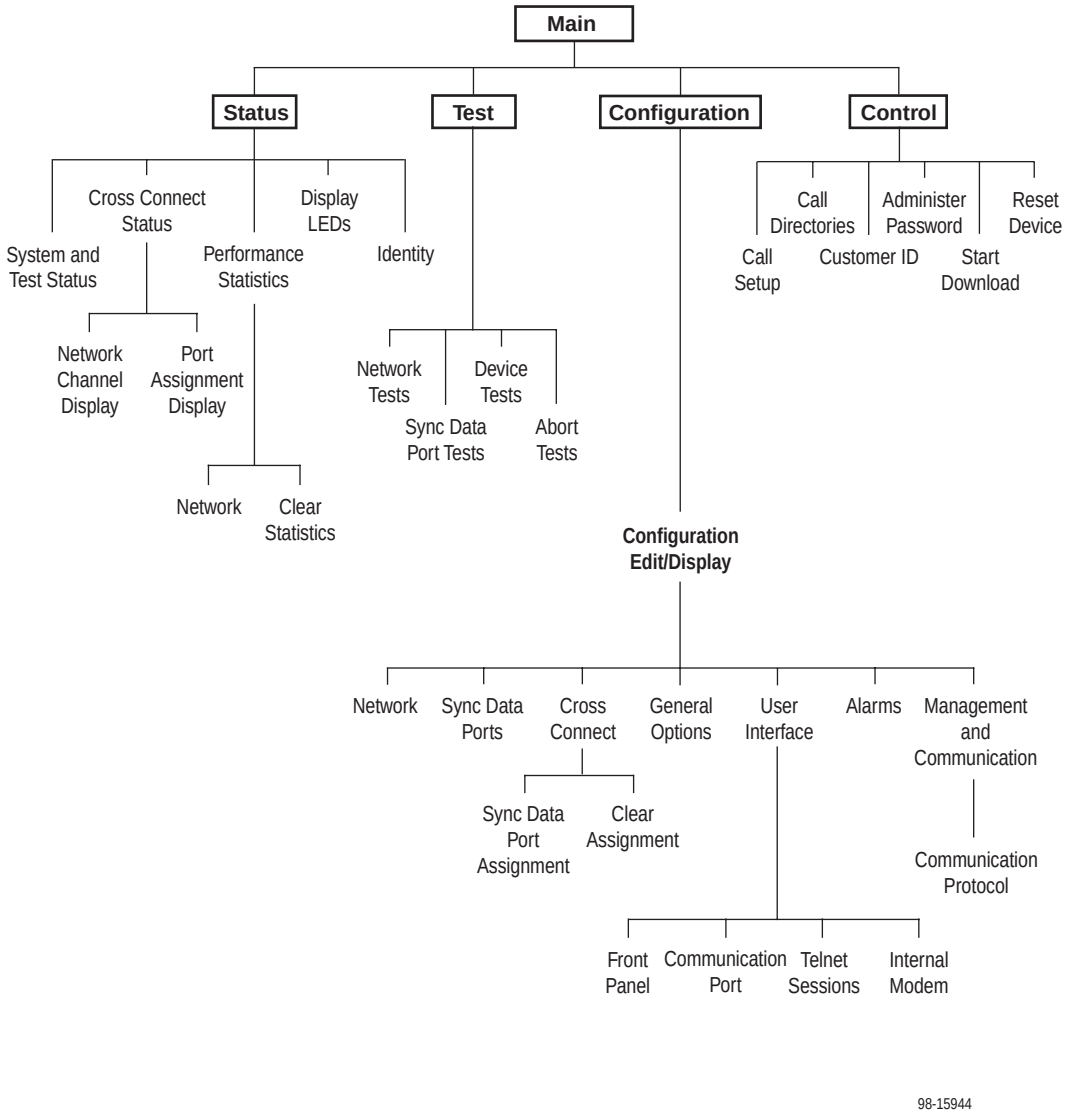


Figure G-2. Menu Organization

Using ATI Screens

There are three types of ATI 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 G-1) or keyboard keys (Table G-2).
- Display screens show the results from a data collection operation or they display device-specific information.

The ATI 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 G-1
Screen Function Keys

Screen Function Key	Usage
M (MainMenu)	Returns to the Main Menu screen.
E (Exit)	Terminates the ATI 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 G-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 ATI for DSU/CSU control.

Setting Customer Identification

The customer identification is used to uniquely identify the DSU/CSU.

▶ Procedure

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 G-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.

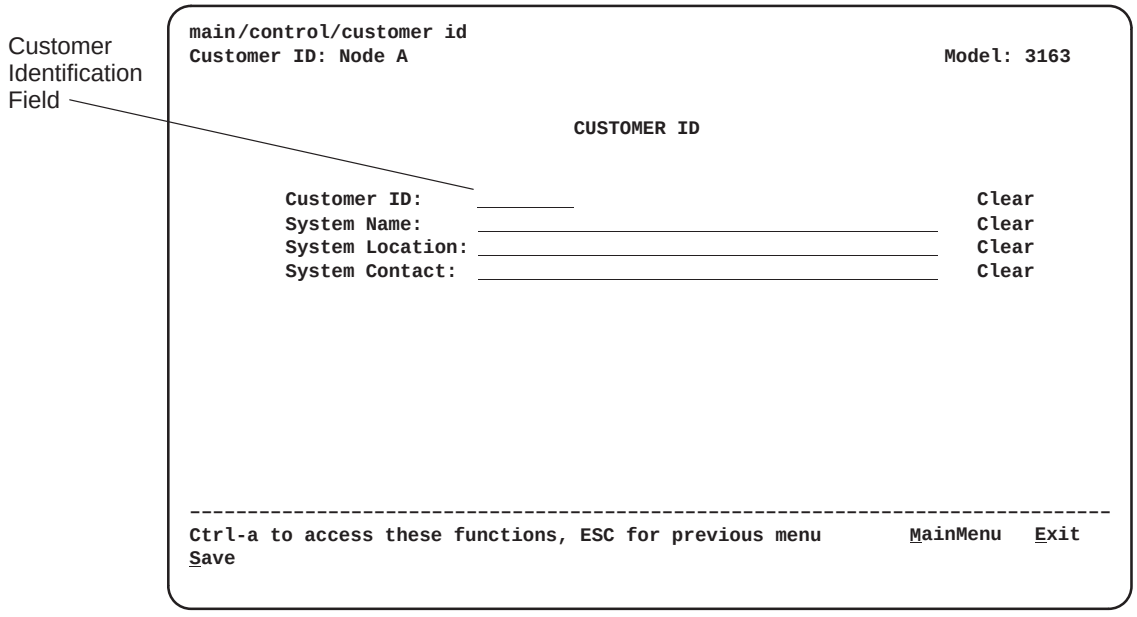


Figure G-3. Customer Identification Screen

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.

▶ Procedure

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 G-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: 3163


                              DISPLAY LEDs

                        GENERAL      NETWORK      PORT 1

                        OK           Sig          DTR
                        Fail         OOF          TXD
                        Test         Alm          RXD
                                     EER          CTS
                                                  RTS









--------------------------------------------------------------------------------
Ctrl-a to access these functions, ESC for previous menu       MainMenu   Exit
Refresh
```

Figure G-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

▶ Procedure

To display or edit configuration options:

1. From the Main Menu screen, select Configuration.

   The Load Configuration From screen appears (Figure G-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: 3163


                          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 G-5. Configuration Load Screen

After selecting the set of configuration options to load, the Configuration Edit/Display screen appears (Figure G-6).

3. Select a functional group to display or edit.

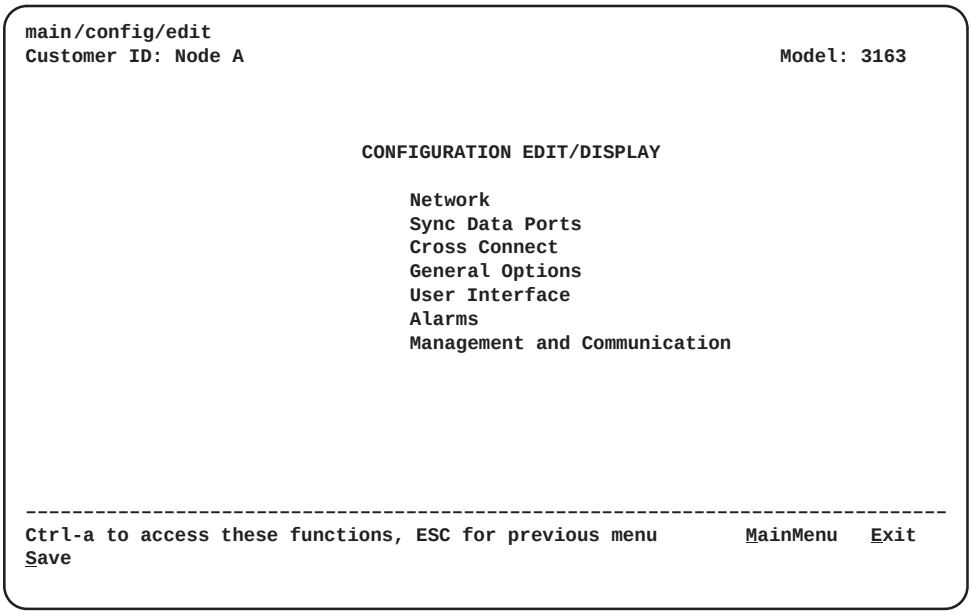


Figure G-6. Configuration Edit/Display Screen

Saving Edit Changes

▶ Procedure

To save edit changes:

1. From the last edit screen, select Save.

   The Save Configuration To screen appears (Figure G-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.

```
main/config/save
Customer ID: Node A                                          Model: 3163


                          SAVE CONFIGURATION TO:

                          Current Configuration
                          Customer Configuration 1
                          Customer Configuration 2









--------------------------------------------------------------------------------
Ctrl-a to access these functions, ESC for previous menu       MainMenu   Exit
```

Figure G-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.

▶ Procedure

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 G-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*.

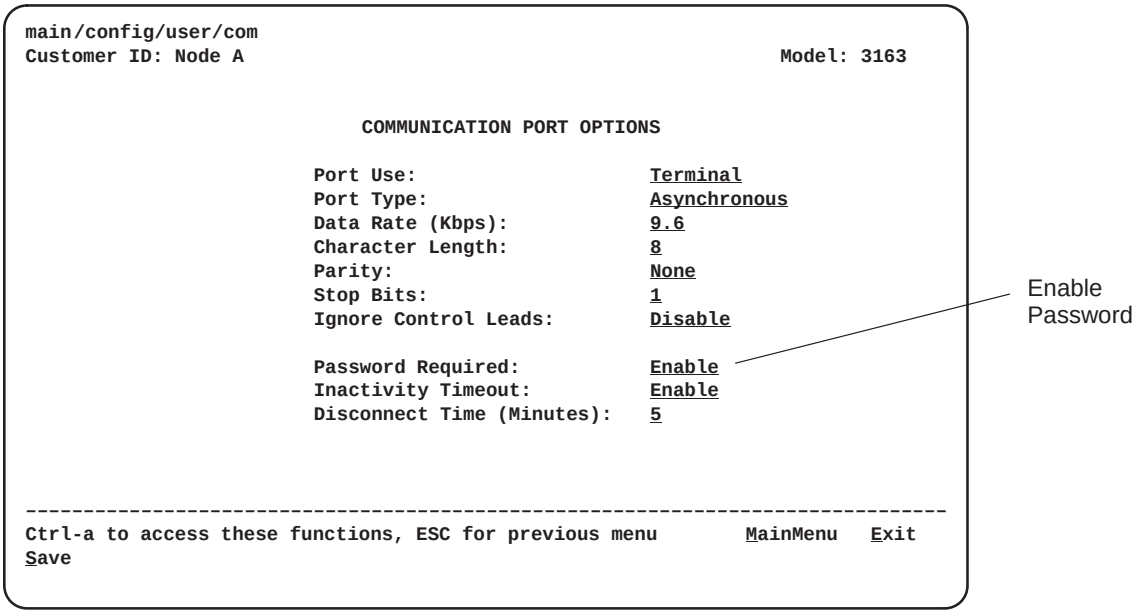


Figure G-8. Enabling a Password

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.

▶ Procedure

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 G-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.

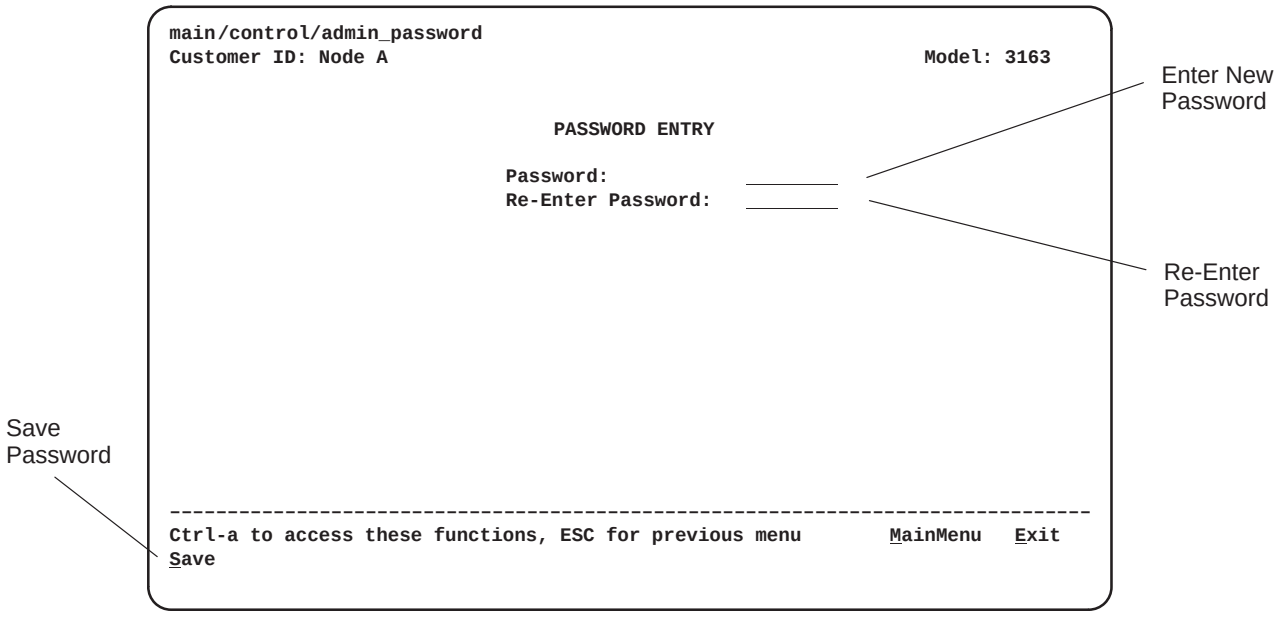


Figure G-9. Setting a Password

Entering a Password to Gain Access

When access security is required, the Login screen (Figure G-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, and dial-in connections are disconnected.

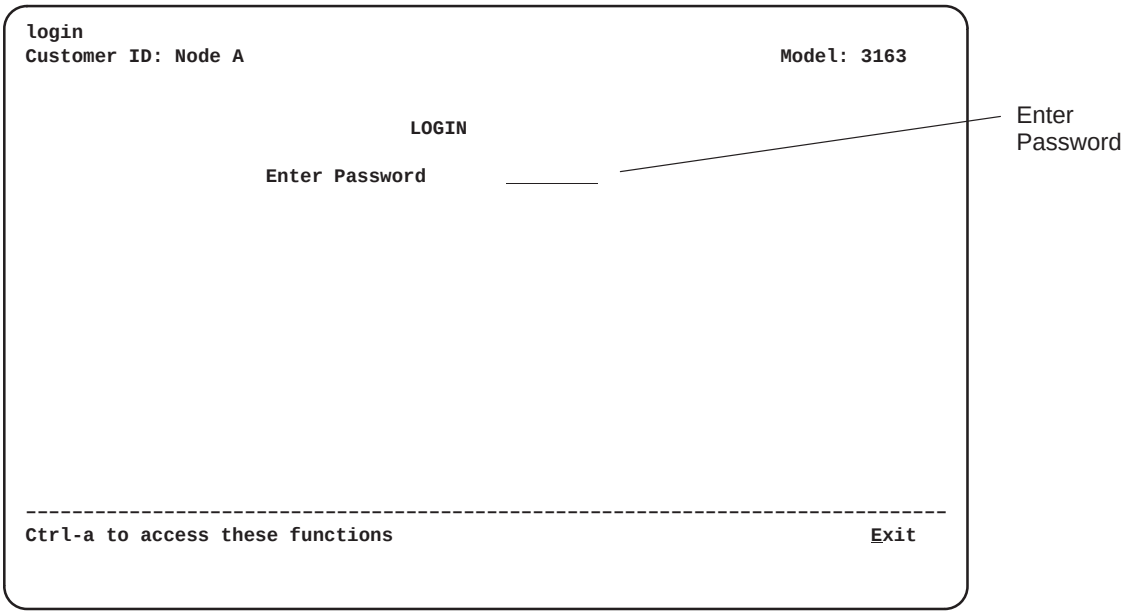


Figure G-10. Entering a Password

Configuration Worksheets for the ATI

This section contains one set of blank worksheets to be used when configuring your DSU/CSU using the ATI. 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

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**, 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**

Alarm Options	Front Panel Equivalent	**Value** (Default in **Bold**)
ASCII Alarm Messages	Alrm Msg	**Disable**, Com Port
Alarm Dial-Out	DialOut	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, FDL
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

Equipment List H

Equipment	Feature Number
Model 3163 DSU/CSU	3163-J2-310
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
Front Panel Emulation Software	3100-C1-010
EIA-530-A-to-RS449/422 Adapter	3100-F1-580
EIA-530-A-to-V.35 Adapter	3100-F1-570
EIA-530-A-to-X.21 Adapter	3100-F1-571
Wall-Mount/Rack-Mount Adapter	3100-F1-400

Glossary

1in8 Test A test pattern consisting of a one (1) followed by seven zeros (on the network only).

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.

ACAMI Alternate Channel Alternate Mark Inversion. A T1 line coding technique.

ACCULINK A product family and a registered trademark of Paradyne.

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.

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 continue transmission continuity and to indicate to the receiving terminal that a transmission fault exists at either the transmitting terminal or upstream of the transmitting signal. Sometimes referred to as Blue Alarm.

alarm An abnormal condition affecting modems, multiplexers, and data services units, usually requiring attention. Major alarms indicate a service disruption; minor alarms are less severe, but are indications of a developing problem.

AMI Alternate Mark Inversion. A line coding technique used to accommodate the ones density requirements of E1 or T1 lines.

ANSI American National Standards Institute. A member of ISO, ANSI accredits and implements standards.

application The use to which a device is put.

ASCII American Standard Code for Information Interchange. The standard for data transmission over telephone lines. A 7-bit code establishes compatibility between data services. The ASCII code consists of 32 control characters (nondisplayed) and 96 displayed characters.

ASCII terminal/printer A device that can be attached, either locally or remotely, to a DSU/CSU to display or print alarm messages.

asynchronous data Data that is formatted so it 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.

AWG American Wire Gauge. An indication of wire size. The heavier the gauge, the lower the AWG number, and the lower the impedance.

bandwidth The range of frequencies that can be passed by a transmission medium, or the range of electrical frequencies a device is capable of handling.

BES	Bursty Error Seconds. A second in which more than one, but less than 320 CRC6 error events have occurred.
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).
block allocation method	A method of allocating digital signal level 0 (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 sequence of successive bits (usually eight) handled as a unit in data transmission.
B8ZS	Bipolar 8 Zero Substitution. Encoding scheme for transmitting clear channel signals over a T1 line.
CD	Carrier Detect. The received line signal detector. V.24 circuit 109.
channel	A bidirectional DS0, voice, or data path, for electrical transmission between two or more points. Also called a circuit, line, link, path, or facility.
channel allocation	Assigning specific DS0 channels in the device to specific interfaces (Network, DTE Drop/Insert, etc.).
CHAP	Challenge Handshake Authentication Protocol. A security technique that allows a user password to be encrypted for transmission.
character	A letter, figure, number, punctuation, or other symbol.
client	A device that receives a specific service, such as database management, from a server.
COM port	Communications port. A computer's serial communications port used to transmit to and receive data from a modem. The modem connects directly to this port.
COMSPHERE	A proprietary product family name and a registered trademark of Paradyne.
configuration	The arrangement of a system or network as defined by the characteristics of its functional units.
configuration option	Device software that sets 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. A device that connects service user equipment or a DSU to the local digital telephone loop.
CTS	Clear To Send. A signal indicating that the device is ready for the DTE to transmit data. Usually occurs in response to Request To Send (RTS).
D4	The transmission standard that specifies 12 frames as a superframe that is used for frame synchronization and to locate signaling bits.
data port	The electrical interface between the device 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 Communications Equipment. The equipment that provides the functions required to establish, maintain, and end a connection. It also provides the signal conversion required 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 factory-preset value that is assumed to be correct unless changed by the user.

digital signal A signal composed of only two discrete values, representing the binary digits 0 and 1.

download A process that transfers device firmware and software from a locally-attached PC to a device, or allows the duplication of firmware and software from a local device to a remote device.

DSR Data Set Ready. A signal from the modem to the DTE that indicates the modem is turned ON and connected to the DTE.

DSU Data Service Unit. Data communications equipment that provides timing, signal regeneration, and an interface to data terminal equipment. A subrate DSU/CSU is normally referred to as a DSU.

DSU/CSU Data Service Unit/Channel Service Unit. A device that combines the functions of a DSU and a CSU. It connects Data Terminal Equipment to the digital network, protects the line from damage, and regenerates the signal.

DS0 Digital signal level 0 (zero). A 64 kbps digital telecommunications signal or channel.

DS0 channel allocation Assigning specific DS0 channels in the E1 NTU to specific interfaces (HDSL Network, G.703 DTE, etc.).

DS1 Digital signal level 1 (one). A digital signal transmitted at the rate of 1.544 Mbps in North America.

DSX-1 Digital Signal Cross Connect level 1. An interconnection point for terminals, multiplexers and transmission facilities.

DTE Data Terminal Equipment. The equipment, such as a computer or terminal, that provides data in the form of digital signals for transmission.

DTLB Data Terminal Loopback. Loopback mode that loops the data for a particular synchronous data port back to the port just before it is combined with the rest of the T1 data stream.

DTMF Dual-Tone Multi-Frequency. A signaling method using two voice frequencies to designate the tones used for touch-tone dialing, as distinguished from pulse dialing.

DTR Data Terminal Ready. A signal from the DTE to the modem, sent via Pin 20 of the EIA-232 interface (V.24 circuit 108/1, /2), that indicates the DTE is turned ON and connected to the modem.

EER Excessive Error Rate. An error rate that is greater than the threshold that has been configured in the device.

EIA Electronic Industries Association. This organization provides standards for the data communications industry to ensure uniformity of interface between DTEs and DCEs.

EIA-530-A An Electronic Industries Association standard for a high-speed, 25-position, DCE/DTE interface.

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. A second with one or more ESF error events (one or more CRC6 error events or OOFs).

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.

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. The Board of Commissioners that regulates all electrical communications that originate in the United States.
FDL	Facility Data Link. The selected framing bits in the ESF format used 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 high-speed connection-oriented packet switching WAN protocol using variable-length frames.
framing	A technique that separates bits into identifiable groups.
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 attached to a network that shares its information and devices with the rest of the network.
Hz	Hertz. A unit of frequency that equals one cycle per second.
ICMP	Internet Control Management Protocol. Internet protocol that allows for the generation of error messages, tests packets, and information messages related to IP.
interface	A shared boundary between functional units.
Internet	The worldwide internetwork, which predominantly uses the TCP/IP protocol.
internetwork	An interconnected collection of networks (also called an internet).
IP address	Internet Protocol address. The address assigned to an internet host.
ISO	International Standards Organization.
ITU	International Telecommunications Union. The telecommunications agency of the United Nations, established to provide standardized communications procedures and practices. Before March 1993 it was called CCITT.
kbps	Kilobits per second. One kilobit is usually taken to be 1,024 bits.
LAN	Local Area Network. A privately owned and administered data communications network limited to a small geographic area.
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. Thin glass plates containing liquid crystal material. When voltage is applied, the amount of light able to pass through the glass plates is altered so that messages can be displayed.
LCP	Link Control Protocol.
LED	Light Emitting Diode. A light or status indicator that glows in response to the presence of a certain condition (e.g., an alarm).
link	The physical connection between one location and another used for data transmission.
link layer protocol	The protocol that regulates the communication between two network nodes.
LLB	Line Loopback. A test in which the received signal on the network interface is looped back to the network without change.

LOF Loss of Frame. Occurs when a DS1 terminal is unable to synchronize on the DS1 signal for some interval.

LOFC Loss Of Frame Count. The number of LOFs declared.

loopback A diagnostic procedure that sends a test message back to its origination point. Used to test various portions of a data link in order to isolate an equipment or data line problem.

LOS Loss of Signal. The T1 line condition where there are no pulses.

LQR Link Quality Reports.

MB Megabyte or megabytes. A unit of memory measurement equal to approximately one million bytes (typically 1,048,576 bytes).

Mbps Megabits per second. One megabit is 1,048,576 (1024^2) bits.

menu tree The structure containing the menu hierarchy starting at a Top-Level menu and extending down to various device functions.

module A compact assembly functioning as a component in a larger system or unit.

MRU Maximum Request Unit.

multiplexing A method for interleaving several access channels onto a single circuit for transmission over the network.

network A configuration of data processing devices used for information exchange.

NMS Network Management System. A computer system used for monitoring and controlling network devices.

node A connection or switching point on the network.

OOF Out Of Frame. An error condition in which frame synchronization bits are in error.

PAP Password Authentication Protocol. A security technique that requires a user password for access to a system.

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 dial network.

PC Personal Computer.

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.

PLB Payload Loopback. Loopback mode that loops the information received on the T1 network interface back to the network after it has passed through receive and transmit framing section.

port An access point for data entry or exit.

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, as specified by Internet RFC 1661.

PRBS Pseudo-Random Bit Sequence. A test pattern containing any possible combination of digital ones and zeros for a given string length.

PRM Performance Report Messages. Messages indicating the current state of a T1 line as specified by ANSI-T1-403.

protocol A set of rules that determines the behavior of devices in achieving and maintaining communication.

PSTN Public Switched Telephone Network. A network shared among many users who can use telephones to establish connections between two points. Also known as dial network.

pulse density	A measure of the number of ones (marks, pulses) in relation to the total number of bits transmitted.
QRSS	Quasi-Random Signal. 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.
reset	An initialization of the device that occurs at power-up or in response to a reset command.
RFC	Request for Comments. One of the documents published by the Internet Engineering Task Force that describe Internet protocols and policies.
RIP	Routing Information Protocol. A protocol for exchanging routing information.
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 device.
router	A device that connects LANs by dynamically routing data according to destination and available routes.
RS-232	An Electronic Industries Association's standard for a low-speed, 25-position, DCE/DTE interface.
RS-449	An Electronic Industries Association's standard for a general-purpose, 37-position, DCE/DTE interface.
RTS	Request to Send. A signal from the DTE to the device, indicating that the DTE has data to send. V.24 circuit 105.
RX	Receive. To obtain transmitted signals.
RXC	Receive Clock. V.24 circuit 115.
RXD	Received Data. Pin 3 of the EIA-232 interface that is used by the DTE to receive data from the modem. Conversely, the modem uses Pin 3 to transmit data to the DTE.
SDCP	Shared Diagnostic Control Panel. A feature that allows carrier-mounted devices to share the same diagnostic control panel. Installed into one COMSPHERE 3000 Series Carrier, it controls and monitors the devices in all the carriers in the cabinet. A single SDCP can control up to 8 carriers, with a total of 128 devices.
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. Usually defined as a second during which a specific number of CRC errors was exceeded, or an OOF or other critical error occurred.
subnet	A portion of a network, which may be a physically independent network segment, that shares a network address with other portions of the network and is distinguished by a subnet number. A subnet is to a network what a network is to an internet.
subnet mask	A number that identifies the subnet portion of a network address. The subnet mask is a 32-bit Internet address written in dotted-decimal notation with all the 1s in the network and subnet portions of the 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 suite in the worldwide Internet, TCP allows a process on one machine to send data to a process on another machine using the IP. TCP can be used as a full-duplex or one-way simplex connection.
Telnet	Virtual terminal protocol in the Internet suite of protocols. Allows the user of one host computer to log into a remote host computer and interact as a normal terminal user for that host.

time slot One of the ways in which bandwidth can be specified for multiplexer channel groups. Time slots are specified by any number from one to twenty-four, with each time slot equal to 64 kbps.

TX Transmit. To send signals from a device.

TXC Transmit Clock. V.24 circuit 114.

TXD Transmit Data. Pin 2 of the EIA-232 interface that is used by the DTE to transmit data to the modem. Conversely, the modem uses Pin 2 to receive data from the DTE.

T1 A term for a digital carrier facility used to transmit a DS1 formatted digital signal at 1.544 Mbps. It is used primarily in North America.

UAS Unavailable Seconds. A count of one-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.

VF Voice Frequency. The part of the audio frequency range used to transmit voice sound (usually 300 Hz to 3400 Hz). This band is used by the modem for its modulated signal.

V.24 An ITU-T standard for a low-speed, 25-position, DCE/DTE interface.

V.35 An ITU-T standard for a high-speed, 34-position, DCE/DTE interface.

V.54 An ITU-T standard for local and remote diagnostic loopback tests.

V.54 Loop 2 An ITU-T standard for a data channel loopback (DCLB).

V.54 Loop 3 An ITU-T standard for a data terminal loopback (DTLB).

WAN Wide Area Network. A network that spans a large geographic area.

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.

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